



## **Redesign of Noble’s Curriculum and Assessment Program to the New Common Core-Aligned P/SAT Assessments**

### **Final Report**

In the summer of 2016, Noble submitted a proposal to Lumicore for support to address a major shift in state-mandated assessment systems. We are so thankful to Lumicore for the \$75,000 grant to Noble that funded resources to realign our formerly ACT-based Curriculum and Assessment Program (CAP) with the SAT for the 2017-2018 school year. This report recaps the progress made and results achieved over the past year to successfully prepare Noble for this transition.

#### **The Problem**

In its original form, the CAP was built on the college-ready standards of the ACT. This internal program provided Noble a platform on which to assess students, share best instructional practices, and drive academic results. It was widely shared beyond Noble’s walls with almost 150 organizations across the nation who used Noble’s CAP for the basis of their own models. The transition by the State to the SAT meant that Noble needed to quickly and effectively transition our largest, network-wide academic program in a way that minimized disruption at our 17 campuses while providing instructors with a new portfolio of resources tailored to the common core standards of the SAT.

#### **Progress on Goals and Outcomes**

The goal of this project was to redesign Noble’s CAP with the common core-based standards of the SAT to provide Noble campuses with an assessment system and related tools aligned to the rigors of common core and the mission-aligned college entrance exam of the SAT. We set two timely outcomes for this project that needed to be achieved for successful program implementation across Noble’s 17 campuses. These outcomes and the corresponding timeline of activities are listed below along with the status of each.

#### **Project Outcomes:**

1. The Hedgehog effectively creates a full set of SAT-aligned assessments and related instructional tools during the summer of 2017 in time for implementation at the start of the school year in August 2017.  
*Status: Completed in the summer of 2017 to make SAT-aligned assessments available for introduction to staff during training in August 2017.*
2. Noble effectively implements this new CAP across our network of 17 schools, which involves the quarterly administration of interim assessments, followed by quarterly network PD sessions for all Noble instructors.  
*Status: Implementation underway for the 2017-2018 school year*

In our proposal, Noble provided a timeline of activities that would set us up to successfully achieve our goal. Given the crucial nature of this work as the driving force behind our assessment and instructional systems, Noble’s Chief Academic Officer and Director of Academics worked to ensure that Noble met each milestone and tracked closely to the schedule we proposed.

*September 2016* – Launch a Task Force composed of instructional leaders and teachers under the leadership of Noble’s Chief Academic Officer to gain a thorough understanding of the nuances of the PSAT and SAT exams.

*Status: The Task Force was comprised of 20 instructional leaders from 12 Noble campuses, representing all core content areas. They began convening in September 2016 to gain a deeper understanding of the SAT.*

*October 2016* – Students in grades 9 through 11 at 10 Noble campuses will participate in official PSAT administration. Their experience and data will impact decisions around assessment design, establishing benchmark data and organizational goal setting for the following year.

*Status: Eleven Noble campuses elected to administer the PSAT to over 5,200 students to give these students additional exposure and familiarity with the exam. Noble learned valuable lessons from this administration, which also gave our organization a starting point to benchmark SAT growth as a test case for the coming school year.*

*September 2016 – June 2017* – The Task Force will conduct a literature and practice test reviews, participate in SAT training sessions, attend conferences, analyze pilot data and visit other charter management organizations doing this work to gather a comprehensive set of findings that will inform the work of assessment creation. Noble will also hire independent writers to create original SAT-aligned passages that will be integrated into the SAT-aligned interim assessments the following summer (using original pieces of work in the assessment design will help Noble in the long run avoid any copyright issues and, thus, continue to share openly with other organizations).

*Status: This activity is complete. The Task Force explored the SAT through a variety of means to inform Noble’s understanding of the exam. Some of their findings were incorporated into resources like the FAQ, which is included as an addendum to this report.*

*March/April 2017* – Students at the pilot campuses will take the PSAT/SAT to provide a year-end benchmark for academic growth over the 2016 – 2017 school year.

*Status: Students took the PSAT/SAT in April at all Noble campuses to benchmark growth for the year. This provided a good sense of how our students’ abilities would be measured and graded on the SAT, which allowed us to set more targeted performance goals for the 2017-2018 school year.*

*July 2017* – Noble’s “Hedgehog” team will spend the month developing a set of academic pacing plans, interim assessments and customized professional development sessions based on the findings of the previous year.

*Status: Complete. Pacing plans, assessments, and PD content were created for all grades across all key content areas in July for use in the upcoming school year. Examples of this content have been included in the addendum following the report.*

*October - March 2017 – Noble implements its newly created interim assessment system: a pacing plan-based, quarterly formative assessment, capped with a guided analysis process and collaborative Network-wide Professional development day.*

*Status: Underway. The SAT-aligned interim assessment system was launched for the current school year. The first interim assessment will take place on October 13<sup>th</sup>, followed by a Network-wide PD the week after.*

*March/April 2018 – 11<sup>th</sup> grade students take the official SAT exam along with their peers across the district and state.*

*Status: SAT scheduled for April 2018.*

*June 2018 and beyond – Noble codifies findings from the first year of SAT and aligned interim assessment implementation. Noble packages and openly shares tools with any interested school partners so they can benefit from Noble’s transition plan from the ACT to the SAT.*

*Status: Scheduled as a crucial step for furthering the impact of our academic program in future years.*

#### **Additional Outcomes:**

Noble has begun sharing out early SAT-aligned CAP materials with a few close sharing partners in Chicago who are also working through the transition. These earliest recipients include Intrinsic, Perspectives, and Uplift – all charter organizations in Chicago. After a year of implementation and adjustments to account for lessons learned in school year 2017-2018, we will be packaging our SAT-aligned system to share more widely with other sharing partners across the nation.

#### **Budget**

Noble adhered to the proposed budget closely, spent the funds completely, and did not encounter any major issues that could have impacted the budget or our progress on project outcomes. This was due largely to our past experience creating, continually improving, and implementing the CAP annually. Overall, Noble’s decade ACT-aligned CAP administration provided a great template that guided our transition to an SAT-aligned assessment system. However the project’s continued success was also dependent on the State of Illinois finally passing a budget for the current fiscal year, which then gave Chicago Public Schools funding to do likewise for school year 2017-2018.

Funding from the Lumicore grant supported the vast majority of the work that happened in year one of the transition project. The remaining expenses for year one were covered by another grant from Charter School Growth Fund, that will also fund project expenses in year two.

## **Addendums**

Noble has included three items created through this project that provide examples of our work and the desired outputs. These documents are samples of the types of resources that will be available to Noble's sharing partners after we further refine the CAP in the summer of 2018 to reflect lessons learned from the 2017-2018 school year. Included in this addendum are the following:

1. An FAQ document that provides an overview of the SAT, how it differs from the ACT, and other Noble-specific content such as testing and professional development timelines for the current school year.
2. 9<sup>th</sup> Grade quarter 1 Interim Assessment
3. Pacing plans for writing and language content across all quarters for grades 9 through 11.



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## Noble Assessments SY 2017-18 FAQ

### What are the standards we're aligning to?

Starting in the 2017-2018 school year, Noble will transition from aligning to ACT's CCRS and will align to the SAT's "Domains and Dimensions." While the state transitioned to the SAT as its accountability measure this school year, Noble decided to wait a year and learn more about the P/SAT suite of assessments. In this year, we learned a great deal and discussed the structure of the new interim assessments with teachers, Deans of Instruction, and principals. We used a structure called the Assessment Working Group to have these discussions and debates. The Assessment Working Group met monthly and was comprised of interested teachers and Deans of Instruction. After months of debate and thought, the Assessment Working Group prosed that the SAT Domains and Dimensions were the best and most appropriate standards for English, math and reading classes to align to. These Domains and Dimensions are aligned to the Common Core State Standards. While English, math, and reading classes can seamlessly align to the Domains and Dimensions, there is no specific set of science standards for the P/SAT. The Assessment Working Group, in conjunction with many campus science departments, concluded that science teachers will align their content to the Next Generation Science Standards (NGSS) in addition to aligning to some "science-based" reading, English, and math Domains and Dimensions by grade level.

### What is the structure of the P/SAT?

	PSAT 8/9	PSAT 10 and PSAT/NMSQT	SAT
Time	2 hours and 25 minutes	2 hours and 45 minutes	3 hours (50 minutes for optional essay)
Sections	<ul style="list-style-type: none"> <li>Evidence-Based Reading and Writing</li> <li>Math</li> </ul>	<ul style="list-style-type: none"> <li>Evidence-Based Reading and Writing</li> <li>Math</li> </ul>	<ul style="list-style-type: none"> <li>Evidence-Based Reading and Writing</li> <li>Math</li> <li>Essay (optional)</li> </ul>
Total Scores with Scale Ranges (Rights-Only Scoring)	240 – 1440	320 – 1520	400 - 1600
Tests	<ul style="list-style-type: none"> <li>Reading (55 min/42 Q)</li> <li>Writing and Language (30 min/40 Q)</li> <li>Math (60 min/ 31 MC &amp; 7 grid-in)</li> </ul>	<ul style="list-style-type: none"> <li>Reading (60 min/47 Q)</li> <li>Writing and Language (35 min/44 Q)</li> <li>Math (70 min/ 40 MC &amp; 8 grid-in)</li> </ul>	<ul style="list-style-type: none"> <li>Reading (65 min/52 Q)</li> <li>Writing and Language (35 min/44 Q)</li> <li>Math (80 min/ 46 MC &amp; 12 grid-in)</li> <li>Essay (50 min/ 1 text-based prompt)</li> </ul>

Noble will transition to the P/SAT suite of assessments this school year for all grades 9 - 11. The P/SAT assessments are broken down into two sections: Evidence-Based Reading & Writing and Math. The Evidence-Based Reading & Writing section includes a reading test and a writing and language test. The Math section includes non-calculator and calculator sections with multiple choice and student produced

responses. There is no specific science section on the P/SAT, but some Domains and Dimensions are considered “science-based” reading, English or math standards.

Due to the developmentally appropriate nature of the SAT suite of assessments, 9<sup>th</sup> grade interims will be the length of the PSAT 8/9; 10<sup>th</sup> grade interims will be the length of the PSAT 10; and 11<sup>th</sup> grade interims will be the length of SAT but created and tested by Academic Approach. Using Academic Approach for our 11<sup>th</sup> grade interims ensures we will have a scaled score for our 11<sup>th</sup> grade exams, but that we will also be able to use Khan Academy as a resource without test validity concerns. Interim assessments will continue to be for grades 9 – 11. English, math and reading teachers will continue to receive scores aligned to standards on these formative interim assessments and P/SAT-aligned scale scores on summative assessments (i.e. Pre/Mid/Post-tests). Science teachers will receive scores for the “science-based” reading, English, and math questions. The state-administered 11<sup>th</sup> grade post-SAT will be April 10 and CPS will administer the 9<sup>th</sup> and 10<sup>th</sup> grade post-PSAT (exact date is TBD).

**What assessments are we taking next year as a network?**

In addition to the P/SAT-related assessments, our first year biology students will continue to take the ISBE-required Illinois Science Assessment. If interested, campuses can opt into taking any national ACT or P/SAT test administrations of their choice.

**What will the pacing plans be aligned to and when will they be released?**

Pacing plans are scheduled to be released at EOY Network PD on June 19. Again, English, math and reading pacing plans will be aligned to the SAT Domains and Dimensions. Science pacing plans will be content-based and aligned to the NGSS as well as some SAT Domains and Dimensions that are the most frequently tagged for science questions.

