- **Math**: Includes multiple-choice and student-produced response questions based on the math that college-bound students typically learn during their first three years of high school.
  Time allotted for Math – No Calculator: 25 minutes.
  Time allotted for Math – Calculator: 55 minutes.
- **Essay (optional)**: Asks you to read and analyze an argument and write an effective response.
  Time allotted for Essay: 50 minutes.

How the SAT Is Scored

All multiple-choice questions are scored the same way: one point for each correct answer and zero points for incorrect answers. No additional points are subtracted for incorrect answers or answers left blank.

- **Total Score**: You will receive one total score, on a scale ranging from 400 to 1600, that is the sum of two section scores:
  - Evidence-Based Reading and Writing
  - Math

  The three scores for the optional Essay will be reported separately on 2-to-8 scales and will not be factored into the total score.
- **Section Scores**: You will receive two section (domain) scores, reported on a scale ranging from 200 to 800, in 10-point intervals:
  - Evidence-Based Reading and Writing, which will combine the Reading Test score and the Writing and Language Test score
  - Math
- **Test Scores**: You will receive three test scores reported on a scale ranging from 10 to 40:
  - Reading
  - Writing and Language
  - Math
- **Cross-Test Scores**: You will receive two cross-test scores that are based on items from across the Reading, Writing and Language, and Math Tests. (The cross-test scores are contingent on the results of research.) These will be reported on a scale ranging from 10 to 40:
  - Analysis in Science
  - Analysis in History/Social Studies
- **Subscores**: You will also receive multiple subscores for Reading, Writing and Language, and Math. In total the redesigned SAT will report seven subscores, each on a scale ranging from 1 to 15:
  - The Reading and Writing and Language Tests will contribute questions to two subscores:
    1. Command of Evidence
    2. Words in Context
  - The Writing and Language Test will also report two additional subscores:
    3. Expression of Ideas
    4. Standard English Conventions
  - The Math Test will report three subscores:
    5. Heart of Algebra
    6. Problem Solving and Data Analysis
    7. Passport to Advanced Math

Resources to Help You Prepare

The College Board is committed to offering the best practice — free, to the world — and to do so, we have partnered with Khan Academy® to help propel students to success. When you upload your specific test results — from the redesigned PSAT/NMSQT®, PSAT™ 10, PSAT™ 8/9, a previous SAT, or the practice test in this booklet — to the computer-adaptive Khan Academy engine, we can offer you individualized instruction in the areas you need most.

If you've already taken the PSAT/NMSQT in October 2015, you have a good idea of what you'll see on the redesigned SAT. Be sure to start using the resources available to you through your online score report at **studentscores.collegeboard.org** and find out how to use your PSAT/NMSQT results to power your study at **satpractice.org**.

As noted previously, the contents of the redesigned SAT are not a mystery. You can prepare by reading more about the redesigned test at **collegereadiness.collegeboard.org**.

Using This Booklet

Use this booklet to:

- Become familiar with the test. Study the descriptions of the SAT, so you're not surprised or confused on test day.
- Learn the test directions. The directions for answering the questions in this booklet are the same as those on the actual test. If you become familiar with the directions now, you'll leave yourself more time to answer the questions when you take the test.
- Review the sample questions. The more familiar you are with the question formats, the more comfortable you'll feel when you see similar questions on the actual test. In particular, be sure to practice writing answers to the student-produced response math questions (see page 24).
- Understand how the tests are scored. You get one point for each right answer. Hard questions count the same amount as easier questions. You won't

such a statement only serves to interrupt the discussion of the community stakeholders with whom transportation planners work.

Choice B is not the best answer because the underlined sentence should not be kept. Although the American Heart Association could theoretically be an example of "other interested organizations" that transportation planners work with, the sentence does not suggest this is the case. Instead, the association is merely the source for the general statement about the benefits of walking, a statement that only serves to interrupt the discussion of the actual community stakeholders with whom transportation planners work.

Choice D is not the best answer because, although the underlined sentence should be deleted, it is not because the sentence lacks specific examples of the numerous benefits of walking. Adding such examples would only serve to blur the focus of the paragraph further with general factual information, as the paragraph's main purpose is to discuss the community stakeholders with whom transportation planners work.

10

A) NO CHANGE
B) varied, and including
C) varied and which include
D) varied, which include

Estimated Difficulty: Hard	**Key:** A

Choice A is the best answer because it uses a comma to effectively subordinate the list of varied fields in which transportation planners major.

Choice B is not the best answer because the comma and coordinating conjunction "and" result in an ungrammatical sentence.

Choice C is not the best answer because the coordinating conjunction "and" along with the subordinating conjunction "which" result in an ungrammatical sentence.

Choice D is not the best answer because is it unclear from this construction to what exactly the subordinating conjunction "which" refers.

Math

The Math questions test your ability to problem-solve and use appropriate approaches and tools strategically. It measures math skills across four areas:

- Heart of Algebra
- Problem Solving and Data Analysis
- Passport to Advanced Math
- Additional Topics in Math (covering relevant concepts learned in high school math, such as the Pythagorean theorem)

Math Test Overview

The Math test includes a portion that allows the use of a calculator and a portion that does **not.** **Total** questions: 58

- 45 standard multiple-choice questions
- 13 student-produced response questions
- Time allotted for Math – No Calculator: 25 minutes
  Time allotted for Math – Calculator: 55 minutes

  Some questions are like those you may have seen in your math courses. The ability to reason logically in a variety of situations, including ones related to career, science, and social studies, is tested throughout. You will also encounter at least three item sets that include more than one question about a given scenario.

Tips for the Math Test

- Familiarize yourself with the directions ahead of time.
- The test does not require you to memorize formulas. Commonly used formulas are provided in the test booklet at the beginning of each math portion. It is up to you to decide which formula is appropriate to a question.
- Read the problem carefully. Look for key words that tell you what the problem is asking. Ask yourself the following questions before you solve each problem: What is the question asking? What do I know?
- With some problems, it may be useful to draw a sketch or diagram of the given information.
- Use the test booklet for scratch work. You are not expected to do all the reasoning and figuring in your head. You will not receive credit for anything written in the booklet, but you will be able to check your work easily later.
- In the portion of the test that allows calculator use, decide when to use a calculator. (See Calculator Tips.)

- Eliminate choices. If you don't know the correct answer to a question, try some of the choices. It's sometimes easier to find the wrong answers than the correct one. On some questions, you can eliminate all the incorrect choices. Remember that you won't lose points for incorrect answers, so plan to make your best guess if you don't know the answer.
- Check your answer to make sure it is a reasonable answer to the question asked. This is especially true for student-produced response questions, where no answer choices are given.
- All figures are drawn to scale unless otherwise indicated.

Calculator Policy

- The no-calculator portion has 20 questions.
- The calculator portion has 38 questions.

You will not be allowed to share calculators. You will be dismissed and your scores will be canceled if you use your calculator to share information during the test or to remove test questions or answers from the test room.

Calculator Tips

- Remember to bring your calculator on test day. Calculators will not be available at the test center. You should be familiar with how to use the calculator you bring to the test.
- Make sure your calculator is in good working order and that its batteries are fresh. If your calculator fails during testing and you have no backup, you will have to complete the test without it (or cancel your scores for the entire test).
- Don't buy an expensive, sophisticated calculator just to take the test. Although you can use them for the test, more sophisticated calculators are not required for any problem.
- Don't try to use a calculator on every question. First, decide how you will solve the problem, and then decide whether to use the calculator. The calculator is meant to aid you in problem solving, not to get in the way.
- Get your thoughts down before using your calculator. It may help to do scratch work in the test booklet.
- Take the practice test with a calculator at hand for the portion of the test that allows calculator use. This will help you practice determining which types of questions you should use your calculator to answer.

Acceptable Calculators

Most questions on the Math with Calculator portion can be solved without a calculator, but you may find using a calculator helpful on some questions. A scientific or graphing calculator is recommended for the Math with Calculator portion.

Calculators permitted during testing are:

- Most graphing calculators (see a list at **sat.collegeboard.org/register/calculator-policy**)
- All scientific calculators
- Four-function calculators (not recommended).

If you bring a calculator with large characters (one-inch high or more) or raised display that might be visible to other test-takers, the test supervisor has discretion to seat you in a location where other test-takers cannot view the large or raised display.

Unacceptable Calculators

Do NOT bring these unacceptable calculators:

- Laptops or other computers, tablets, cell phones, or smartphones
- Models that can access the Internet, have wireless, Bluetooth, cellular, audio/video recording and playing, camera, or any other smartphone-type feature
- Models that have typewriter-like keypad, pen-input, or stylus
- Models that use electrical outlets, make noise, or have a paper tape (unless approved to use as an accommodation)

In addition, the use of hardware peripherals such as a stylus with an approved calculator is not permitted. Some models with touch-screen capability are not permitted (e.g., Casio ClassPad). Check the list of acceptable calculators for models that are permitted.

Sample Math Materials

Following are samples of the kinds of Math – No Calculator and Math – Calculator questions that may appear on your test. For these sample materials:

- Review the notes and reference materials.
- Decide on the best answer to each multiple-choice question.
- Follow the directions for the student-produced responses, shown here on page 24.
- Read the explanation for the best answer to each question, and for the multiple-choice questions, for the answer you chose (if they are different).

The notes and reference materials will appear at the beginning of both portions on the actual test. The explanation of the student-produced responses will appear in both portions of the actual test, but only once in these sample materials (page 24). The directions provided here match what you will see on the actual text.

Math Test – No Calculator Questions

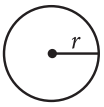
Directions

For questions 1-5, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. For question 6, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 6 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

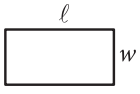
Notes

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.

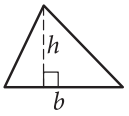
Reference



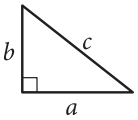
$A = \pi r^2$
$C = 2\pi$



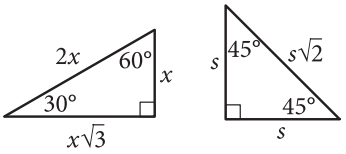
$A = \ell w$



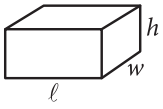
$A = \frac{1}{2}bh$



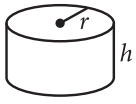
$c^2 = a^2 + b^2$



Special Right Triangles

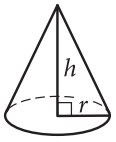


$V = \ell wh$

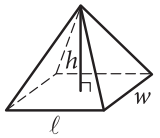


$V = \pi r^2 h$

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



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



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

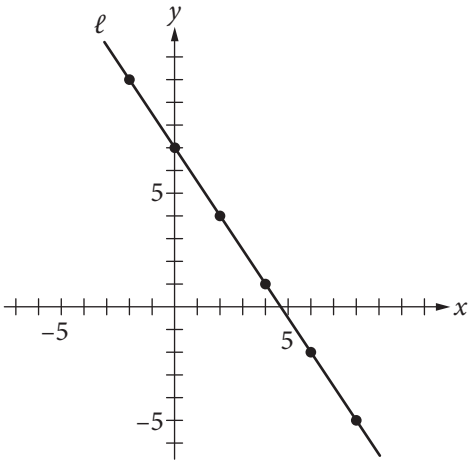
The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is 2π.

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

1

Line ℓ is graphed in the xy-plane below.



If line ℓ is translated up 5 units and right 7 units, then what is the slope of the new line?

A) $-\frac{2}{5}$

B) $-\frac{3}{2}$

C) $-\frac{8}{9}$

D) $-\frac{11}{14}$

Estimated Difficulty: Easy	**Key:** B

Choice B is correct. The slope of a line can be determined by finding the difference in the y-coordinates divided by the difference in the x-coordinates for any two points on the line. Using the points indicated, the slope of line ℓ is $-\frac{3}{2}$. Translating line ℓ moves all the points on the line the same distance in the same direction, and the image will be a line parallel to ℓ. Therefore, the slope of the image is also $-\frac{3}{2}$.

Choice A is incorrect. This value may result from a combination of errors. You may have erroneously determined the slope of the new line by adding 5 to the numerator and adding 7 to the denominator in the slope of line ℓ and gotten the result $(-3 + 5)/(-2 + 7)$.

Choice C is incorrect. This value may result from a combination of errors. You may have erroneously determined the slope of the new line by subtracting 5 from the numerator and subtracting 7 from the denominator in the slope of line ℓ.

Choice D is incorrect and may result from adding $\frac{5}{7}$ to the slope of line ℓ.

2

The mean number of students per classroom, y, at Central High School can be estimated using the equation $y = 0.8636x + 27.227$, where x represents the number of years since 2004 and $x \leq 10$. Which of the following statements is the best interpretation of the number 0.8636 in the context of this problem?

A) The estimated mean number of students per classroom in 2004

B) The estimated mean number of students per classroom in 2014

C) The estimated yearly decrease in the mean number of students per classroom

D) The estimated yearly increase in the mean number of students per classroom

Estimated Difficulty: East	**Key:** D

Choice D is correct. When an equation is written in the form $y = mx + b$, the coefficient of the x-term (in this case 0.8636) is the slope. The slope of this linear equation gives the amount that the mean number of students per classroom (represented by y) changes per year (represented by x).

Choice A is incorrect and may result from a misunderstanding of slope and y-intercept. The y-intercept of the equation represents the estimated mean number of students per classroom in 2004.

Choice B is incorrect and may result from a misunderstanding of the limitations of the model. You may have seen that $x \leq 10$ and erroneously used this statement to determine that the model finds the mean number of students in 2014.

Choice C is incorrect and may result from a misunderstanding of slope. You may have recognized that slope models the rate of change but thought that a slope of less than 1 indicates a decreasing function.

3

The graph of $y = (2x - 4)(x - 4)$ is a parabola in the xy-plane. In which of the following equivalent equations do the x- and y-coordinates of the vertex of the parabola appear as constants or coefficients?

A) $y = 2x^2 - 12x + 16$

B) $y = 2x(x - 6) + 16$

C) $y = 2(x - 3)^2 + (-2)$

D) $y = (x - 2)(2x - 8)$

Estimated Difficulty: Medium	**Key:** C

Choice C is correct. The equation $y = (2x - 4)(x - 4)$ can be written in vertex form, $y = a(x - h)^2 + k$, to display the vertex, (h, k), of the parabola. To put the equation in vertex form, first multiply: $(2x - 4)(x - 4) = 2x^2 - 8x - 4x + 16$. Then, add like terms, $2x^2 - 8x - 4x + 16 = 2x^2 - 12x + 16$. The next step is completing the square.

$y = 2x^2 - 12x + 16$	
$y = 2(x^2 - 6x) + 16$	Isolate the x^2 term by factoring
$y = 2(x^2 - 6x + 9 - 9) + 16$	Make a perfect square in the parentheses
$y = 2(x^2 - 6x + 9) - 18 + 16$	Move the extra term out of the parentheses
$y = 2(x - 3)^2 - 18 + 16$	Factor inside the parentheses
$y = 2(x - 3)^2 - 2$	Simplify the remaining terms

Therefore, the coordinates of the vertex, $(3, -2)$, are only both revealed in choice C. Since you are told that all of the equations are equivalent, simply knowing the form that displays the coordinates of the vertex will save all of these steps — this is known as "seeing structure in the expression or equation."

Choice A is incorrect; it displays the y-value of the y-intercept of the graph $(0, 16)$ as a constant.

Choice B is incorrect; it displays the y-value of the y-intercept of the graph $(0, 16)$ as a constant.

Choice D is incorrect; it displays the x-value of one of the x-intercepts of the graph $(2, 0)$ as a constant.

4

Which of the following is equal to $(14 - 2i)(7 + 12i)$? (Note: $i = \sqrt{-1}$)

A) 74

B) 122

C) $74 + 154i$

D) $122 + 154i$

Estimated Difficulty: Medium	**Key:** D

Choice D is correct. Applying the distributive property to multiply the binomials yields the expression $98 + 168i - 14i - 24i^2$. The note in the question reminds you that $i = \sqrt{-1}$, therefore $i^2 = -1$. Substituting this value into the expression gives you $98 + 168i - 14i - (-24)$, and combining like terms results in $122 + 154i$.

Choice A is incorrect and may result from a combination of errors. You may not have correctly distributed when multiplying the binomials, multiplying only the first terms together and the second terms together. You may also have used the incorrect equality $i^2 = 1$.

Choice B is incorrect and may result from a combination of errors. You may not have correctly distributed when multiplying the binomials, multiplying only the first terms together and the second terms together.

Choice C is incorrect and results from misapplying the statement $i = \sqrt{-1}$.

5

Which of the following is equal to $\sin\left(\frac{\pi}{5}\right)$?

A) $-\cos\left(\frac{\pi}{5}\right)$

B) $-\sin\left(\frac{\pi}{5}\right)$

C) $\cos\left(\frac{3\pi}{10}\right)$

D) $\sin\left(\frac{7\pi}{10}\right)$

Estimated Difficulty: Hard	**Key:** C

Choice C is correct. Sine and cosine are related by the equation: $\sin(x) = \cos\left(\frac{\pi}{2} - x\right)$. Therefore, $\sin\left(\frac{\pi}{5}\right) = \cos\left(\frac{\pi}{2} - \frac{\pi}{5}\right)$, which reduces to $\cos\left(\frac{\pi}{10}\right)$.