**When will the interims be and when will they be available?**

Interim assessments will be available on the Hedgehog Wiki by July 15. The draft schedule for quarterly interims is as follows:

Assessment (Type)	Date
<b>Pre-P/SAT (Summative)</b> *mandatory for 9 <sup>th</sup> **optional for 10 <sup>th</sup> /11 <sup>th</sup>	<b>August</b>
<b>Interim Assessment (Formative)</b>	<b>October</b>
<b>Midyear P/SAT (Summative)</b>	<b>December</b>
<b>Interim Assessment (Formative)</b>	<b>February</b>
<b>Post-P/SAT (Summative)</b>	<b>April</b>
<b>Interim Assessment (Formative)</b> *mandatory for 9 <sup>th</sup> and 10 <sup>th</sup>	<b>June</b>

Noble will adopt a mid-year summative assessment to be administered across all campuses as a check in for 9<sup>th</sup> and 10<sup>th</sup> grade scaled scores. While a midyear assessment has not been run by the Academics Department in the past, since a significant amount of campuses found midyear data useful and important, we will now be supporting this administration. In addition, we will also adopt a mandatory formative assessment in June to maximize the instructional time after the P/SAT post-tests in April until

the end of the year. This formative assessment will allow teachers to measure the impact of their instruction in the last two months of school after the post-test. A suggested pacing plan will be provided for maximizing the instructional time between August and June.

### **What is the difference between formative and summative assessments?**

Formative assessments (as 9<sup>th</sup> and 10<sup>th</sup> grade interims have been in the past) are designed to test a specific set of standards as indicated in the quarterly pacing plans for 9<sup>th</sup> and 10<sup>th</sup> grades. These assessments will report a percentage correct rather than a scaled score since they test a set of focus standards. The purpose of these tests is strictly to help a teacher answer, “How effective were my curriculum and instructional choices on tackling the standards I taught?” and to provide that teacher actionable data for re-teaching. Students’ “overall scores” are less important than how teachers respond to the data. Summative assessments, in the form of released P/SATs, however, test a variety of unplanned standards and focus more on providing teachers with a benchmark scaled score. The 11<sup>th</sup> grade interims are generally summative in nature as they will be Academic Approach exams with scaled scores; however, we also aim to make them useful for instructional reflection by providing standard-based data.

### **What is the future of OERs and will essays be integrated into our interims?**

Although we value multiple forms of student assessment, at this point, there is no plan to reintroduce Open Ended Response Interim Assessments in their previous form. This school year, we plan to focus on creating high quality multiple choice interim assessments aligned to the P/SAT. In the future, there is room to re-open the discussion of how to incorporate essays into our interim assessments. At the network level, the essay will not be required on the 11<sup>th</sup> grade interims (administering the essay will be left up to campus discretion).

### **The college-ready score on ACT is a 21. What’s a “21” on the SAT?**

According to College Board’s conversion table, a 21 on the ACT is equivalent to an SAT score between 1060-1090. This conversion table first equates the ACT score to the old SAT scoring system (out of 2400) and then converts that score to the new SAT scoring system (out of 1600), so there is some variance in the concordance. In contrast to a composite score equivalency, College Board also notes the college-ready benchmark for each of its subject scores as a score of a 480 on the Evidence-Based Reading and Writing exam and a 530 on the Math exam.

### **Why is science different next year?**

After a year of reviewing, debating, and gathering information from content teachers and Deans of Instruction in the Assessment Working Group, the Assessment Working Group, Principals, and Academics Team, determined that the SAT Domains & Dimensions were not a sufficient guide for science instruction. As such, Hedgehog will provide both SAT and NGSS-based pacing plans for teachers to use to inform their curriculum. While there is no official science assessment supported at the network level for SY17-18, campuses are encouraged to set a vision for science instruction, experiment with assessments, and report findings back to each other and the Academics Team. We will continue the discussion of science assessment exploration at the Academic Working Group throughout next school year as campuses pilot science assessments.

### **What support is there for teachers in this transition to the SAT?**

Similar to under the ACT-based model, the Hedgehog team will produce a standards-based pacing plan to ensure teachers across Noble are asking the same questions at the same time around college skills mastery. Similarly, the Academics Team will utilize the Hedgehog team to build assessments and use our network data systems to regularly let teachers know the impact of their instructional and curricular

choices. We will continue to run collaboration days for teachers to work together around shared SAT puzzles, learn more about the SAT Domains and Dimensions, and revise the new P/SAT based interims. Also, as with our ACT-based model, campuses will continue to place their full coaching, PD funds, and time toward developing their teachers in the transition towards this new model.

**In addition to the SAT transition resources, what other supports might be available to teachers in the upcoming school year?**

**Curriculum Support:**

The Academics Team is introducing a new part-time Curriculum Supervisor role whose job it will be to reach out to teachers who have had historically high growth and stipend them for organizing and sharing their curriculum. Teachers who are content providers will curate their curriculum to share across the Network as a baseline that other teachers can use to fall back on. The main goal is to generate baseline curricula (in core subjects grades 9 – 11) for teachers to access throughout the school year as necessary. These content providers will not be creating a Network-wide Noble curriculum, but rather allow all core content teachers access to a quality optional baseline curriculum if needed/desired. Teachers who are content providers will also run rooms at Network Collaboration days to field questions about their curriculum and share best practices.



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## ACT Assessment Guidelines SY2017-18

Pre & Midyear P/SAT Test Pool "Do Not Touch List"	11 <sup>th</sup> Interim Assessments	Open Resource P/SATs
SAT Practice Test #2	11.1, 11.2, 11.3 Interims provided by Academic Approach – no soft copy booklets allowed	SAT Practice Test #1
PSAT/NMSQT Practice Test #1		SAT Practice Test #3
PSAT 8/9 Fall 2016		SAT Practice Test #4
PSAT 8/9 Fall 2017 (to be administered)		SAT Practice Test #5
		SAT Practice Test #6
		SAT Practice Test #7
		SAT Practice Test #8
		PSAT/NMSQT Practice Test #2

### GENERAL GUIDELINES:

- **Pre Forms:** Avoid seeking out and using any of the forms indicated above as Pre/Post for classroom use--this includes using them even as general guidelines for teacher-created practice questions, etc.. Once a test is administered as a Pre-test, however, it is considered an open resource for that academic year only (i.e. you can use it for an initial gap analysis with students in Q1, but please avoid using it for creating any future handouts, class assessments, etc. as we want to avoid accidental exposure for future administration).
- **11<sup>th</sup> Interim Assessments and 10<sup>th</sup> Midyear Form:** Our 11<sup>th</sup> grade interim forms and 10<sup>th</sup> grade midyear forms are created by Academic Approach and are copyrighted. They may not be photocopied, scanned as soft copies, or integrated into curricular resources.
- **Khan Academy:** All released forms of the P/SAT are able to be accessed on Khan Academy. For this reason, please note that students could be exposed to pre-test materials.
- **Open Resource Forms:** Please speak w/ your Principal or Dean of Instruction before using forms identified as available for Open Resource since campuses may have plans to use them in any number of capacities.
- **Special Education & Accommodations:** In general, students with multi-day accommodations should aim to finish their final day of assessment on the official testing date, ensuring that all students can be represented in the initial scoring and data reporting. Case Managers and special education teachers should always confirm with their testing coordinators around particular administration guidelines for every assessment.
- **Avoid Test Prep Mentality:** Keep in mind, research has shown that focusing on traditional "test prep"—drill & kill practice problems—has a negative impact on student achievement. The best way to maximize student performance on the SAT is to incorporate the Domains and Dimensions and rigor into the curriculum and instruction—maximize the amount of time students are creatively engaged in and applying skills-based thinking.



## **9.1 Interim Assessment 2017-18**

# Reading Test

55 MINUTES, 42 QUESTIONS

Turn to Section 1 of your answer sheet to answer the questions in this section.

## DIRECTIONS

Each passage or pair of passages below is followed by a number of questions. After reading each passage or pair, choose the best answer to each question based on what is stated or implied in the passage or passages and in any accompanying graphics (such as a table or graph).

### Questions 1-8 are based on the following passage.

The following passage is adapted from “The Faith Cure Man” by Paul Laurence Dunbar

Hope is tenacious. It goes on living and working when science has dealt it what should be its deathblow.

Line 5 In a room at the top of the old tenement house little Lucy lay wasting away with a relentless disease. The medical doctor had said at the beginning of the winter that she could not live. Now he said that he could do no more for her except to ease the few days that remained.

10 But Martha Benson would not believe him. She was confident that doctors were not infallible. Anyhow, this one wasn't, for she saw life and health ahead for her little one.

15 Hope grasps at a straw, and it was quite in keeping with the condition of Martha's mind that she should open her ears and her heart when they told her of the wonderful works of the faith-cure man. People had gone to him on crutches, and he had touched or rubbed them and they had come away whole. It was so easy for her to believe it all.

20 The only religion she had ever known, the wild, emotional religion of most of her race, put her credulity to stronger tests than that. Already she saw Lucy strong, and running about like a mouse,

25 the joy of her heart and the light of her eyes.

As soon as she could get time she went humbly to see the faith doctor, and laid her case before him.

30 “I will come to your child, madam,” said the faith curist, “I am not a physician. I do not claim to be.

I only claim to teach people how not to be sick. In this little bottle here I have an elixir which has never been known to fail in any of the things claimed for it. Since the world has got used to taking medicine we must make some concessions to its prejudices. But this in reality is not a medicine at all. It is only a symbol. It is really liquefied prayer and faith.”

35 Martha did not understand anything of what he was saying. She only felt a blind trust in him that filled her heart with unspeakable gladness. She seized the precious elixir and hurried away home to Lucy, to whom she was carrying life and strength. The little one made a weak attempt to smile at her mother, but the light flickered away and died into greyness on her face. “Now mammy's little gal gwine to git well fu' sho'.

40 Mammy done bring huh somep'n' good.” Awed and reverent, she tasted the wonderful elixir; it tasted like sweetened water to her, but she knew that it was not, and had no doubt of its virtues.

45 Lucy swallowed it as she swallowed everything her mother brought to her, and in the course of an hour her mother had persuaded herself that there was a perceptible brightening in her daughter's face.

50 Mrs. Mason, Martha's neighbor, inquired about Lucy, and the mother told her about the new faith doctor and his wonderful powers. Her neighbor listened in silence, but when she went back to her own room it was to shake her head and murmur: “Po' Marfy, she jes' ez blind ez a bat. She jes' go 'long, holdin' on to dat chile wid all huh might, an' I see death in Lucy's face now.”

65 But Martha needed no pity then. She was happy in her self-delusion. In the next two days

Martha saw, or thought she saw, a steady improvement in Lucy. When she went out on Saturday morning she promised to bring Lucy something good for Christmas. “I done brung my little lady bird huh somep’n nice,” said Martha, but Lucy did not answer. “You sleep?” Martha went over to the bed. The little face was pinched and ashen. The hands were cold.

“Lucy! Lucy!” called the mother. “Lucy! Oh, Gawd! It ain’t true! She ain’t daid! My little one, my las’ one!” She rushed for the elixir and brought it to the bed. The thin dead face stared back at her, unresponsive.

The next day was set apart for the funeral. The preacher read: “The Lord giveth and the Lord taketh away, blessed be the name of the Lord,” and someone said “Amen!” But Martha could not echo it in her heart. Lucy was her last, her one treasured lamb.

1

Which choice best describes a main theme of the passage?

- A) Faith and prayer must be combined with medical knowledge to achieve results.
- B) Desperate measures are taken when the pain of watching a loved one die is too great.
- C) Belief in a higher power can heal the sick and provide comfort to those mourning the sick.
- D) Alternative medicines provide hope where traditional medicine falls short.

2

Based on the passage, which choice most closely describes Martha’s perspective on medical doctors?