Choice A is incorrect and may result from a misunderstanding about trigonometric relationships. You may have thought that cosine is the inverse function of sine and therefore reasoned that the negative of the cosine of an angle is equivalent to the sine of that angle.

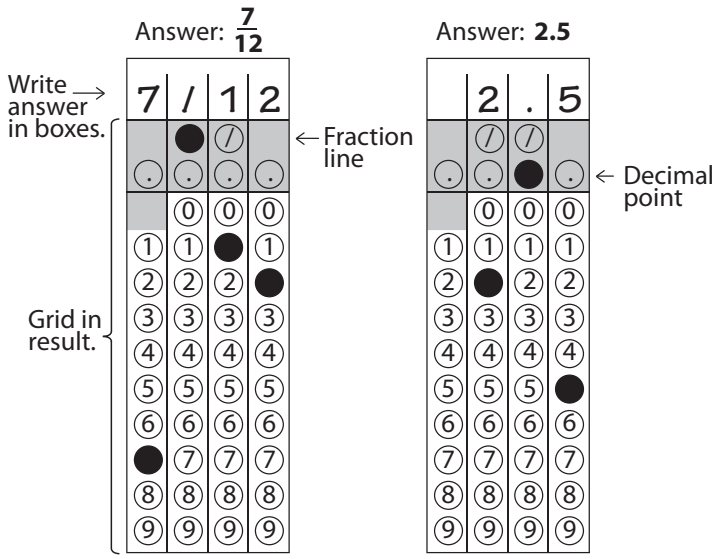
Choice B is incorrect and may result from a misunderstanding of the unit circle and how it relates to trigonometric expressions. You may have thought that, on a coordinate grid, the negative sign only changes the orientation of the triangle formed, not the value of the trigonometric expression.

Choice D is incorrect. You may have confused the relationship between sine and cosine and erroneously added $\frac{\pi}{2}$ to the given angle measure instead of subtracting the angle measure from $\frac{\pi}{2}$.

Student-Produced Response Math Questions

For some questions in the Math Tests, you will be asked to solve the problem and enter your answer in the grid, as described below, on the answer sheet.

1. 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.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
4. Some problems may have more than one correct answer. In such cases, grid only one answer.
5. 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 $3\frac{1}{2}$.)
6. **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.



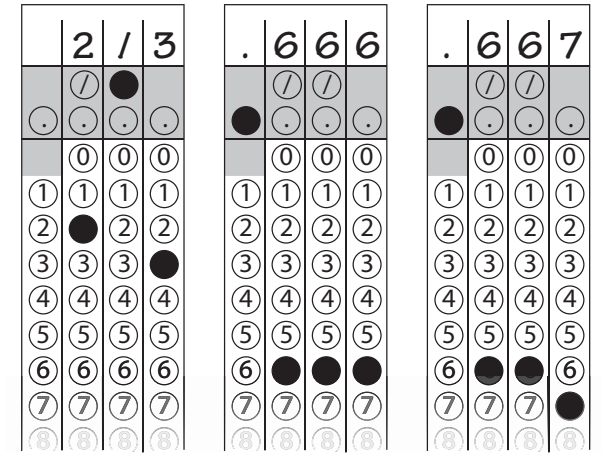
6

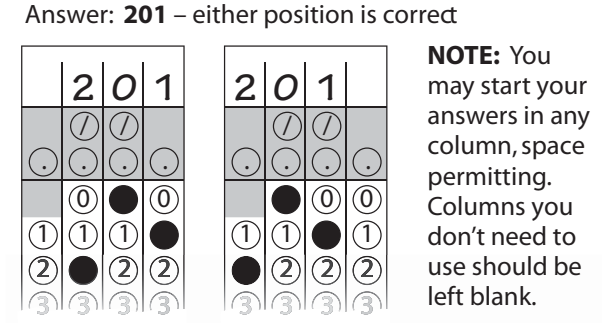
$$x^2 + y^2 - 6x + 8y = 144$$

The equation of a circle in the xy-plane is shown above. What is the *diameter* of the circle?

Estimated Difficulty: Hard	**Key:** 26

Completing the square yields the equation $(x - 3)^2 + (y + 4)^2 = 169$, the standard form of an equation of the circle. Understanding this form results in the equation $r^2 = 169$, which when solved for r gives the value of the radius as 13. Diameter is twice the value of the radius; therefore, the diameter is 26.





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

Math Test – Calculator Questions

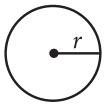
Directions

For questions 1-8, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 9-10**, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 6 on page 24 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

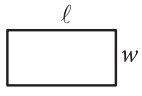
Notes

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.

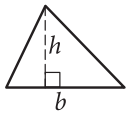
Reference



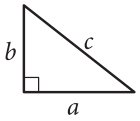
$A = \pi r^2$
$C = 2\pi$



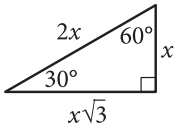
$A = \ell w$

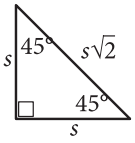


$A = \frac{1}{2}bh$

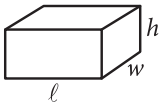


$c^2 = a^2 + b^2$

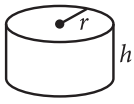




Special Right Triangles

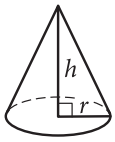


$V = \ell wh$

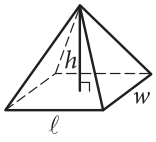


$V = \pi r^2 h$

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



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



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

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

The number of radians of arc in a circle is 2π.

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

1

The recommended daily calcium intake for a 20-year-old is 1,000 milligrams (mg). One cup of milk contains 299 mg of calcium and one cup of juice contains 261 mg of calcium. Which of the following inequalities represents the possible number of cups of milk m and cups of juice j a 20-year-old could drink in a day to meet or exceed the recommended daily calcium intake from these drinks alone?

A) $299m + 261j \geq 1{,}000$

B) $299m + 261j > 1{,}000$

C) $\frac{299}{m} + \frac{261}{j} \geq 1{,}000$

D) $\frac{299}{m} + \frac{261}{j} > 1{,}000$

Estimated Difficulty: Easy	**Key:** A

Choice A is correct. Multiplying the number of cups of milk by the amount of calcium each cup contains and multiplying the number of cups of juice by the amount of calcium each cup contains gives the total amount of calcium from each source. You must then find the sum of these two numbers to find the total amount of calcium. Because the question asks for the calcium from these two sources to meet or exceed the recommended daily intake, the sum of these two products must be greater than or equal to 1,000.

Choice B is incorrect and may result from a misunderstanding of the meaning of inequality symbols as they relate to real-life situations. This answer does not allow for the daily intake to meet the recommended daily amount.

Choice C is incorrect and may result from a misunderstanding of proportional relationships. Here the wrong operation is applied, with the total amount of calcium per cup divided by the number of cups of each type of drink. These values should be multiplied.

Choice D is incorrect and may result from a combination of mistakes. The inequality symbol used allows the option to exceed, but not to meet, the recommended daily value, and the wrong operation may have been applied when calculating the total amount of calcium intake from each drink.

2

A company's manager estimated that the cost C, in dollars, of producing n items is $C = 7n + 350$. The company sells each item for $12. The company makes a profit when the total income from selling a quantity of items is greater than the total cost of producing that quantity of items. Which of the following inequalities gives all possible values of n for which the manager estimates that the company will make a profit?

A) $n < 70$

B) $n < 84$

C) $n > 70$

D) $n > 84$

Estimated Difficulty: Medium	**Key:** C

Choice C is correct. One way to find the correct answer is to create an inequality. The income from sales of n items is $12n$. For the company to profit, $12n$ must be greater than the cost of producing n items; therefore, the inequality $12n > 7n + 350$ can be used to model the scenario. Solving this inequality yields $n > 70$.

Choice A is incorrect and may result from a misunderstanding of the properties of inequalities. You may have found the number of items of the break-even point as 70 and used the incorrect notation to express the answer, or you may have incorrectly modeled the scenario when setting up an inequality to solve.

Choice B is incorrect and may result from a misunderstanding of how the cost equation models the scenario. If you use the cost of $12 as the number of items n and evaluate the expression $7n$, you will find the value of 84. Misunderstanding how the inequality relates to the scenario might lead you to think n should be less than this value.

Choice D is incorrect and may result from a misunderstanding of how the cost equation models the scenario. If you use the cost of $12 as the number of items n and evaluate the expression $7n$, you will find the value of 84. Misunderstanding how the inequality relates to the scenario might lead you to think n should be greater than this value.

3

At a primate reserve, the mean age of all the male primates is 15 years, and the mean age of all female primates is 19 years. Which of the following must be true about the mean age m of the combined group of male and female primates at the primate reserve?