- A) Doctors are able to cure any disease if they try hard enough.
- B) Doctors can give incorrect diagnoses to patients.
- C) Doctors care more about the rich than the poor.
- D) Doctors need to work with religious leaders to cure people.

3

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 6-7 (“The medical...live”)
- B) Lines 10-11 (“She was...infallible”)
- C) Lines 29-31 (“I will...sick”)
- D) Lines 34-36 (“Since...prejudices”)

4

As used in line 36, “prejudices” most nearly means

- A) preferences.
- B) prejudgments.
- C) discriminations.
- D) harms.

5

As used in line 40, “blind trust” most strongly suggests that Martha

- A) is aware that she is unwilling to accept the decline of Lucy’s health and inevitable death.
- B) believes so unquestioningly in the faith cure man she requires no rationale for how he works.
- C) is hesitant to use the faith cure man’s elixir without further comprehending what it is made of.
- D) cannot see and fears that without the faith cure man’s elixir Lucy will suffer the same fate.

6

The narrator indicates that Martha Benson’s behavior throughout the passage was mainly caused by her

- A) wish to meet the faith cure man.
- B) determination to prove her neighbor wrong.
- C) desire to see her daughter healthy again.
- D) inability to afford traditional medicine.

7

At the end of the passage it can reasonably be inferred that Martha Benson

- A) has lost her faith in God with Lucy’s death.
- B) continues to use the elixir to keep Lucy alive.
- C) tells her neighbors not to trust the faith cure man.
- D) is grateful for the faith community comforting her.

8

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 77-78 (“She...bed”)
- B) Lines 81-82 (“The Lord...Lord”)
- C) Line 83 (“And...Amen”)
- D) Lines 83-84 (“But...heart”)

Questions 9-17 are based on the following passages.

Passage 1 is adapted from Olaudah Equiano, “The Middle Passage” c. 1780. Passage 2 is adapted from a speech given by Patrick Henry to the Second Virginia Convention in support of American independence from British rule on March 23, 1775.

### Passage 1

We were conducted immediately to the merchant’s yard, where we were all pent up together, like so many sheep in a fold, without regard to sex or age. As every object was new to me, everything I saw filled me with surprise.

We were not many days in the merchant’s custody before we were sold after their usual manner. On a signal given by the beating of a drum, the buyers rush at once into the yard where the slaves are confined and make choice of that parcel they like best. The noise and confusion with which this is attended, and the eagerness visible on the expressions of the buyers, serve not a little to increase the apprehension of terrified Africans, who considered these people to be the original source of their misery. In this manner, without scruple, are families and friends separated, most of them never to see each other again.

I remember, in the ship in which I was brought over, in the men’s apartment, there were several brothers. In the sale these brothers were sold in different lots. It was very moving on this occasion, to see and hear their cries at parting.

O, ye Christians in name only! Might not an African ask you — Learned you this from your God? Did He not say unto you, “Do unto all men as you would men should do unto you”? Is it not enough that we are torn from our country and friends, to toil for your luxury and lust of gain? Must every tender feeling be likewise sacrificed to your greed? Are the dearest friends and relations, now made more dear by their separation from their kindred, still to be parted from each other? Are they to be prevented from cheering the gloom of slavery, with the small comfort of being together, and mingling their sufferings and sorrows? Why are parents to lose their children, brothers their sisters, or husbands their wives? Surely, this is a new refinement in cruelty, for it has no advantage to atone for it. It merely serves to

Line  
5

10

15

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40

45 cause distress and add fresh horrors even to the  
wretchedness of slavery.

**Passage 2**

MR. PRESIDENT:

50 The question before the House is one of  
awful moment to this country. For my own  
part, I consider it as nothing less than a  
question of freedom or slavery. If we wish to  
be free, we must fight! I repeat it, sir, we must  
fight! An appeal to arms and to the God of  
Hosts is all that is left us!

55 They tell us, sir, that we are weak; unable  
to cope with so powerful a foe. But when shall  
we be stronger? Will it be the next week, or the  
next year? Sir, we are not weak if we make a  
proper use of those means which God hath  
placed in our power. Three millions of people,  
60 armed in the holy cause of liberty, are  
invincible by any force which our enemy can  
send against us. Besides, sir, we shall not fight  
our battles alone. There is a just God who  
presides over the destinies of nations; and who  
will raise up friends to fight our battles for us.  
65 The battle, sir, is not to the strong alone; it is to  
the vigilant, the active, the brave. There is no  
retreat but in submission and slavery! Our  
chains are forged! Their clanking may be heard  
on the plains of Boston! The war is inevitable  
70 and let it come! I repeat it, sir, let it come.

It is in vain, sir, to debate the matter.  
Gentlemen may cry, Peace, Peace, but there is  
no peace. The war is actually begun! The next  
75 gale that sweeps from the north will bring to  
our ears the clash of resounding arms! Our  
brethren are already in the field! Why stand we  
here idle? What is it that gentlemen wish?  
What would they have? Is life so dear, or peace  
80 so sweet, as to be purchased at the price of  
chains and slavery? Forbid it, Almighty God! I  
know not what course others may take; but as  
for me, give me liberty or give me death!

9

It is clear that Equiano believes that slave owners separate slave families to:

- A) be cruel and make slave life even worse than it already is.
- B) ensure there are not too many slaves on each farm.
- C) give slaves a fresh slate so they can start over in America.
- D) provide more individualized attention to each of their slaves.

10

As used in line 1, “conducted” most nearly means

- A) demeaned.
- B) transmitted.
- C) behaving.
- D) transported.

11

Equiano uses the phrase “O, ye Christians in name only!” (line 26) most likely to

- A) state that most slave owners were Christians during this time, while Africans were not.
- B) imply that slave owners call themselves Christians, but do not act like it.
- C) introduce the paragraph in which he questions Christian teachings as unfamiliar.
- D) denounces Christianity as the religion of American colonists and not of his country.

12

In Passage 2, Patrick Henry makes the claim that British rule over America is most similar to

- A) Freedom
- B) War
- C) Slavery
- D) God

13

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 47-48 (“The question...country”)
- B) Lines 49-50 (“I consider...slavery”)
- C) Lines 54-55 (“They...foe”)
- D) Lines 57-59 (“Sir...power”)

14

In Passage 2, Patrick Henry’s continuous use of rhetorical questions serves to

- A) convey that the need to fight for independence is immediate.
- B) draw the president’s attention to reasons for independence.
- C) highlight the uncertainties of fighting a war against Britain.
- D) support the points about independence he’s already made.

15

According to the last paragraph of Passage 2, Patrick Henry implies that he

- A) would rather die than be under control of Britain.
- B) believes life to be too precious to throw away.
- C) wants to be free, but he does not want to die.
- D) does not know whether slavery or death is worse.

16

On which of the following points would the authors of both passages most likely agree?

- A) Slavery is an unjust institution that must be stopped at all costs.
- B) Being a slave can be equated to weakness and Americans are not weak.
- C) When there is a system that allows some to control others’ lives, it is unfair.
- D) Everyone should stand up and fight against those who oppress them.

17

Which choice would best support the claim that the author of Passage 2 considers the “wretchedness of slavery” (lines 43-44, Passage 1)?

- A) Lines 54-55 (“They...foe”)
- B) Lines 67-69 (“There...forged”)
- C) Lines 73-74 (“Gentlemen...no peace”)
- D) Lines 81-83 (“I know...death”)

**Questions 18-26 are based on the following passages.**

The following passage is adapted from “The Magic of Forensic Science, Lesson 4: Forensic Entomology”

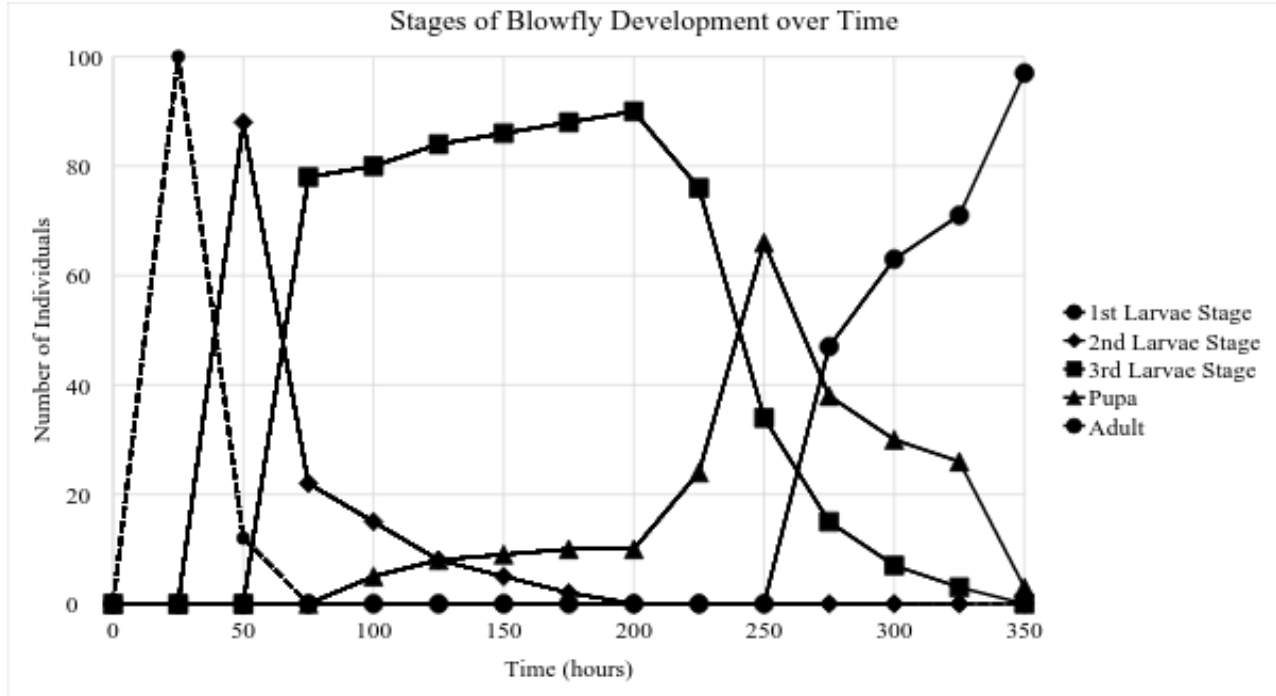
Forensic entomology is the study of bugs and how they relate to the human corpse by allowing us to determine the time of death. An entomologist knows that certain creatures will help dispose of a body and uses the insects and bugs around a decomposing body to assist in determining a timeline or a “Post Mortem Interval” (PMI). Based on what type of bug is present when the body is found, the entomologist can create a temporal map using his or her knowledge of the normal succession.

While a variety of flies or beetles provide specific information about a body contingent upon when they arrive and how they interact with the corpse, the “work horse” for forensic entomologists is the blowfly, as it’s always the first to arrive to the scene. It can be one of the most helpful when creating a timeline as there are multiple stages of development that it goes through. If the scenario involved nice weather kept at a fairly consistent 70 degrees Fahrenheit, the general sequence goes as follows. First, a person is murdered. Next, the blood attracts flies. Finally, the flies lay eggs on the corpse. How quickly they emerge is based on the temperature, so learning this is essential for an accurate timeline. (As temperature rises, the larvae will grow faster and die sooner. When temperature is cooler, the larvae will live longer.)

Other insects in the forensic entomologists’ toolkit contribute different details. Some give insight into a very recent death, while others indicate days and even weeks have passed. Some of the insects are flies, and others are beetles. A few of the most important examples:

- **Flesh Fly:** As the name suggests, the flesh fly will feed on the flesh of the corpse as well as any maggots or larvae from the blowfly and arrives very early on the scene. They also give live birth, often on the body, rather than laying eggs, like the blowfly.
- **House Fly:** These are the flies that are typically seen in homes, and they also arrive early and feed on carbohydrates. The house fly will lay eggs, like the blowfly.