A) $m = 17$

B) $m > 17$

C) $m < 17$

D) $15 < m < 19$

Estimated Difficulty: Medium	**Key:** D

Choice D is correct. You must reason that because the mean of the males is lower than that of the females, the combined mean cannot be greater than or equal to that of the females, while also reasoning that because the mean of the females is greater than that of the males, the combined mean cannot be less than or equal to the mean of the males. Therefore, the combined mean must be between the two separate means.

Choice A is incorrect and results from finding the mean of the two means. This answer makes an unjustified assumption that there are an equal number of male and female primates.

Choice B is incorrect and results from finding the mean of the two means and misapplying an inequality to the scenario. This answer makes an unjustified assumption that there are more females than males.

Choice C is incorrect and results from finding the mean of the two means and misapplying an inequality to the scenario. This answer makes an unjustified assumption that there are more males than females.

4

A biology class at Central High School predicted that a local population of animals will double in size every 12 years. The population at the beginning of 2014 was estimated to be 50 animals. If P represents the population n years after 2014, then which of the following equations represents the class's model of the population over time?

A) $P = 12 + 50n$

B) $P = 50 + 12n$

C) $P = 50(2)^{12n}$

D) $P = 50(2)^{\frac{n}{12}}$

Estimated Difficulty: Medium	**Key:** D

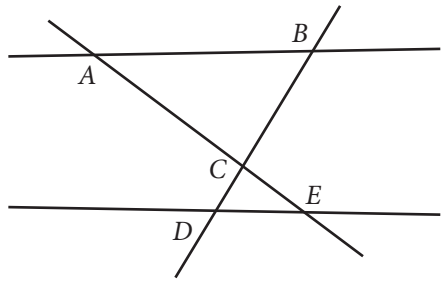
Choice D is correct. You must first recognize that a population that doubles in size over equal time periods is increasing at an exponential rate. In a doubling scenario, an exponential growth model can be written in the form $y = a(2)^{\frac{n}{b}}$, where a is the initial population (that is, the population when $n = 0$) and b is the number of years it takes for the population to double in size. In this case, the initial population is 50, the number of animals at the beginning of 2014. Therefore, $a = 50$. The text explains that the population will double in size every 12 years. Therefore, $b = 12$.

Choice A is incorrect and may result from a misunderstanding of exponential equations or of the context. This linear model indicates that the initial population is 12 animals and the population is increasing by 50 animals each year. However, this is not the case.

Choice B is incorrect and may result from a misunderstanding of exponential equations or of the scenario. This linear model indicates that the initial population is 50 animals and the population is increasing by 12 animals each year. However, this is not the case.

Choice C is incorrect. This exponential model indicates that the initial population is 50 animals and is doubling. However, the exponent $12n$ indicates that the population is doubling 12 times per year, not every 12 years. This is not the case.

5



Note: Figure not drawn to scale.

In the figure above, $\triangle ABC \sim \triangle EDC$. Which of the following must be true?

A) $\overline{AE} \parallel \overline{BD}$
B) $\overline{AE} \perp \overline{BD}$
C) $\overline{AB} \parallel \overline{DE}$
D) $\overline{AB} \perp \overline{DE}$

Estimated Difficulty: Medium	**Key:** C

Choice C is correct. Given that $\triangle ABC$ is similar to $\triangle EDC$, you can determine that the corresponding $\angle BAC$ is congruent to $\angle CED$. The converse of the alternate interior angle theorem tells us that $\overline{AB} \parallel \overline{DE}$. (You can also use the fact that $\angle ABC$ and $\angle CDE$ are congruent to make a similar argument.)

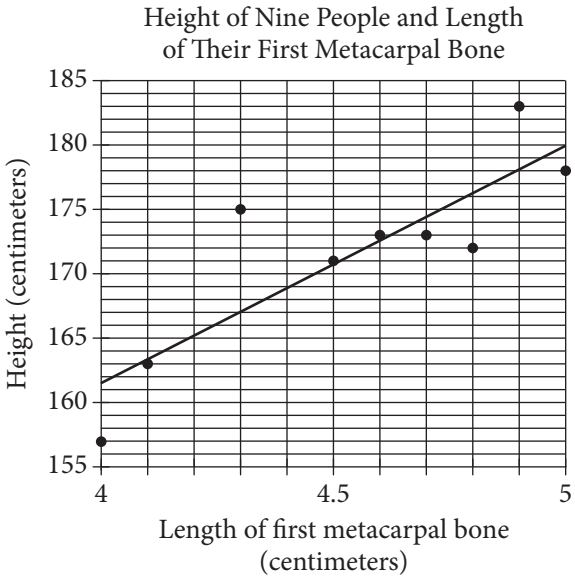
Choice A is incorrect and may result from multiple misconceptions. You may have misidentified the segments as perpendicular and used the wrong notation to express this statement.

Choice B is incorrect and may result from using only the diagram and not considering the given information. The line segments appear to be perpendicular, but need not be, given the information provided.

Choice D is incorrect and may result from misunderstanding either the notation or the vocabulary of parallel and perpendicular lines. You may have incorrectly identified parallel lines as perpendicular.

Questions 6–8 refer to the following information.

The first metacarpal bone is located in the hand. The scatterplot below shows the relationship between the length of the first metacarpal bone and height of 9 people. The line of best fit is also shown.



6

How many of the 9 people have an actual height that differs by more than 3 centimeters from the height predicted by the line of best fit?

A) 2
B) 4
C) 6
D) 9

Estimated Difficulty: Easy	**Key:** B

Choice B is correct. The people who have first metacarpal bones of length 4.0, 4.3, 4.8, and 4.9 centimeters have heights that differ by more than 3 centimeters from the height predicted by the line of best fit.

Choice A is incorrect. There are 2 people whose actual heights are more than 3 centimeters above the height predicted by the line of best fit. However, there are also 2 people whose actual heights are farther than 3 centimeters below the line of best fit.

Choice C is incorrect. There are 6 data points in which the absolute value between the actual height and the height predicted by the line of best fit is greater than 1 centimeter.

Choice D is incorrect. The data on the graph represents 9 different people; however, the absolute value of the difference between actual height and predicted height is not greater than 3 for all of the people.

7

Which of the following is the best interpretation of the slope of the line of best fit in the context of this problem?

A) The predicted height increase in centimeters for one centimeter increase in the first metacarpal bone

B) The predicted first metacarpal bone increase in centimeters for every centimeter increase in height

C) The predicted height in centimeters of a person with a first metacarpal bone length of 0 centimeters

D) The predicted first metacarpal bone length in centimeters for a person with a height of 0 centimeters

Estimated Difficulty: Easy	**Key:** A

Choice A is correct. The slope is the change in the vertical distance divided by the change in the horizontal distance between any two points on a line. In this context, the change in the vertical distance is the change in the predicted height of a person, and the change in the horizontal distance is the change in the length of his or her first metacarpal bone. The unit rate, or slope, is the increase in predicted height for each increase of one centimeter of the first metacarpal bone.

Choice B is incorrect. If you selected this answer, you may have interpreted slope incorrectly as run over rise.

Choice C is incorrect. If you selected this answer, you may have mistaken slope for the y-intercept.

Choice D is incorrect. If you selected this answer, you may have mistaken slope for the x-intercept.

8

Based on the line of best fit, what is the predicted height for someone with a first metacarpal bone that has a length of 4.45 centimeters?

A) 168 centimeters

B) 169 centimeters

C) 170 centimeters

D) 171 centimeters

Estimated Difficulty: Easy	**Key:** C

Choice C is correct. You must notice that the scale of the x-axis is 0.1, and therefore the x-value of 4.45 is halfway between the unmarked value of 4.4 and the marked value of 4.5. You must then find the y-value on the line of best fit that corresponds with an x-value of 4.45, which is 170.

Choice A is incorrect. If you mistakenly find the point on the line between the x-values of 4.3 and 4.4, you will likely find a predicted metacarpal bone length of 168 centimeters.

Choice B is incorrect. If you mistakenly find the point on the line that corresponds with an x-value of 4.4 centimeters, you will likely find a predicted height of approximately 169 centimeters.

Choice D is incorrect. If you mistakenly find the point on the line that corresponds with an x-value of 4.5 centimeters, you will likely find a predicted height of approximately 171 centimeters. You might also choose this option if you mistakenly use the data point that has an x-value closest to 4.45 centimeters.

Student-Produced Response Math Questions

For questions 9 and 10, you are asked to solve the problem and enter your answer in the grid, as described on page 24 of this booklet.

9

The table below classifies 103 elements as metal, metalloid, or nonmetal and as solid, liquid, or gas at standard temperature and pressure.