- **Rove Beetle:** Fairly large in size (up to 3.5-4cm), this beetle will be one of the first to arrive. They go through a fast three-stage larval development and will eat the maggots/larvae of flies and subsequently lay their own eggs. Beetles in general will start to bury themselves under the body as well, so it is important to not only look on the corpse for bugs, but also underneath.
- **Burying Beetle/Carrion Beetle:** This beetle is the last of the early arrivers, feeding on maggots and other insects that have already landed on the corpse. They are called burying beetles as they will often bury themselves in the dirt just underneath the body, making it important to get a sample of the ground underneath the corpse.
- **Clown Beetle:** The shiny black beetles are nocturnal, and during the day will hide underneath the body. They will feed on the maggots and larvae. They have a fast larval development with two stages. Along with the Carpet Beetle, they arrive quite late to the body.



18

According to the author, flies and beetles are significant to forensic entomologists primarily because they

- A) reveal a great deal about how temperature impacts a human corpse.
- B) survive by eating the flesh of a dead human.
- C) help to create the timeline of a person's death.
- D) are necessary to solving a murder in which there are no witnesses.

19

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 8-11 (“Based...succession”)
- B) Lines 12-15 (“While a variety...corpse”)
- C) Lines 20-22 (“If...follows”)
- D) Lines 27-30 (“As...longer”)

20

The author includes the bulleted list at the end of the passage most likely to

- A) clarify the process used by forensic entomologists with specific examples of insects in addition to the blowfly.
- B) contrast the responsibilities of a forensic entomologist with those of a regular entomologist.
- C) summarize the way in which a forensic entomologist would create a post mortem interval.
- D) highlight the complexity of how a forensic biologist uses bugs to determine details about a human death.

21

As it is used in line 15, the phrase “work horse” most strongly suggests that the blowfly is

- A) over-used by forensic entomologists.
- B) the only insect needed to create a timeline.
- C) the largest of the six insects used in forensic entomology.
- D) the forensic entomologists’ most valuable insect.

22

As it is used in line 33, “insight” most nearly means

- A) perception.
- B) understanding.
- C) judgment.
- D) refinement.

23

Based on the passage, what do the flesh fly, house fly, and rove beetle have in common?

- A) They are found in the area around the corpse rather than on the corpse itself.
- B) They arrive at the corpse very soon after death.
- C) They require a steady temperature to be of use to forensic entomologists.
- D) They feed on the flesh of the corpse.

24

Which statement about blowfly development is best supported by the graph?

- A) The second larvae phase is the shortest phase of development.
- B) Not all of the larvae that are alive in the first larvae phase live to the second larvae phase.
- C) Blowflies do not enter the adult phase until 300 hours into development.
- D) The third larvae phase is the longest phase of development.

25

What information discussed in the passage is best represented by the graph?

- A) Lines 3-8 (“An entomologist...(PMI)”)
- B) Lines 8-11 (“Based on...succession”)
- C) Lines 17-20 (“It can...through”)
- D) Lines 32-34 (“Some give...passed”)

26

In the graph, which developmental phase has the greatest increase between 50 and 200 hours?

- A) First Larvae Stage
- B) Second Larvae Stage
- C) Third Larvae Stage
- D) Pupa Stage

**Questions 27-34 are based on the following passages.**

The following passage is adapted in part from “The Hard Problem: What is Consciousness,” from *The Economist*, September 12, 2015.

René Descartes said, “I think, therefore I am” in 1637. It’s a cliché, but it leads to one of the great unanswered questions of psychology and philosophy: What is consciousness? It is something that cannot be measured, at least, so far. It can only be described subjectively. Understanding whether or not any other living thing is conscious is something we cannot measure, so we cannot prove it to a certainty.

With other human beings, we assume that consciousness exists. Within that concept, psychology has attempted to probe the differences between conscious and subconscious thought. However, our examinations of our states of consciousness still avoid the basic question: What is consciousness? Does a dog have it? A whale? A butterfly? We have no effective way to ask the question.

Do we apply it only to creatures that have large, active brains? How can we say one way or another without coming to conclusions that are basically flattering to ourselves? What’s more, consciousness can go away temporarily, even when a brain is healthy and functional. In general, people are “asleep” for a third of their lives. Unless they wake up while they are dreaming, they have no sense of being conscious during sleep periods. But recordings of the electrical activity in the brain show that a sleeping brain is often just as busy as an “awake” brain. Thus, whether we can objectively quantify it or not, consciousness looks like a specific phenomenon, not a side-effect of our brain activity. In turn, that suggests that it is an evolved characteristic—something with a biological purpose. It is these factors, specificity and purpose, on which researchers focus.

A lot of brain science looks at brains that were injured in some way. One of the most intriguing examples has emerged from work on a phenomenon called blindsight. Blindsight is sometimes seen in people who are blind as a result of damage to the visual cortex of the brain, such as from a stroke or a brain tumor, as opposed to injury to the eyes or optic nerves.

Such people have no conscious awareness of being able to see. However, they can point to and sometimes even grab items that are in their visual fields.

This is an example of how brain damage can remove the conscious experience of a phenomenon without removing the phenomenon itself. Conversely, it seems that even without important parts of the brain, full consciousness is sometimes retained. A woman in China was born without a cerebellum, a structure in the back of the brain that coordinates movement. She has difficulty moving around, but she is completely conscious. She can describe her surroundings and experiences. Therefore, the cerebellum must play no part in consciousness.

These kinds of observations have led to a search for the neural correlates of consciousness—the bits of the brain responsible for generating conscious experience. But even finding those neural correlates does not answer the question of what consciousness actually is. What is it that people are experiencing while they are conscious? In 1995 a philosopher named David Chalmers called this the “hard question” of consciousness.

Another philosopher named Thomas Nagel addressed the problem in an interesting way in 1974. He presented the problem of consciousness in a paper titled “What is it Like to Be a Bat?” In his thought experiment Nagel assumed that bats have conscious experience of the world. If so, he argued, it would be built mainly on the basis of echolocation—a sense that human beings do not have. We might be able to imagine some parts of a bat’s existence, such as hanging upside down for long periods of time or flying. But we cannot possibly imagine what it is like to see the world through sonar.

The crux of the “hard problem,” then, is to make this unimaginable reality imaginable. Other fields of science use math to imagine inconceivable things. Even with the help of psychiatrists, such as Freud and others, we find it nearly impossible to get inside the mind of another human being. The “hard problem” may in fact be the “impossible problem.”

27

The main purpose of the passage is

- A) provide reasons for why it is important to study consciousness.
- B) describe how consciousness is defined for various creatures.
- C) discuss the difficulties and attempts in studying a biological phenomenon.
- D) explain the relationship between consciousness and brain functions.

28

What is the author's main point about consciousness?

- A) Consciousness is only something that creatures with large active brains can experience.
- B) Consciousness has proved challenging to objectively measure and thus we may never truly understand it.
- C) Consciousness is an independent brain function represented by sleep and vision capabilities.
- D) Consciousness is a philosophical phenomenon, rather than a biological one, as previously thought.

29

Which choice provides the best evidence for the answer to the previous question?

- A) Line 7-9 (“Understanding...certainty”)
- B) Lines 20-22 (“How...ourselves”)
- C) Lines 40-42 (“One...blindsight”)
- D) Line 63-66 (“These...experience”)

30

What is the main effect of the author asking questions throughout the text?

- A) They criticize the shortcomings of current research in this field.
- B) They create a conversational tone in order to challenge firmly held beliefs.
- C) They discredit the author by suggesting he is unsure of himself.
- D) They present some of the problems the author will explore in the passage.

31

As used in line 50, “fields” most nearly means

- A) ranges.
- B) occupations.
- C) courts.
- D) plains.

32

By using examples of people with brain injuries (paragraphs 4 and 5), researchers make the assumption that

- A) consciousness is a phenomenon that is observable but not specifically explainable.
- B) conscious awareness is unrelated to any specific part of the human brain.
- C) consciousness stems directly from the brain and impacts on its functioning.
- D) only creatures with brains similar to the size of humans can experience consciousness.

33

Which choice provides the best example of the conclusion that the difficulty of consciousness lies in our “inability to make the unimaginable, imaginable” (lines 87)?

- A) Line 63-66 (“These...experience”)
- B) Lines 81-84 (“We...flying”)
- C) Lines 84-85 (“But...sonar”)
- D) Line 88-89 (“Other...things”)

34

Which of the following best describe what the author believes about the research that has been done on consciousness?

- A) It is important but only to those who have limited brain functioning.
- B) It is a futile pursuit that should instead rely on the methods of math.
- C) It relies too heavily on the study of animals but offers some human insight.
- D) It is valuable in its unique approaches to questions but incomplete.

**Questions 35-42 are based on the following passages.**

This passage was adapted from Spencer Salette, "Five new man-made elements." © 2017, Noble National Chemistry Association.

The periodic table is the most important chemistry reference there is. It arranges all the known elements in an informative array, from left to right and top to bottom in order of increasing atomic number. The periodic table is an established document that has been amended over 148 years. So how do new elements become part of the periodic table? The short answer is, they are revealed in particle accelerators, or invented through atomic collisions. In the summer of 2016, four new elements were added to the periodic table, and one more element was added in 2017. None of these elements occur in nature, but rather were created in a lab. Of the 119 elements now in the periodic table, only 94 have been found naturally on Earth. The other 25 have been synthesized in a lab.

How can an element that has never been found on Earth be created in the lab? The process is not actually as complex as one might think. It involves changing the structure of the most basic unit of matter, the atom.

Atoms have three main sub-particles: positively-charged protons, negatively-charged electrons, and neutrons, which have no charge. Protons and neutrons are in the nucleus of the atom. Elements are defined by the number of protons an atom has, and that number also corresponds to the atomic number of the element. As electrons are relatively low in mass, the mass number of an element is largely made up by protons and neutrons and therefore the majority of mass is found in the nucleus of an atom.

Electrons orbit the nucleus within specific energy levels. The different rows of elements in the periodic table are called periods. The period number of an element signifies the highest principal energy level an electron in that element occupies in the unexcited state. The number of electrons in an element increases as one traverses down the periodic table. The electron configuration of an element refers to the specific arrangement of electrons into different energy levels and sub-

levels surrounding the nucleus, and can be used to predict the chemical behaviors of the element.

Those familiar with the periodic table can extract information concerning individual elements. For instance, a scientist can use the atomic mass of carbon to determine how many carbon atoms there are in a one-kilogram block of carbon. Furthermore, physical and chemical properties can be inferred by the position of an element in the periodic table. Melting point, or the temperature required to change an element from a solid to a liquid state, and ionization energy, the amount of energy it takes to remove an electron from an atom, can both be predicted using the periodic table.

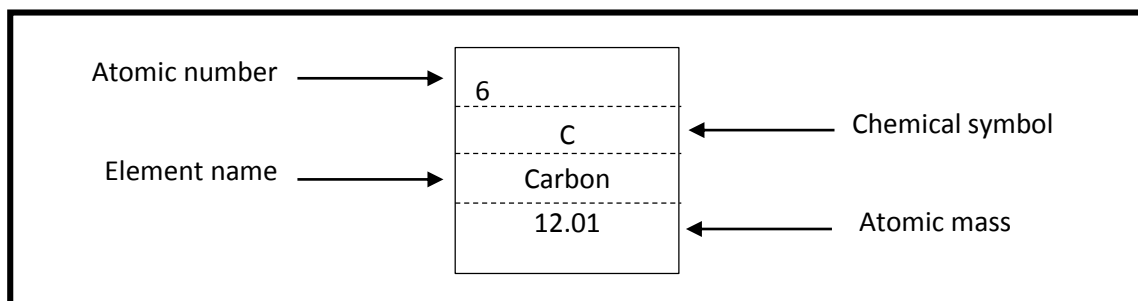
New elements are created by adding protons onto the nuclei of an atom until the total proton count is greater than any that has been reached before. Scientists believe there may be as many as 170 to 210 elements, based on how many protons can be added to the nucleus of an atom. All of the "new" elements that remain to be discovered are similar to the ones that have been synthesized already. These are superheavy elements that are also highly radioactive. Making these involves smashing smaller elements together in the hopes that they will fuse. But even when they are created, the new elements are so radioactive that they are extremely unstable, sometimes lasting only a fraction of a second. Almost as soon as they form, they disappear.