	Solids	Liquids	Gases	Total
Metals	77	1	0	78
Metalloids	7	0	0	7
Nonmetals	6	1	11	18
Total	90	2	11	103

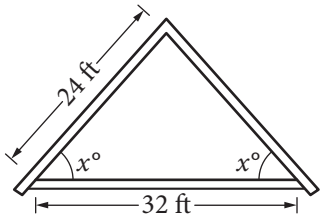
What fraction of all solids and liquids in the table are metalloids?

Estimated Difficulty: Easy | **Key:** $\frac{7}{92}$

There are 7 metalloids that are solid or liquid, and there are 92 total solids and liquids. Therefore, the fraction of solids and liquids that are metalloids is $\frac{7}{92}$.

10

An architect drew the sketch below while designing a house roof. The dimensions shown are for the interior of the triangle.



Note: Figure not drawn to scale.

What is the value of cos x?

Estimated Difficulty: Hard | **Key:** $\frac{2}{3}$

Because the triangle is isosceles, constructing a perpendicular from the top vertex to the opposite side will bisect the base and create two smaller right triangles. In a right triangle, the cosine of an acute angle is equal to the length of the side adjacent to the angle divided by the length of the hypotenuse. This gives $\cos x = \frac{16}{24}$, which can be simplified to $\cos x = \frac{2}{3}$. Note that $\frac{16}{24}$ cannot be entered into the answer grid, so this fraction must be reduced.)

Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

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

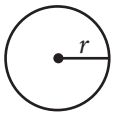
DIRECTIONS

For questions 1-15, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 16-20**, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 16 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

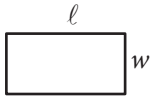
NOTES

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.

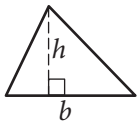
REFERENCE



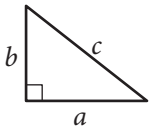
$A = \pi r^2$
$C = 2\pi r$



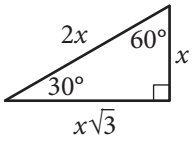
$A = \ell w$

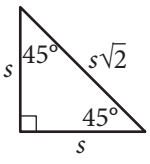


$A = \frac{1}{2}bh$

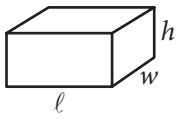


$c^2 = a^2 + b^2$

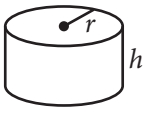




Special Right Triangles

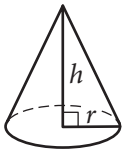


$V = \ell wh$

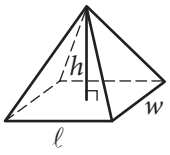


$V = \pi r^2 h$

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



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



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

The number of degrees of arc in a circle is 360.
The number of radians of arc in a circle is 2π.
The sum of the measures in degrees of the angles of a triangle is 180.

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CONTINUE

1

If $\frac{x-1}{3} = k$ and $k = 3$, what is the value of x ?

A) 2

B) 4

C) 9

D) 10

2

For $i = \sqrt{-1}$, what is the sum $(7 + 3i) + (-8 + 9i)$?

A) $-1 + 12i$

B) $-1 - 6i$

C) $15 + 12i$

D) $15 - 6i$

3

On Saturday afternoon, Armand sent m text messages each hour for 5 hours, and Tyrone sent p text messages each hour for 4 hours. Which of the following represents the total number of messages sent by Armand and Tyrone on Saturday afternoon?

A) $9mp$

B) $20mp$

C) $5m + 4p$

D) $4m + 5p$

4

Kathy is a repair technician for a phone company. Each week, she receives a batch of phones that need repairs. The number of phones that she has left to fix at the end of each day can be estimated with the equation $P = 108 - 23d$, where P is the number of phones left and d is the number of days she has worked that week. What is the meaning of the value 108 in this equation?

A) Kathy will complete the repairs within 108 days.

B) Kathy starts each week with 108 phones to fix.

C) Kathy repairs phones at a rate of 108 per hour.

D) Kathy repairs phones at a rate of 108 per day.

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CONTINUE

5

$$(x^2y - 3y^2 + 5xy^2) - (-x^2y + 3xy^2 - 3y^2)$$

Which of the following is equivalent to the expression above?

A) $4x^2y^2$

B) $8xy^2 - 6y^2$

C) $2x^2y + 2xy^2$

D) $2x^2y + 8xy^2 - 6y^2$

6

$$h = 3a + 28.6$$

A pediatrician uses the model above to estimate the height h of a boy, in inches, in terms of the boy's age a, in years, between the ages of 2 and 5. Based on the model, what is the estimated increase, in inches, of a boy's height each year?

A) 3

B) 5.7

C) 9.5

D) 14.3

7

$$m = \frac{\left(\frac{r}{1{,}200}\right)\left(1 + \frac{r}{1{,}200}\right)^N}{\left(1 + \frac{r}{1{,}200}\right)^N - 1} P$$

The formula above gives the monthly payment m needed to pay off a loan of P dollars at r percent annual interest over N months. Which of the following gives P in terms of m, r, and N ?

A) $P = \frac{\left(\frac{r}{1{,}200}\right)\left(1 + \frac{r}{1{,}200}\right)^N}{\left(1 + \frac{r}{1{,}200}\right)^N - 1} m$

B) $P = \frac{\left(1 + \frac{r}{1{,}200}\right)^N - 1}{\left(\frac{r}{1{,}200}\right)\left(1 + \frac{r}{1{,}200}\right)^N} m$

C) $P = \left(\frac{r}{1{,}200}\right) m$

D) $P = \left(\frac{1{,}200}{r}\right) m$

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CONTINUE

8

If $\frac{a}{b} = 2$, what is the value of $\frac{4b}{a}$?

A) 0

B) 1

C) 2

D) 4

9

$$3x + 4y = -23$$
$$2y - x = -19$$

What is the solution (x, y) to the system of equations above?

A) $(-5, -2)$

B) $(3, -8)$

C) $(4, -6)$

D) $(9, -6)$

10

$$g(x) = ax^2 + 24$$

For the function g defined above, a is a constant and $g(4) = 8$. What is the value of $g(-4)$?

A) 8

B) 0

C) -1

D) -8

11

$$b = 2.35 + 0.25x$$
$$c = 1.75 + 0.40x$$

In the equations above, b and c represent the price per pound, in dollars, of beef and chicken, respectively, x weeks after July 1 during last summer. What was the price per pound of beef when it was equal to the price per pound of chicken?

A) \$2.60

B) \$2.85

C) \$2.95

D) \$3.35

12

A line in the xy-plane passes through the origin and has a slope of $\frac{1}{7}$. Which of the following points lies on the line?

A) $(0, 7)$

B) $(1, 7)$

C) $(7, 7)$

D) $(14, 2)$

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CONTINUE

13

If $x > 3$, which of the following is equivalent to $\dfrac{1}{\dfrac{1}{x+2}+\dfrac{1}{x+3}}$?

A) $\dfrac{2x+5}{x^2+5x+6}$

B) $\dfrac{x^2+5x+6}{2x+5}$

C) $2x+5$

D) x^2+5x+6

14

If $3x - y = 12$, what is the value of $\dfrac{8^x}{2^y}$?

A) 2^{12}

B) 4^4

C) 8^2

D) The value cannot be determined from the information given.

15

If $(ax+2)(bx+7) = 15x^2 + cx + 14$ for all values of x, and $a + b = 8$, what are the two possible values for c ?

A) 3 and 5

B) 6 and 35

C) 10 and 21

D) 31 and 41

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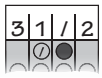
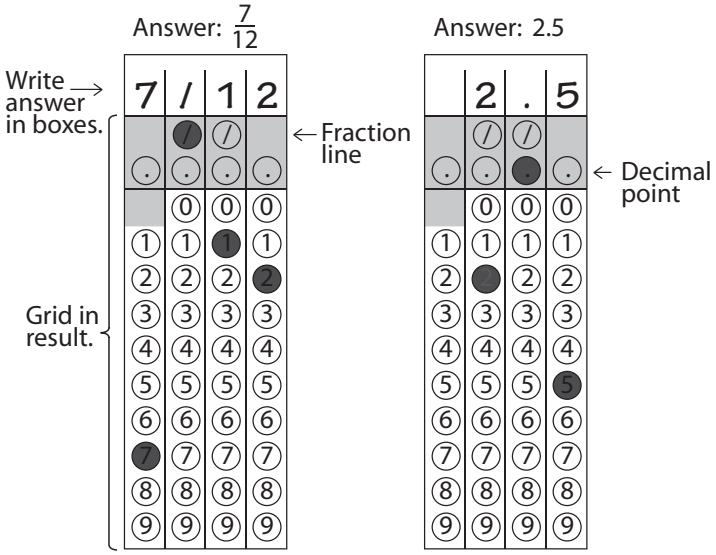
CONTINUE