**Fig. 1 Elements from the Periodic Table**

13	14	15	16	17	18
81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [208.982]	85 At Astatine 209.987	86 Rn Radon 222.018
113 Nh Nihonium unknown	114 Fl Flerovium [289]	115 Mc Moscovium unknown	116 Lv Livermorium [292]	117 Ts Tennessine unknown	118 Og Oganesson [294]

### Element Key

Important information about an element is given in each square of the periodic table. The key below is given for the element carbon.



35

What is the author's main point about the advantages of the Periodic Table?

- A) It records the full history of the elements, including ones no longer found on earth.
- B) It communicates the radioactive elements to scientists in all fields in order to ensure safety.
- C) It leaves room for scientists to synthesize new elements by manipulating protons.
- D) Its organizational structure provides a wealth of information about the behavior of elements.

36

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 7-11 ("So how...collisions")
- B) Lines 19-23 ("How can...atom")
- C) Lines 37-41 ("The different...state")
- D) Lines 50-52 ("Those familiar...elements")

37

The author includes the information in paragraph 3 (lines 24-35) primarily to

- A) establish the structure of the atom to later explain how "new" elements are created.
- B) reveal the findings of recent research on electron influence on atomic mass.
- C) describe the complex process used to synthesize "new" elements.
- D) argue that the structure of atoms in all elements contain three sub-particles.

38

As used in line 35, "found" most nearly means

- A) formed.
- B) located.
- C) started.
- D) supported.

39

According to the passage, how do scientists continue to "discover" new elements?

- A) They must design elements in particle accelerators.
- B) They must smash small elements together until they become radioactive.
- C) They must change the ionization of an atom to a new charge.
- D) They must add protons into the nuclei to reach a new count.

40

As used in line 79, "unstable" most nearly means

- A) volatile.
- B) disturbed.
- C) wobbly.
- D) irrational.

41

Based on information in the passage and Figure 1, how many protons does the element flerovium have?

- A) 14
- B) 82
- C) 114
- D) 289

42

Which choice provides the best evidence to support the organizational structure of the periodic table in Figure 1?

- A) Lines 7-11 ("So how...collisions")
- B) Lines 19-23 ("How can...atom")
- C) Lines 28-31 ("Elements are...element")
- D) Lines 44-49 ("The electron...element")

**STOP**

If you finish before time is called, you may check your work on this section only.  
Do not turn to any other section.

# Writing and Language Test

30 MINUTES, 40 QUESTIONS

Turn to Section 2 of your answer sheet to answer the questions in this section.

## DIRECTIONS

Each passage below is accompanied by a number of questions. For some questions, you will consider how the passage might be revised to improve the expression of ideas. For other questions, you will consider how the passage might be edited to correct errors in sentence structure, usage, or punctuation. A passage or a question may be accompanied by one or more graphics (such as a table or graph) that you will consider as you make revising and editing decisions.

Some questions will direct you to an underlined portion of a passage. Other questions will direct you to a location in a passage or ask you to think about the passage as a whole.

After reading each passage, choose the answer to each question that most effectively improves the quality of writing in the passage or that makes the passage conform to the conventions of standard written English. Many questions include a “NO CHANGE” option. Choose that option if you think the best choice is to leave the relevant portion of the passage as it is.

Questions 1-10 are based on the following passage.

**The Science of Fingerprinting—adapted from a text by the Federal Bureau of Investigation**

Identification by means of fingerprinting is one of the most significant factors in apprehending fugitives who might escape arrest and continue **1** it's criminal activities indefinitely. Fingerprinting also determines the number of previous arrests. In turn, this information results in more equitable sentencing. An individual who violates the law cannot pose successfully as a first, or minor, offender. In addition, with this system, prosecutors can refer to an offender's previous

**1**

- A) NO CHANGE
- B) they're
- C) its
- D) their

record. It also provides the **2** probation, officers,  
and the governor with clear information upon  
which to base their judgment in criminal cases.

That said, the FBI's civil fingerprint file  
contains three times as many fingerprints as the  
criminal file. While the FBI stores fingerprints of  
criminals in the criminal file, **3** he uses the civil  
file to store fingerprints of everyday citizens.  
Often, these citizens help to identify missing  
persons and unknown deceased. In the latter  
category, the victims of major disasters **4** had  
been quickly identified if their fingerprints are on  
file, thus providing a humanitarian benefit not  
usually associated with fingerprint records.

2

- A) NO CHANGE
- B) probation officers and
- C) probation officers, and
- D) probation, officers and

3

- A) NO CHANGE
- B) they
- C) it
- D) she

4

- A) NO CHANGE
- B) may be quickly identified
- C) were quickly identified
- D) are quickly identifying

In sum, citizens who submit prints to the FBI's civil file play an important role in the drama of identification. **5** However, their action expands the size of the fingerprint files, sometimes so significantly that the FBI has to deal with a backlog of prints. **6**

Fingerprinting to identify people **7** uses distinctive ridge outlines that appear on the inside of the end joints of the fingers and thumbs. These ridges have several general pattern **8** types: each with general and specific variations, dependent on the shape and relationship of the ridges. The outlines of the ridges appear most clearly when

5

- A) NO CHANGE
- B) Earlier, their action
- C) Instead, their action
- D) Their action

6

The writer wants to conclude the paragraph effectively while also reinforcing the point that the civil file of fingerprints actually enhances the criminal justice system. Which choice best accomplishes this goal?

- A) NO CHANGE
- B) but these files may have to be discarded if no storage for them can be found.
- C) which occasionally have their contents transferred to criminal files.
- D) thereby increasing the value of the files to all law enforcement agencies.

7

- A) NO CHANGE
- B) use
- C) is used
- D) were used

8

- A) NO CHANGE
- B) types;
- C) types and
- D) types,

inked impressions are taken upon paper so that the ridges are black against a white background **9** created with ink markings of different shapes.

Of all the methods of identification, fingerprinting alone is both accurate and straightforward. **10** Fingerprinting, though, remains the most accurate. Using these older systems has caused many cases of mistaken identification. To date the fingerprints of no two individuals have been found to be identical.

The background and history of the science of fingerprints constitute an eloquent drama of human lives, of good and of evil. Nothing has played a part more exciting than that enacted by the fascinating loops, whorls, and arches etched on the fingers of a human being.

9

- A) NO CHANGE
- B) appearing in a range of different patterns and shapes.
- C) visible because of the contrast between white and black.
- D) DELETE the underlined portion and end the sentence with a period.

10

At this point, the writer is considering adding the following sentence:

Other methods certainly exist, including documentation of tattoos, distinctive clothing, photography, and body measurements.

Should the writer make this addition here?

- A) Yes, because it identifies the methods that support the claim about the benefits of fingerprinting.
- B) Yes, because it helps explain how ineffective other methods of identification are.
- C) No, because it contains information about fingerprinting that is irrelevant and redundant.
- D) No, because it interrupts the comparison between fingerprinting and other methods of identification.

Questions 11-20 are based on the following passage.

**Cover Musicians: Good or Bad?**

In the 1950s and '60s, a number of white recording artists established successful careers by recording songs previously performed by African American artists. **11** In our current day and time, these white artists have faced support and criticism for the material they “covered.”

Some people believe that the white artists who “covered” black artists’ material **12** were pioneers, not only in the field of music but also in the field of race relations. They risked their careers by taking the black musical culture and conveying it to audiences who otherwise never would have had that exposure. By doing so, they paved the way **13** for accepting others and tolerance.

Furthermore, this was a situation that benefited both sides in finance and prestige. When the white musicians recorded the songs, the original artists made more money selling the **14** rights to the songs than they had made on their own recordings.

11

- A) NO CHANGE
- B) In recent years,
- C) Conversely,
- D) On the other hand,

12

- A) NO CHANGE
- B) was
- C) are
- D) is

13

- A) NO CHANGE
- B) for being accepting and tolerant of others.
- C) for accepting and tolerating others.
- D) for acceptance and tolerance.

14

- A) NO CHANGE
- B) rites
- C) writes
- D) right’s

**15** They are true that these white artists made much more money than the black artists they covered. But the popularity of the white performers enabled them to bring widespread attention to the original artists. As the late B.B. King himself said, these British bands, “made the US as a **16** whole aware of the blues.”

Critics believe that these white artists should never be honored as catalysts in the struggle for racial equality and social acceptance.

**17** Instead of being honored, critics suggest that these performers be condemned as creative parasites. If they were genuinely interested in advancing race relations, they would have signed the black artists to lucrative contracts and promoted the African American material.

As they say, however, money **18** talks, white studios realized that there was money to be made in toning down this “dangerous” music. Buying the rights to the best of the blues classics, white artists got rich while the creative forces behind their music barely scraped by. Once they redistributed it to mainstream white audiences, rock ’n’ roll took off.

15

- A) NO CHANGE
- B) Its
- C) It is
- D) They’re

16

- A) NO CHANGE
- B) hole
- C) wholly
- D) holy

17

The writer is considering revising the paragraph to remove the underlined portion. Should this information be kept or deleted?

- A) Kept, because it further explains the viewpoint of the critics.
- B) Kept, because it describes the cover artists’ perspective.
- C) Deleted, because it undermines the critics’ viewpoint on cover artists.
- D) Deleted, because it is additional information and is redundant.

18

- A) NO CHANGE
- B) talks, and
- C) talks; and
- D) talks and

White “cover artists” built careers on the work of the gifted black musicians who had gone before them.

Even those few black artists such as Little Richard or Chuck Berry who were reluctantly “allowed” to perform their own songs had to so in watered-down versions. They **19** had to render their great songs in versions that were tame enough to be considered “acceptable” to white audiences. How ironic that it took the bands of the “British Invasion” to return this vibrant music to the country in which it **20** originated?

19

- A) NO CHANGE
- B) have to render
- C) has to render
- D) render

20

- A) NO CHANGE
- B) originated;
- C) originated.
- D) originated...

Questions 21-30 are based on the following passage.

**Roosevelt in the Badlands**—adapted from a text by Hermann Hagedorn

The train rumbled across three hundred feet of trestle and came to a stop. A young man, slender, not over-tall, with spectacles and a moustache, descended the steps. If **21** he expected that his foot, groping below the bottom step in the blackness for something to land on, would find a platform, he was doomed to disappointment. The "depot" at Little Missouri did not boast a platform.

The time was three o'clock on a cool, September morning, and the place, in the language of the Badlands, **22** were "dark as the inside of a cow." If the traveler from afar had desired illumination and a reception committee, he should have set his arrival not for September 7th, but for September 6th. Twenty-four hours previous, it happened: the citizens of Little Missouri had, in honor of a distinguished party which was on its way westward to celebrate the completion of the road, amply anticipated any passion for entertainment which the passengers on the Overland might have possessed. As the engine came to a stop, **23** a child clapped her hands, showing the joy in the community.

On this day, however, the "depot" was deserted. Theodore Roosevelt dragged his belongings through the sagebrush toward a huge black building looming northeastward through the night and **24** hammering on the door until the proprietor appeared, muttering curses.

21

- A) NO CHANGE
- B) they
- C) she
- D) you

22

- A) NO CHANGE
- B) are
- C) is
- D) was

23

The writer wants to conclude the paragraph effectively while also reinforcing the point that September 6<sup>th</sup> had been raucous. Which choice best accomplishes this goal?

- A) NO CHANGE
- B) party-goers silently assembled, quietly waving to the new visitors.
- C) citizens returned to their homes having enjoyed the disturbingly peaceful evening.
- D) a deafening yell pierced the night, punctuated with harsh pistol-shots.

24

- A) NO CHANGE
- B) hammers
- C) hammered
- D) had hammered

The face that Roosevelt saw, in the light of a smoky lantern, was not one to inspire confidence on a dark night. The features were those of a man who might have been drinking **25**. He was short and stout and choleric, with a wiry moustache under **26** a red nose; and seemed to be distinctly under the impression that Roosevelt had done something for which he should apologize.

He led the way upstairs. Fourteen beds were scattered about the loft which was the second story of the Pyramid Park Hotel, and which, **27** Roosevelt heard therefore, was known as the "bull-pen." One was unoccupied. He **28** accepted it without a murmur.

25

At this point, the writer is considering adding the following information.

with inconsiderable interruptions for a very long time.

Should the writer make this addition here?

- A) Yes, because it illustrates why the proprietor had been drinking.
- B) Yes, because it further develops reasons for Roosevelt's unease.
- C) No, because it implies that Roosevelt may have tried to take advantage of his circumstances.
- D) No, because it interrupts the paragraph's description of the proprietor.

26

- A) NO CHANGE
- B) a red nose; seemed
- C) a red nose; he seemed
- D) a red nose, seemed

27

- A) NO CHANGE
- B) Roosevelt heard subsequently,
- C) Roosevelt heard however,
- D) Roosevelt heard indeed,

28

- A) NO CHANGE
- B) accepts
- C) excepted
- D) excepts

What the thirteen hardened characters who were his roommates said next morning, when they discovered the "Eastern punkin-lily" which had blossomed in their midst, is lost to history. It was **29** unquestionably frank profane, and unwashed. He was, in fact, not a sight to awaken sympathy in the minds of such inhabitants as Little Missouri possessed. He had just recovered from an attack of cholera morbus, and though he had written his mother from Chicago that he was already "feeling like a fighting-cock," the marks of his illness were still on his face. Besides, he wore glasses, which, as he later discovered, were considered in the Badlands as a sign of a "defective moral **30** character".

29

- A) NO CHANGE
- B) unquestionably, frank, profane,
- C) unquestionably frank profane
- D) unquestionably frank, profane,

30

- A) NO CHANGE
- B) character"
- C) character."
- D) character?"

Questions 31-40 are based on the following passage and supplementary material.

### Extinction

“Extinction” is one of the more shocking words in natural science, since it refers to the complete, permanent disappearance of a living species from Earth. Part of the reason the word is so chilling is its finality. An extinct species will never again live on the planet. When a passenger pigeon named Martha died on September 1, 1914, in the Cincinnati Zoo, she **31** will be the last-ever passenger pigeon—there were no more passenger pigeons alive in the world, nor would there ever be.

The passenger pigeon gives another reason why the word “extinction” causes such distress for most of us: passenger pigeons were driven from existence by human beings. A century before Martha died, the species had numbered in the billions. Passenger pigeon flocks were so large that they darkened the skies overhead, taking hours to pass above a specific spot. **32** Those billions of passenger pigeons were largely eliminated by hunting, something that seemed incredible to people in the 1800s. But like most other human-caused extinctions, habitat destruction also played a role in the disappearance of passenger **33** pigeons? The birds nested in huge tracts of virgin forest, and as **34** these were cleared for farms, their vast populations were bound to shrink.

31

- A) NO CHANGE
- B) was
- C) is
- D) should be

32

At this point, the writer is considering adding the following sentence. “They were the most abundant birds in North America.” Should the writer make this addition here?

- A) Yes, because it reinforces the paragraph’s main idea about how many passenger pigeons were alive.
- B) Yes, because it adds a specific detail that helps transition to the rest of the paragraph.
- C) No, because it blurs the paragraph’s focus on the role of pigeons in the 1800s.
- D) No, because it is irrelevant to the paragraph’s focus on human beings driving extinction.

33

- A) NO CHANGE
- B) pigeons!
- C) pigeons.
- D) pigeons:

34

- A) NO CHANGE
- B) it
- C) he or she
- D) you

**35** While most people are confused about how many species are extinct, the fact is that extinction is as much a part of the natural world as **36** volcanoes earthquakes and storms. Estimates drawn from the fossil record suggest that 99.9 percent of **37** all species in the world that have ever lived on Earth are extinct. Given that scientists estimate that there are some ten to fourteen million different species alive today, the number of species that have gone extinct is vast—somewhere around five billion living species.

35

Which clause most successfully transitions from the previous paragraph to the next?

- A) NO CHANGE
- B) While most people are concerned that human activity is wiping out important species,
- C) While most people are unaware of the shrinking populations,
- D) While most people are concerned about the remaining number of species,

36

- A) NO CHANGE
- B) volcanoes, earthquakes, and,
- C) volcanoes: earthquakes, and
- D) volcanoes, earthquakes, and

37

- A) NO CHANGE
- B) all species
- C) all species of life
- D) all species in history

Of greater concern to most people **38** is mass extinctions. These are events that wipe out large percentages of the living species in a comparatively short time. The fossil record shows that **39** their have been at least five mass extinctions in the history of life on Earth. The data below shows those five mass-extinction events.

**Mass Extinctions in the Fossil Record**

Million Years Ago	% of Species Disappeared
445	57
370	50
250	90
200	50
65	50

Today, many scientists believe a sixth mass extinction is underway. Species seem to be dying out much more quickly than the background extinction **40** rate perhaps well above 100,000 species annually. Such large-scale losses of species can only result from changes in the global systems, and the concern is that humans are causing those changes.

38

- A) NO CHANGE
- B) are
- C) was
- D) were

39

- A) NO CHANGE
- B) they're
- C) there
- D) they

40

- A) NO CHANGE
- B) rate: perhaps
- C) rate—perhaps
- D) rate; perhaps

**No Test Material On This Page**



# Math Test – No Calculator

20 MINUTES, 13 QUESTIONS

Turn to Section 3 of your answer sheet to answer the questions in this section.

## DIRECTIONS

For questions **1-10** solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. For questions **11-13**, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 11 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

## NOTES

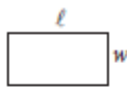
1. The use of a calculator **is not permitted**.
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated, the domain of a given function  $f$  is the set of all real numbers  $x$  for which  $f(x)$  is a real number.

## REFERENCE

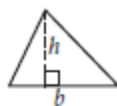


$$A = \pi r^2$$

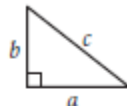
$$C = 2\pi r$$



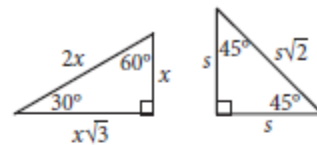
$$A = \ell w$$



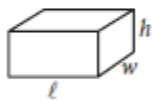
$$A = \frac{1}{2}bh$$



$$c^2 = a^2 + b^2$$



Special Right Triangles



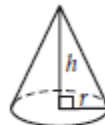
$$V = \ell wh$$



$$V = \pi r^2 h$$



$$V = \frac{4}{3}\pi r^3$$



$$V = \frac{1}{3}\pi r^2 h$$



$$V = \frac{1}{3}\ell wh$$

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is  $2\pi$ .

The sum of the measures in degrees of the angles of a triangle is 180.



1

Which of the following is equivalent to  $8(4x - 3)$  ?

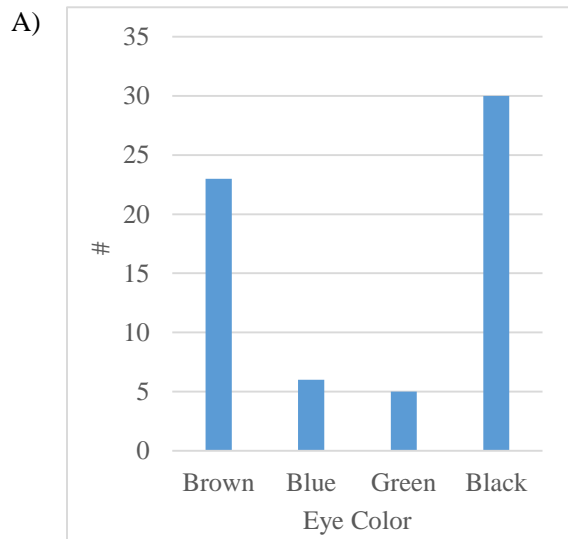
- A)  $32x - 3$
- B)  $12x + 5x$
- C)  $32x - 24$
- D)  $32x + 24$

2

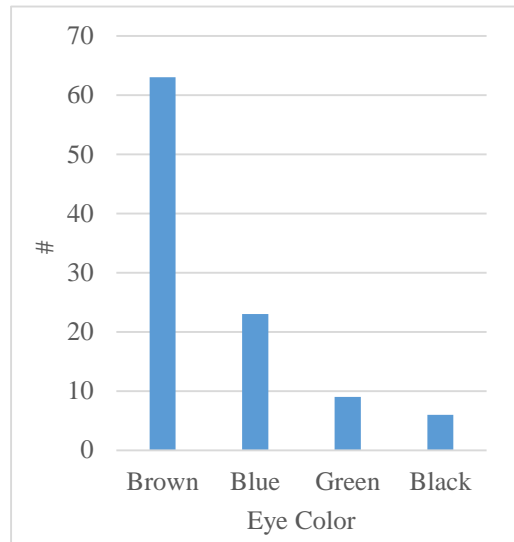
The table below shows the results of a 100 person observational study.

		Eye Color				Total
		Brown	Blue	Green	Black	
Hair Color	Blonde	5	8	1	2	16
	Red	7	2	1	0	10
	Brown	21	10	6	1	28
	Black	30	3	1	3	36
	Total	63	23	9	6	100

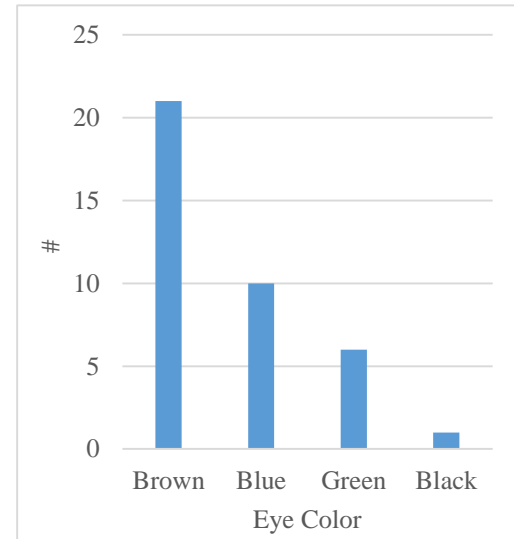
Which of the following bar graphs correctly shows the frequency for the eye color of individuals with brown hair?