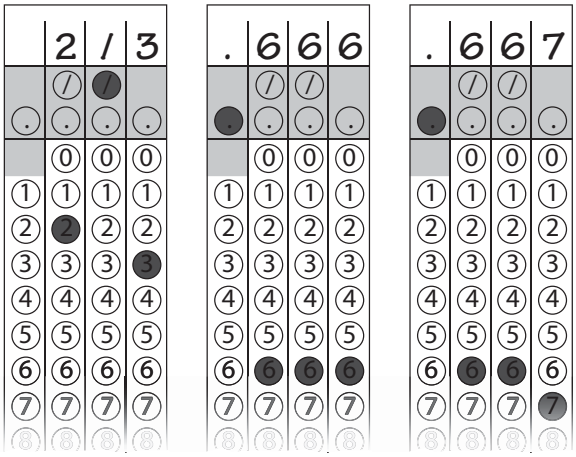
DIRECTIONS

For questions 16–20, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

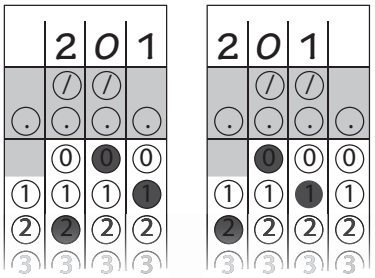
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
4. Some problems may have more than one correct answer. In such cases, grid only one answer.
5. **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 $3\frac{1}{2}$.)
6. **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.



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



Answer: 201 – either position is correct



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

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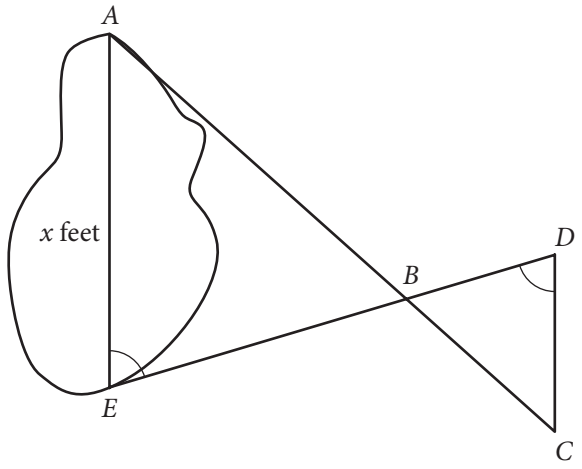
CONTINUE

16

If $t > 0$ and $t^2 - 4 = 0$, what is the value of t ?

17



A summer camp counselor wants to find a length, x, in feet, across a lake as represented in the sketch above. The lengths represented by AB, EB, BD, and CD on the sketch were determined to be 1800 feet, 1400 feet, 700 feet, and 800 feet, respectively. Segments AC and DE intersect at B, and $\angle AEB$ and $\angle CDB$ have the same measure. What is the value of x ?

18

$$x + y = -9$$
$$x + 2y = -25$$

According to the system of equations above, what is the value of x ?

19

In a right triangle, one angle measures $x°$, where $\sin x° = \frac{4}{5}$. What is $\cos(90° - x°)$?

20

If $a = 5\sqrt{2}$ and $2a = \sqrt{2x}$, what is the value of x ?

STOP

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

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Math Test – Calculator

55 MINUTES, 38 QUESTIONS

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

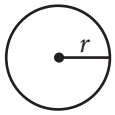
DIRECTIONS

For questions 1-30, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 31-38**, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 31 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

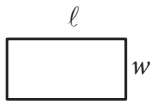
NOTES

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.

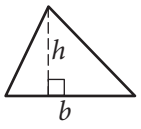
REFERENCE



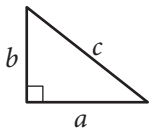
$A = \pi r^2$
$C = 2\pi r$



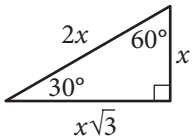
$A = \ell w$

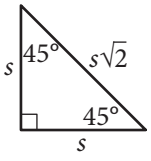


$A = \frac{1}{2}bh$

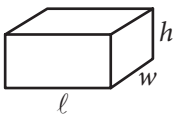


$c^2 = a^2 + b^2$

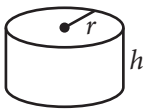




Special Right Triangles

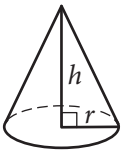


$V = \ell wh$

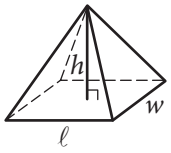


$V = \pi r^2 h$

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



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



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

The number of degrees of arc in a circle is 360.
The number of radians of arc in a circle is 2π.
The sum of the measures in degrees of the angles of a triangle is 180.

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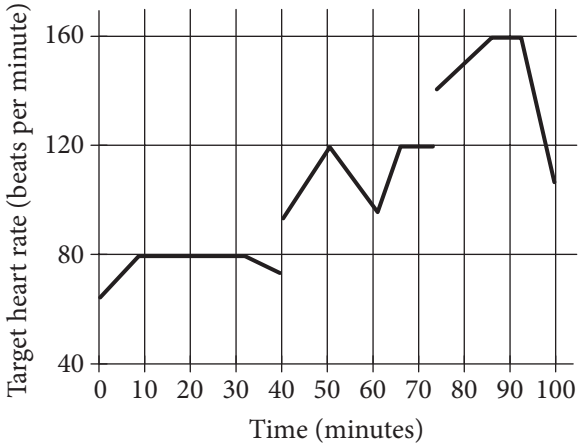
CONTINUE

1

John runs at different speeds as part of his training program. The graph shows his target heart rate at different times during his workout. On which interval is the target heart rate strictly increasing then strictly decreasing?



A) Between 0 and 30 minutes

B) Between 40 and 60 minutes

C) Between 50 and 65 minutes

D) Between 70 and 90 minutes

2

If $y = kx$, where k is a constant, and $y = 24$ when $x = 6$, what is the value of y when $x = 5$?

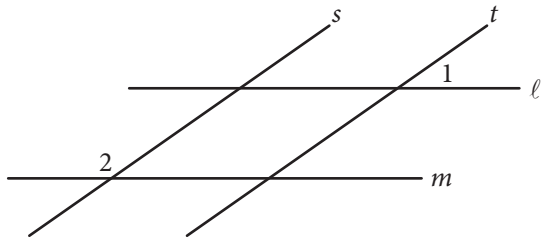
A) 6

B) 15

C) 20

D) 23

3



In the figure above, lines ℓ and m are parallel and lines s and t are parallel. If the measure of $\angle 1$ is 35°, what is the measure of $\angle 2$?

A) 35°

B) 55°

C) 70°

D) 145°

4

If $16 + 4x$ is 10 more than 14, what is the value of $8x$?

A) 2

B) 6

C) 16

D) 80

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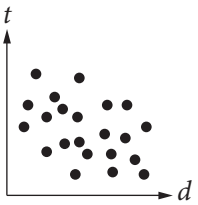
CONTINUE

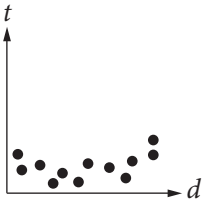
5

Which of the following graphs best shows a strong negative association between d and t ?

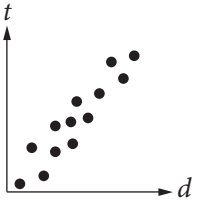
A)



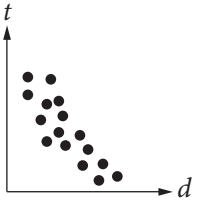
B)



C)



D)



6

1 decagram = 10 grams
1,000 milligrams = 1 gram

A hospital stores one type of medicine in 2-decagram containers. Based on the information given in the box above, how many 1-milligram doses are there in one 2-decagram container?

A) 0.002

B) 200

C) 2,000

D) 20,000

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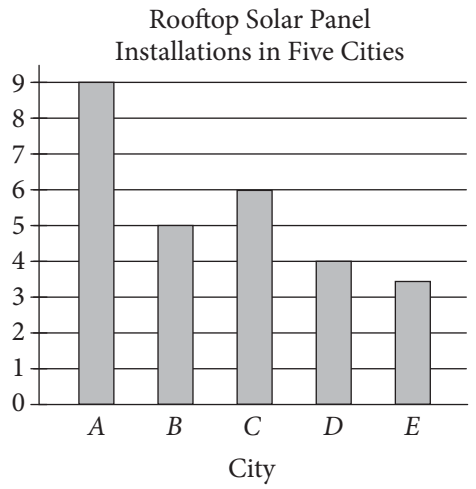
CONTINUE

7



The number of rooftops with solar panel installations in 5 cities is shown in the graph above. If the total number of installations is 27,500, what is an appropriate label for the vertical axis of the graph?