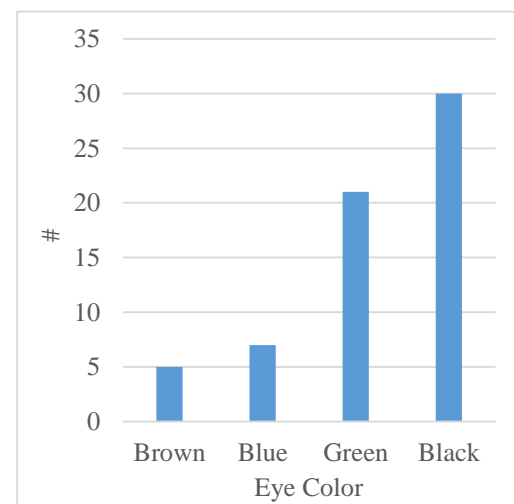
B)



C)



D)





3

$$(-3x + 8y) - (4x - 3y)$$

Which of the following expressions is equivalent to the expression above?

- A)  $-7x + 5y$
- B)  $-7x + 11y$
- C)  $7x + 5y$
- D)  $7x + 11y$

4

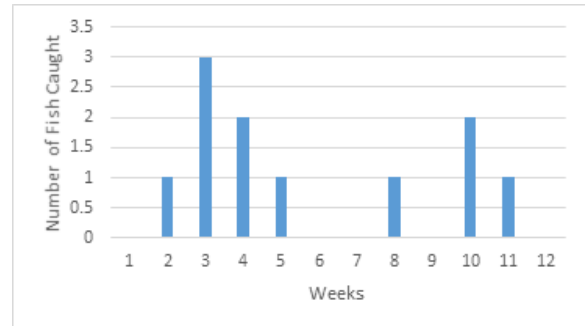
$$3(2x - y) + 4(-2x - 3y)$$

Which of the following is equivalent to the expression above?

- A)  $-2x - 4y$
- B)  $-2x - 15y$
- C)  $14x + 15y$
- D)  $14x - 4y$

5

In the Rocky Mountains, the summer fishing season spans twelve weeks. In the table below, Jordan recorded the amount of fish he caught each week last summer.



How many more fish did Jordan catch in the first 6 weeks of the season than in the last 6?

- A) 1
- B) 3
- C) 11
- D) 15

6

Which of the following is equivalent to the expression  $a(a + b)$  ?

- A)  $a + ab$
- B)  $2a + ab$
- C)  $a^2 + ab$
- D)  $aab$



7

A school was planning an end of year barbeque for their 600 students and wanted to determine what type and amount of drinks to purchase. Three years ago the school purchased 501 waters and 150 juices. Two years ago the school purchased 820 waters and 274 juices. Last year the school purchased 450 waters and 310 juices. Assuming that the school wants to use the average amount purchased each of the three previous years to make their order for this year, how many juices should the school order?

- A) 245
- B) 274
- C) 418
- D) 590

8

The sum of  $3x^2 - 8x + 9$  and  $6x^2 + 14x + 17$  can be written in the form of  $ax^2 + bx + c$ . Which of the following is the correct value of  $b$ ?

- A) 6
- B) 9
- C) 22
- D) 26

9

Hansberry College Prep Botany teachers decide to take their students on a field trip to the Botanical Gardens. Each student is responsible for measuring a 5 ft by 5 ft square section of the garden, and none of these sections can overlap. Once the students have measured off their section, they are to count the amount of sunflower seeds within 5 centimeters below the ground of their section that have not been germinated. The results are shown in the table below.

Region	Number of Sunflowers Seeds	Region	Number of Sunflowers Seeds
A	10	G	18
B	17	H	6
C	18	I	12
D	13	J	15
E	12	K	13
F	12	L	6

Which of the following is a reasonable approximation of the number of sunflower seeds to a depth of 5 centimeters beneath the ground for a 100 square foot area of the garden?

- A) 13
- B) 52
- C) 152
- D) 1260

10


$$\frac{8}{xy} - \frac{5}{x}$$

If  $x \neq 0$  and  $y \neq 0$ , which of the following is equivalent to the expression above?

- A)  $\frac{3}{xy-x}$
- B)  $\frac{3}{y}$
- C) 3
- D)  $\frac{8-5y}{xy}$



For questions 11-13, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

- Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
- Mark no more than one circle in any column.
- No question has a negative answer.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- Mixed numbers** such as  $3\frac{1}{2}$  must be gridded as 3.5 or  $7/2$ . (If  is entered into the grid, it will be interpreted as  $\frac{31}{2}$ , not  $3\frac{1}{2}$ .)
- Decimal answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid.

Answer:  $\frac{7}{12}$       Answer: 2.5

Write answer in boxes. →      ← Fraction line      ← Decimal point

	7	/	1	2		2	.	5
	○	○	○	○		○	○	○
	○	○	○	○		○	○	○
Grid in result.	○	○	○	○		○	○	○
	①	①	①	①		①	①	①
	②	②	②	②		②	②	②
	③	③	③	③		③	③	③
	④	④	④	④		④	④	④
	⑤	⑤	⑤	⑤		⑤	⑤	⑤
	⑥	⑥	⑥	⑥		⑥	⑥	⑥
	⑦	⑦	⑦	⑦		⑦	⑦	⑦
	⑧	⑧	⑧	⑧		⑧	⑧	⑧
	⑨	⑨	⑨	⑨		⑨	⑨	⑨

Acceptable ways to grid  $\frac{2}{3}$  are:

	2	/	3			.666		.667
	○	○	○	○		○	○	○
	○	○	○	○		○	○	○
	○	○	○	○		○	○	○
①	①	①	①	①		①	①	①
②	②	②	②	②		②	②	②
③	③	③	③	③		③	③	③
④	④	④	④	④		④	④	④
⑤	⑤	⑤	⑤	⑤		⑤	⑤	⑤
⑥	⑥	⑥	⑥	⑥		⑥	⑥	⑥
⑦	⑦	⑦	⑦	⑦		⑦	⑦	⑦
⑧	⑧	⑧	⑧	⑧		⑧	⑧	⑧
⑨	⑨	⑨	⑨	⑨		⑨	⑨	⑨

Answer: 201 – either position is correct

	2	0	1			2	0	1
	○	○	○	○		○	○	○
	○	○	○	○		○	○	○
	○	○	○	○		○	○	○
①	①	①	①	①		①	①	①
②	②	②	②	②		②	②	②
③	③	③	③	③		③	③	③
④	④	④	④	④		④	④	④
⑤	⑤	⑤	⑤	⑤		⑤	⑤	⑤
⑥	⑥	⑥	⑥	⑥		⑥	⑥	⑥
⑦	⑦	⑦	⑦	⑦		⑦	⑦	⑦
⑧	⑧	⑧	⑧	⑧		⑧	⑧	⑧
⑨	⑨	⑨	⑨	⑨		⑨	⑨	⑨

**NOTE:** You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.



11

A trail mix brand guarantees a peanut to raisin ratio of 5:2. If a bag of that trail mix contains 30 peanuts, how many raisins are in the bag?

12

















Animal	Average Life Span (in decades)
Crocodile	4
Alligator	7
Leopard	1
Tiger	3
Grizzly Bear	5

A student studied the life span of predatory animals using the table above. How many decades under the mean life span for predatory animals does the leopard live?

13

A scientist studying genetics wants to determine the variation of traits (characteristics) that would occur if two very different mice were paired together to produce a large number of baby mice. The traits used in the study were fur color (either brown or white) and tails (either have tails or a mutation for no tails). In this scenario “B” (brown) is dominant to “b” (white) and will be expressed when “B” is present, and “T” (tail) is dominant to “t” and will be expressed when a “T” is present.

A Brown-tailed mouse (BbTt) is mated with a white-no-tailed mouse (bbtt). The geneticist mapped the probable genetic outcome for their predicted offspring.

	BT	Bt	bT	bt
bt	BbTt 	Bbtt 	bbTt 	bbtt 
bt	BbTt 	Bbtt 	bbTt 	bbtt 
bt	BbTt 	Bbtt 	bbTt 	bbtt 
bt	BbTt 	Bbtt 	bbTt 	bbtt 

According to the proportions in the table above, what is the number of white mice with tails that would be born if 400 total mice offspring were produced?

# STOP

If you finish before time is called, you may check your work on this section only.  
Do not turn to any other section.



# Math Test – Calculator

40 MINUTES, 25 QUESTIONS

Turn to Section 4 of your answer sheet to answer the questions in this section.

## DIRECTIONS

For questions 1-21, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. For questions 22-25, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 22 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

## NOTES

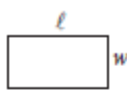
1. The use of a calculator **is permitted**.
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated, the domain of a given function  $f$  is the set of all real numbers  $x$  for which  $f(x)$  is a real number.

## REFERENCE

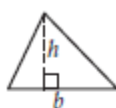


$$A = \pi r^2$$

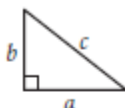
$$C = 2\pi r$$



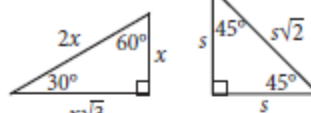
$$A = \ell w$$



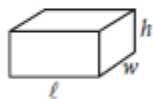
$$A = \frac{1}{2}bh$$



$$c^2 = a^2 + b^2$$



Special Right Triangles



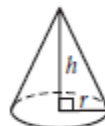
$$V = \ell wh$$



$$V = \pi r^2 h$$



$$V = \frac{4}{3}\pi r^3$$



$$V = \frac{1}{3}\pi r^2 h$$



$$V = \frac{1}{3}\ell wh$$

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is  $2\pi$ .

The sum of the measures in degrees of the angles of a triangle is 180.



1

A baseball team scored 3, 6, 4, 3, and 7 runs through their first 5 games of the season. After the sixth game, the team's run average rounded to the nearest tenth was 5.2 runs per game. How many runs did they score in their sixth game?

- A) 5
- B) 6
- C) 8
- D) 10

2

The table below shows Joe Toye's points and rebounds in each of the first four games of the 2017-2018 college basketball season.

	Points	Rebounds
Game 1	23	8
Game 2	14	12
Game 3	17	10
Game 4	19	7

What was the mean of Toye's rebounds per game through the first four games of the season?

- A) 9
- B) 9.25
- C) 13.75
- D) 18.25

3

Most human cells are measured in a unit called micrometers. There are 1,000,000 micrometers in a meter. If a white blood cell is 9 micrometers in length, how many meters is this?

- A) 0.000009 meters
- B) 9 meters
- C) 111,111.1 meters
- D) 9,000,000 meters

4

In downtown Chicago, waiters receive tips that typically average 18% of the customer's bill. At this rate, which of the following is closest to the tip that a waiter can expect to receive when the customer's bill is \$272.53?

- A) \$4.90
- B) \$49.06
- C) \$223.47
- D) \$321.59



5

Campus	Number of Laptops Assigned
Baker	60
Butler	65
Comer	122
Hansberry	113
Johnson	84
Mansueto	27

The table above shows the number of laptops assigned to teachers at each of the Noble south side campuses. Based on the table, what is the median number of laptops assigned for the 6 campuses?

- A) 74.5
- B) 78.5
- C) 95
- D) 117.5

6

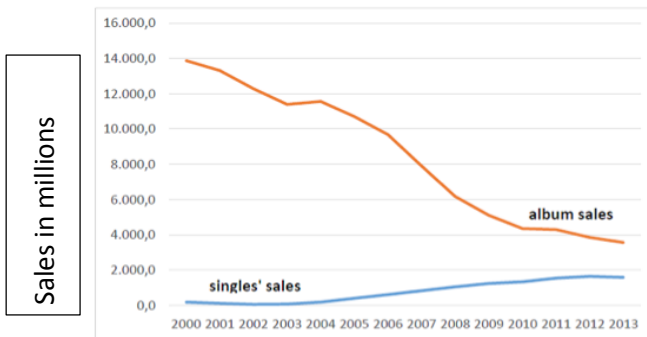


Figure 1: The album and singles market in the US, 2000-2013

The graph above shows the total number of album sales and singles' sales in the United States from 2000 to 2013 (in millions). Based on the graph, which of the following statements is most accurate?