A) Number of installations (in tens)

B) Number of installations (in hundreds)

C) Number of installations (in thousands)

D) Number of installations (in tens of thousands)

8

For what value of n is $|n-1|+1$ equal to 0 ?

A) 0

B) 1

C) 2

D) There is no such value of n.

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CONTINUE

Questions 9 and 10 refer to the following information.

$$a = 1{,}052 + 1.08t$$

The speed of a sound wave in air depends on the air temperature. The formula above shows the relationship between a, the speed of a sound wave, in feet per second, and t, the air temperature, in degrees Fahrenheit (°F).

9

Which of the following expresses the air temperature in terms of the speed of a sound wave?

A) $t = \dfrac{a - 1{,}052}{1.08}$

B) $t = \dfrac{a + 1{,}052}{1.08}$

C) $t = \dfrac{1{,}052 - a}{1.08}$

D) $t = \dfrac{1.08}{a + 1{,}052}$

10

At which of the following air temperatures will the speed of a sound wave be closest to 1,000 feet per second?

A) −46°F

B) −48°F

C) −49°F

D) −50°F

11

Which of the following numbers is NOT a solution of the inequality $3x - 5 \geq 4x - 3$?

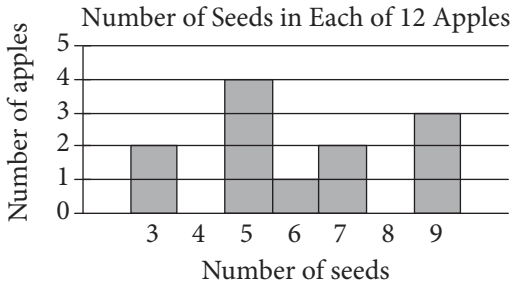
A) −1

B) −2

C) −3

D) −5

12



Based on the histogram above, of the following, which is closest to the average (arithmetic mean) number of seeds per apple?

A) 4

B) 5

C) 6

D) 7

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CONTINUE

13

		Course			
		Algebra I	Geometry	Algebra II	Total
Gender	Female	35	53	62	150
	Male	44	59	57	160
	Total	79	112	119	310

A group of tenth-grade students responded to a survey that asked which math course they were currently enrolled in. The survey data were broken down as shown in the table above. Which of the following categories accounts for approximately 19 percent of all the survey respondents?

A) Females taking Geometry

B) Females taking Algebra II

C) Males taking Geometry

D) Males taking Algebra I

14

Lengths of Fish (in inches)						
8	9	9	9	10	10	11
11	12	12	12	12	13	13
13	14	14	15	15	16	24

The table above lists the lengths, to the nearest inch, of a random sample of 21 brown bullhead fish. The outlier measurement of 24 inches is an error. Of the mean, median, and range of the values listed, which will change the most if the 24-inch measurement is removed from the data?

A) Mean

B) Median

C) Range

D) They will all change by the same amount.

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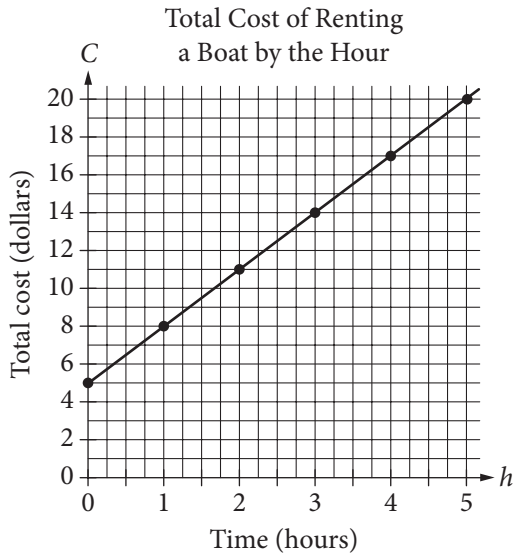
CONTINUE

Questions 15 and 16 refer to the following information.



The graph above displays the total cost C, in dollars, of renting a boat for h hours.

15

What does the C-intercept represent in the graph?

A) The initial cost of renting the boat

B) The total number of boats rented

C) The total number of hours the boat is rented

D) The increase in cost to rent the boat for each additional hour

16

Which of the following represents the relationship between h and C ?

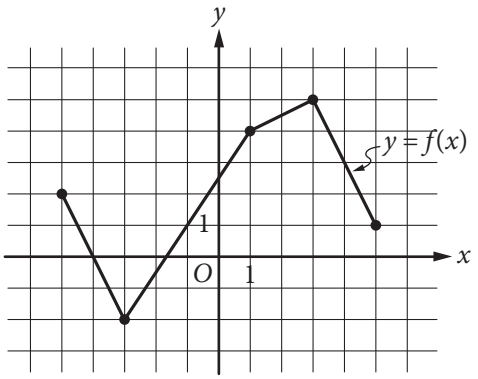
A) $C = 5h$

B) $C = \frac{3}{4}h + 5$

C) $C = 3h + 5$

D) $h = 3C$

17



The complete graph of the function f is shown in the xy-plane above. For what value of x is the value of $f(x)$ at its minimum?

A) -5

B) -3

C) -2

D) 3

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CONTINUE

18

$$y < -x + a$$
$$y > x + b$$

In the xy-plane, if $(0, 0)$ is a solution to the system of inequalities above, which of the following relationships between a and b must be true?

A) $a > b$

B) $b > a$

C) $|a| > |b|$

D) $a = -b$

19

A food truck sells salads for $6.50 each and drinks for $2.00 each. The food truck's revenue from selling a total of 209 salads and drinks in one day was $836.50. How many salads were sold that day?

A) 77

B) 93

C) 99

D) 105

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CONTINUE

20

Alma bought a laptop computer at a store that gave a 20 percent discount off its original price. The total amount she paid to the cashier was p dollars, including an 8 percent sales tax on the discounted price. Which of the following represents the original price of the computer in terms of p ?

A) $0.88p$

B) $\frac{p}{0.88}$

C) $(0.8)(1.08)p$

D) $\frac{p}{(0.8)(1.08)}$

21

Dreams Recalled during One Week

	None	1 to 4	5 or more	Total
Group X	15	28	57	100
Group Y	21	11	68	100
Total	36	39	125	200

The data in the table above were produced by a sleep researcher studying the number of dreams people recall when asked to record their dreams for one week. Group X consisted of 100 people who observed early bedtimes, and Group Y consisted of 100 people who observed later bedtimes. If a person is chosen at random from those who recalled at least 1 dream, what is the probability that the person belonged to Group Y ?

A) $\frac{68}{100}$

B) $\frac{79}{100}$

C) $\frac{79}{164}$

D) $\frac{164}{200}$

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CONTINUE

Questions 22 and 23 refer to the following information.

Annual Budgets for Different Programs in Kansas, 2007 to 2010

Program	Year			
	2007	2008	2009	2010
Agriculture/natural resources	373,904	358,708	485,807	488,106
Education	2,164,607	2,413,984	2,274,514	3,008,036
General government	14,347,325	12,554,845	10,392,107	14,716,155
Highways and transportation	1,468,482	1,665,636	1,539,480	1,773,893
Human resources	4,051,050	4,099,067	4,618,444	5,921,379
Public safety	263,463	398,326	355,935	464,233

The able above lists the annual budget, in thousands of dollars, for each of six different state programs in Kansas from 2007 to 2010.

22

Which of the following best approximates the average rate of change in the annual budget for agriculture/natural resources in Kansas from 2008 to 2010 ?

A) $50,000,000 per year
B) $65,000,000 per year
C) $75,000,000 per year
D) $130,000,000 per year

23

Of the following, which program's ratio of its 2007 budget to its 2010 budget is closest to the human resources program's ratio of its 2007 budget to its 2010 budget?

A) Agriculture/natural resources
B) Education
C) Highways and transportation
D) Public safety

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CONTINUE

24

Which of the following is an equation of a circle in the xy-plane with center $(0, 4)$ and a radius with endpoint $\left(\frac{4}{3}, 5\right)$?

A) $x^2 + (y - 4)^2 = \frac{25}{9}$

B) $x^2 + (y + 4)^2 = \frac{25}{9}$

C) $x^2 + (y - 4)^2 = \frac{5}{3}$

D) $x^2 + (y + 4)^2 = \frac{3}{5}$

25

$$h = -4.9t^2 + 25t$$

The equation above expresses the approximate height h, in meters, of a ball t seconds after it is launched vertically upward from the ground with an initial velocity of 25 meters per second. After approximately how many seconds will the ball hit the ground?