- A) Album sales have decreased at a constant rate every year since 2000.
- B) Album sales decreased dramatically at first but then continually grew.
- C) Album sales decreased at a faster rate between 2000 and 2003 than between 2010 and 2013.
- D) Album sales increased slowly from 2000 to 2013.

7

The table below illustrates the average salary for specified age ranges in the United States.

Age Range	Average Salary
16-19	\$21,840
20-24	\$27,456
25-34	\$39,416
35-44	\$49,400
45-54	\$50,024
55-64	\$49,608

What is the range of average salaries across the span of ages shown above?

- A) The range is \$27,768
- B) The range is \$28,184
- C) The range is \$71,864
- D) The range is \$44,408

8

On average, there are 3 pages in every chapter of a James Patterson novel. Each book has approximately 79 chapters. If James Patterson has published 58 books, approximately how many pages has James Patterson written?

- A) 140 pages
- B) 174 pages
- C) 4,582 pages
- D) 13,746 pages



9

Ms. McKenna and Mr. Fearing are writing the upcoming exam for their Algebra course. The exam will contain a total of 60 questions and Ms. McKenna has committed to writing 70% of the questions. How many questions will Mr. Fearing write on the Algebra exam?

- A) 18
- B) 20
- C) 30
- D) 42

10

A gestation period is defined as the amount of time that it takes a fetus to develop before it is born. The human gestation period is 40 weeks long and is twice that of a goat. An African elephant's gestation period is six times that of a goat. Which of the following is closest to a baby elephant's gestation period?

- A) 80 weeks
- B) 120 weeks
- C) 240 weeks
- D) 480 weeks

11

A survey of 160 randomly selected Noble students in 9<sup>th</sup> through 12<sup>th</sup> grade collected data on dress code preference for scholars. The data are shown in the table below.

	Like polo with sweatshirt	Like polo without sweatshirt	Total
9th & 10th	41	37	78
11th & 12th	30	52	82
Total	71	89	160

Which of the following is the closest to the percent of those surveyed who like a polo without a sweatshirt?

- A) 44%
- B) 49%
- C) 51%
- D) 56%

12

	5-7 Age	8-10 Age	11-13 Age	14 - 16 Age	17- 19 Age	Total
Males	3	7	10	17	15	52
Females	1	2	2	4	1	10
Total	4	9	12	21	16	62

The table above shows the age group and sex of all of the Jesse White Tumblers in Chicago. If a male tumbler is selected at random, what is the likelihood that he is not in the age group of 8 – 10?

- A)  $\frac{7}{52}$
- B)  $\frac{45}{52}$
- C)  $\frac{7}{62}$
- D)  $\frac{45}{62}$



Questions 13 and 14 refer to the following table:

Type of vegetable	Amount of seeds needed to grow 2g of vegetables
Beet	6 mg
Brussel Sprout	86 mg
Radish	110 mg
Spinach	1.9 mg

13

A fall salad was made with 400 grams of spinach, 20 grams of radish, 200 grams of beets, and 40 grams of Brussel sprouts. What is the total amount, in grams, of seeds needed to grow the required amount of spinach?

- A) .38 g
- B) 38 g
- C) 380 g
- D) 380,000 g

14

Which total mass in milligrams is closest to the quantity of seeds needed to grow 9 grams of spinach and 400 grams of Brussel sprouts?

- A) 8.55 mg
- B) 17,200 mg
- C) 17,209 mg
- D) 35,617 mg

15

A chemistry student wanted to make slime for her sister's birthday party. The recipe for 10 people requires 40 ounces of glue and 8 tablespoons of borax. What amount of glue is needed for the 30 people attending her sister's birthday party?

- A) 13.3 oz
- B) 24 tablespoons
- C) 120 oz
- D) 320 tablespoons

16

$$(2x + 3xy) - 3(4xy - 6x)$$

Which of the following is equivalent to the expression above?

- A)  $20x - 9xy$
- B)  $-16x - 9xy$
- C)  $-4x - 9xy$
- D)  $20x - 9x^2y^2$



17

The wolf is the only predator that threatens the caribou population in a particular Canadian national park. This results in a population ratio that remains constant at about 1 wolf to 4 caribou. The table below shows how the populations of both species have changed over a 6 year period.

Year	Wolf Population	Caribou Population
2010	64	257
2011	44	175
2012	30	120
2013	25	102
2014	21	90
2015	24	97

In 2016 the wolf population was reduced to  $\frac{1}{3}$  of what it was in 2012. Which of the following best estimates the size of the corresponding caribou population in 2016?

- A) 10
- B) 30
- C) 40
- D) 120

18

A coffee company produces 350 1-pound bags of coffee per hour. If they expect that 1.6% of the bags will have defective beans and cannot be sold, which of the following is the best estimate for how many bags they will have to throw away after 8 hours of production?

- A) 6 bag
- B) 45 bags
- C) 448 bags
- D) 4400 bags

19

At UIC College Prep there are 1000 students and 410 of them play a sport. If the rest of the Noble Network has the same proportion of students who play sports and there are 12,125 students attending a Noble Network School, which of the following is the best estimate of the total amount of students who play a sport in the Noble Network?

- A) 497
- B) 1410
- C) 4971
- D) 29,573

20

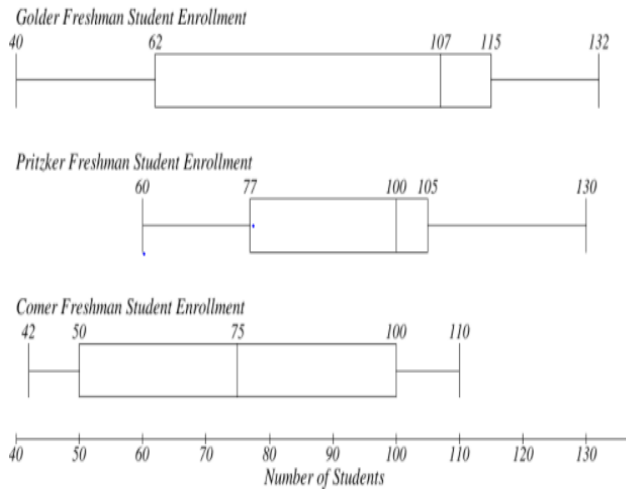
Quincy bought a new pair of Jordan's from a local shoe store that gave a 15 percent discount off the original price,  $j$ . The total included a 10 percent sales tax on the discounted price. Which of the following represents the total amount Quincy paid for the Jordan's in terms of  $j$ ?

- A)  $.15j + .1j$
- B)  $.85j$
- C)  $.85j + .1j$
- D)  $.85j + .1(.85j)$



21

The box-and-whisker plot below shows the minimum, first quartile, median, third quartile, and maximum number of students over several years from Golder College Prep, Pritzker College Prep, and Gary Comer College Prep.



Which of the following ranks the campuses for the median of the number of students from least to greatest?

- A) Golder, Comer, Pritzker
- B) Pritzker, Comer, Golder
- C) Comer, Pritzker, Golder
- D) Pritzker, Golder, Comer



For questions 22-25, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

- Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
- Mark no more than one circle in any column.
- No question has a negative answer.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- Mixed numbers** such as  $3\frac{1}{2}$  must be gridded as 3.5 or  $7/2$ . (If  $\begin{array}{|c|c|c|} \hline 3 & 1 & 2 \\ \hline \end{array}$  is entered into the grid, it will be interpreted as  $\frac{31}{2}$ , not  $3\frac{1}{2}$ .)
- Decimal answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid.

Answer:  $\frac{7}{12}$       Answer: 2.5

Write answer in boxes. →      ← Fraction line      ← Decimal point

	7	/	1	2		2	.	5
	○	○	○	○		○	○	○
	○	○	○	○		○	○	○
①	○	○	○	○	①	○	○	○
②	○	○	○	○	②	○	○	○
③	○	○	○	○	③	○	○	○
④	○	○	○	○	④	○	○	○
⑤	○	○	○	○	⑤	○	○	○
⑥	○	○	○	○	⑥	○	○	○
⑦	○	○	○	○	⑦	○	○	○
⑧	○	○	○	○	⑧	○	○	○
⑨	○	○	○	○	⑨	○	○	○

Grid in result. →

Acceptable ways to grid  $\frac{2}{3}$  are:

	2	/	3		.	6	6	6		.	6	6	7
	○	○	○		○	○	○	○		○	○	○	○
	○	○	○		○	○	○	○		○	○	○	○
①	○	○	○	①	○	○	○	○	①	○	○	○	○
②	○	○	○	②	○	○	○	○	②	○	○	○	○
③	○	○	○	③	○	○	○	○	③	○	○	○	○
④	○	○	○	④	○	○	○	○	④	○	○	○	○
⑤	○	○	○	⑤	○	○	○	○	⑤	○	○	○	○
⑥	○	○	○	⑥	○	○	○	○	⑥	○	○	○	○
⑦	○	○	○	⑦	○	○	○	○	⑦	○	○	○	○
⑧	○	○	○	⑧	○	○	○	○	⑧	○	○	○	○
⑨	○	○	○	⑨	○	○	○	○	⑨	○	○	○	○

Answer: 201 – either position is correct

	2	0	1		2	0	1
	○	○	○		○	○	○
	○	○	○		○	○	○
①	○	○	○	①	○	○	○
②	○	○	○	②	○	○	○
③	○	○	○	③	○	○	○
④	○	○	○	④	○	○	○
⑤	○	○	○	⑤	○	○	○
⑥	○	○	○	⑥	○	○	○
⑦	○	○	○	⑦	○	○	○
⑧	○	○	○	⑧	○	○	○
⑨	○	○	○	⑨	○	○	○

**NOTE:** You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.



22

A pizzeria currently has 73 pounds of mozzarella cheese. If the owner of the pizzeria requires the workers to use exactly 6 ounces of mozzarella cheese on each 12" pizza, what is the largest possible number of 12" pizzas that can be made with the pizzeria's current supply of cheese? (Note: 1 pound = 16 ounces)

23

A healthy honeybee colony will contain 15% male bees, known as drones. If Hive B was considered a healthy hive, what number of worker bees would you expect to find in that hive?

Hive	Workers	Drones	Queens
A	1399	210	1
B	?	90	1
C	999	150	1

**Questions 24 and 25 refer to the following information:**

The United States Department of Agriculture reported that the average American consumes 72 kilograms (kg) of refined sugars each year. Medical experts recommend that men should have no more than 38 g of sugar a day and they recommend that women should have no more than 25 g of sugar each day. A recent report states that the average American consumes 2.5 cans of soda per day which is thus the leading reason as to why Americans over-consume sugar. The amount of sugar in grams (g) in a 12 fluid ounce can of soda for top-selling soda products is shown in the table below:

Beverage	Amount of sugar per 12 fl oz. can
Sunkist	52 g
Coca-Cola	39 g
Cherry Coca-Cola	42 g
Barq's Root Beer	45 g
Mello Yellow	47 g
Sprite	38 g
Mountain Dew	46 g
Pepsi	41 g
Sun Drop	50 g

24

Dave is an average American man. In his refrigerator he has 6 cans of Sprite, 12 cans of Pepsi, 4 cans of Mello Yellow, 10 cans of Sun Drop and 2 cans of Sunkist. What's the probability in simplest form that Dave chooses a can at random that has more than 45g of sugar?

25

If Lesly is an average American woman who consumes the recommended maximum amount of sugar every day for a year by only drinking Sun Drop Soda, how many total cans, rounded to the nearest whole number, of Sun Drop per year does she drink? One year has 365 days.

**STOP**

If you finish before time is called, you may check your work on this section only.  
Do not turn to any other section.