A) 3.5

B) 4.0

C) 4.5

D) 5.0

26

Katarina is a botanist studying the production of pears by two types of pear trees. She noticed that Type A trees produced 20 percent more pears than Type B trees did. Based on Katarina's observation, if the Type A trees produced 144 pears, how many pears did the Type B trees produce?

A) 115

B) 120

C) 124

D) 173

27

A square field measures 10 meters by 10 meters. Ten students each mark off a randomly selected region of the field; each region is square and has side lengths of 1 meter, and no two regions overlap. The students count the earthworms contained in the soil to a depth of 5 centimeters beneath the ground's surface in each region. The results are shown in the table below.

Region	Number of earthworms	Region	Number of earthworms
A	107	F	141
B	147	G	150
C	146	H	154
D	135	I	176
E	149	J	166

Which of the following is a reasonable approximation of the number of earthworms to a depth of 5 centimeters beneath the ground's surface in the entire field?

A) 150

B) 1,500

C) 15,000

D) 150,000

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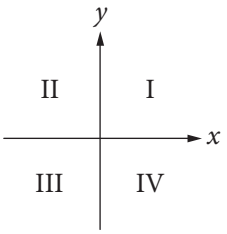
CONTINUE

28



If the system of inequalities $y \geq 2x + 1$ and $y > \frac{1}{2}x - 1$ is graphed in the xy-plane above, which quadrant contains no solutions to the system?

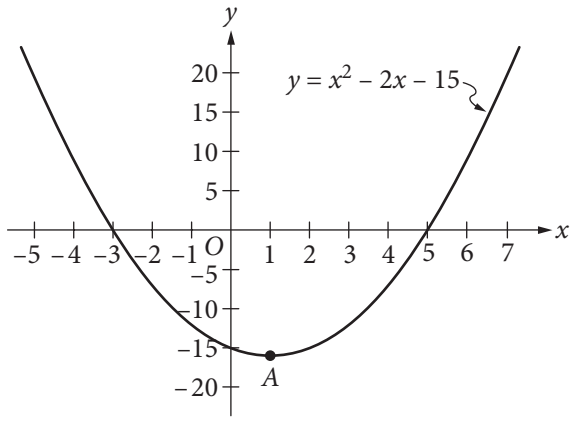
A) Quadrant II
B) Quadrant III
C) Quadrant IV
D) There are solutions in all four quadrants.

29

For a polynomial $p(x)$, the value of $p(3)$ is -2. Which of the following must be true about $p(x)$?

A) $x - 5$ is a factor of $p(x)$.
B) $x - 2$ is a factor of $p(x)$.
C) $x + 2$ is a factor of $p(x)$.
D) The remainder when $p(x)$ is divided by $x - 3$ is -2.

30



Which of the following is an equivalent form of the equation of the graph shown in the xy-plane above, from which the coordinates of vertex A can be identified as constants in the equation?

A) $y = (x + 3)(x - 5)$
B) $y = (x - 3)(x + 5)$
C) $y = x(x - 2) - 15$
D) $y = (x - 1)^2 - 16$

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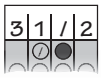
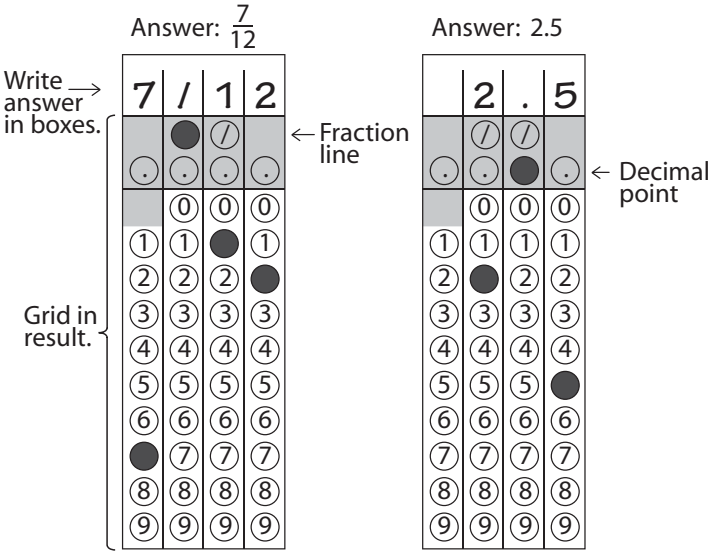
CONTINUE

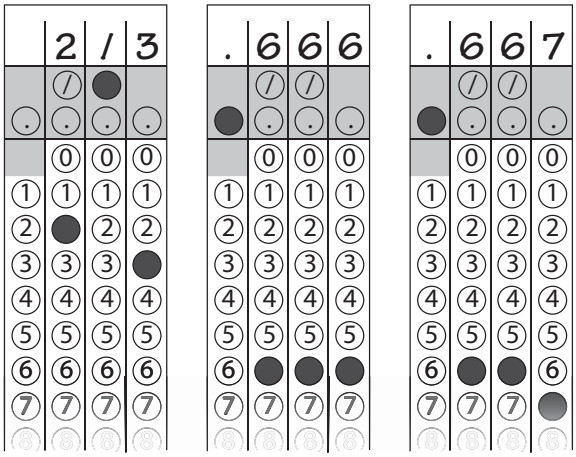
DIRECTIONS

For questions 31–38, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

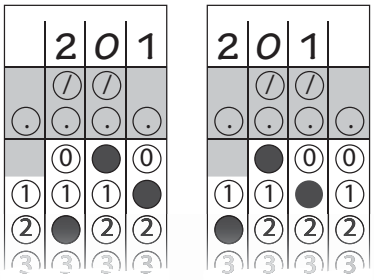
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
4. Some problems may have more than one correct answer. In such cases, grid only one answer.
5. **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 $3\frac{1}{2}$.)
6. **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.



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



Answer: 201 – either position is correct



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

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CONTINUE

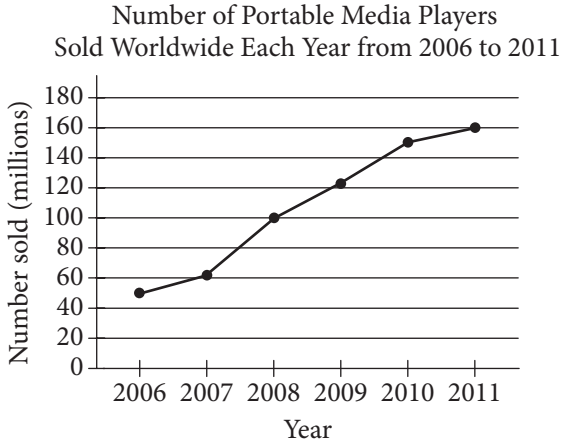
31

Wyatt can husk at least 12 dozen ears of corn per hour and at most 18 dozen ears of corn per hour. Based on this information, what is a possible amount of time, in hours, that it could take Wyatt to husk 72 dozen ears of corn?

32

The posted weight limit for a covered wooden bridge in Pennsylvania is 6000 pounds. A delivery truck that is carrying x identical boxes each weighing 14 pounds will pass over the bridge. If the combined weight of the empty delivery truck and its driver is 4500 pounds, what is the maximum possible value for x that will keep the combined weight of the truck, driver, and boxes below the bridge's posted weight limit?

33



According to the line graph above, the number of portable media players sold in 2008 is what fraction of the number sold in 2011 ?

34

A local television station sells time slots for programs in 30-minute intervals. If the station operates 24 hours per day, every day of the week, what is the total number of 30-minute time slots the station can sell for Tuesday and Wednesday?

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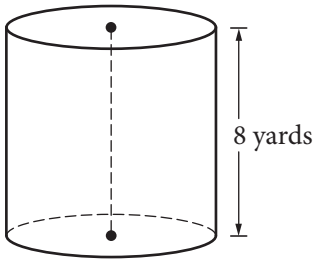
CONTINUE

35



A dairy farmer uses a storage silo that is in the shape of the right circular cylinder above. If the volume of the silo is 72π cubic yards, what is the diameter of the base of the cylinder, in yards?

36

$$h(x) = \frac{1}{(x-5)^2 + 4(x-5) + 4}$$

For what value of x is the function h above undefined?

Questions 37 and 38 refer to the following information.

Jessica opened a bank account that earns 2 percent interest compounded annually. Her initial deposit was \$100, and she uses the expression $\$100(x)^t$ to find the value of the account after t years.

37

What is the value of x in the expression?

38

Jessica's friend Tyshaun found an account that earns 2.5 percent interest compounded annually. Tyshaun made an initial deposit of \$100 into this account at the same time Jessica made a deposit of \$100 into her account. After 10 years, how much more money will Tyshaun's initial deposit have earned than Jessica's initial deposit? (Round your answer to the nearest cent and ignore the dollar sign when gridding your response.)

STOP

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

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Personalized SAT Practice	satpractice.org
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