

Name: _____

| DATE | SECTION |
|-----------------------------|---|
| M 05/23 | Exam 1, Section 3 <ul style="list-style-type: none"> • 25 minutes—20 Questions • No Calculator |
| T 05/24 | Go over problems |
| W 05/25 | Exam 1, Section 4 (half) <ul style="list-style-type: none"> • 30 minutes—21 Questions • Calculator |
| R 05/26 | Go over problems |
| F 05/27 | Exam 1, Section 4 (half) <ul style="list-style-type: none"> • 25 minutes—18 Questions • Calculator |
| M 05/30 | NO SCHOOL—Memorial Day |
| T 05/31 | Go over problems |
| W 06/01 | Exam 2, Section 3 <ul style="list-style-type: none"> • 25 minutes—20 Questions • No Calculator |
| R 06/02 | Go over problems |
| F 06/03 | Exam 2, Section 4 (half) <ul style="list-style-type: none"> • 30 minutes—21 Questions • Calculator |
| M 06/06 | Go over problems |
| T 06/07 (Finals 1 and 3) | Exam 2, Section 4 (half) <ul style="list-style-type: none"> • 25 minutes—18 Questions • Calculator |
| W 06/08 (Finals 8 and 4) | Go over problems |
| R 06/09 (Finals 2 and 5) | Go over problems |
| F 06/10 (Finals 7 and 6) | SAT Practice Exam (both math sections) <ul style="list-style-type: none"> • 20 non-calculator (25 minutes) • 38 calculator (55 minutes) • Class is 90 minute finals period |



SAT[®] Practice Test #1

IMPORTANT REMINDERS

1

A No. 2 pencil is required for the test.
Do not use a mechanical pencil or pen.

2

Sharing any questions with anyone
is a violation of Test Security
and Fairness policies and may result
in your scores being canceled.

This cover is representative of what you'll see on test day.

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Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

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

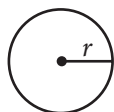
DIRECTIONS

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

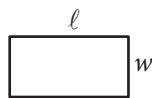
- The use of a calculator **is not permitted**.
- All variables and expressions used represent real numbers unless otherwise indicated.
- Figures provided in this test are drawn to scale unless otherwise indicated.
- All figures lie in a plane unless otherwise indicated.
- Unless otherwise indicated,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

REFERENCE

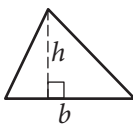


$$A = \pi r^2$$

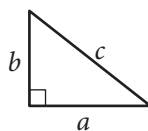
$$C = 2\pi r$$



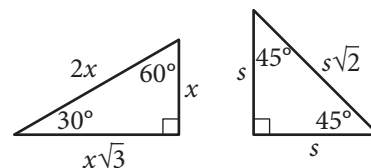
$$A = \ell w$$



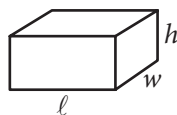
$$A = \frac{1}{2}bh$$



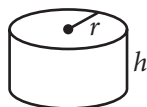
$$c^2 = a^2 + b^2$$



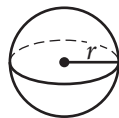
Special Right Triangles



$$V = \ell wh$$



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



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



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



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

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.



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.



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



8

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

- A) 0
- B) 1
- C) 2
- D) 4

9

$$\begin{aligned} 3x + 4y &= -23 \\ 2y - x &= -19 \end{aligned}$$

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) $(14, 2)$



13

If $x > 3$, which of the following is equivalent

to $\frac{1}{\frac{1}{x+2} + \frac{1}{x+3}}$?

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

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

C) $2x+5$

D) x^2+5x+6

14

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

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

**DIRECTIONS**

For questions 16–20, 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 $\begin{array}{|c|c|c|c|} \hline 3 & 1 & / & 2 \\ \hline \bullet & \bullet & / & \bullet \\ \hline \end{array}$ 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.

Write answer → in boxes.

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

| | | | | |
|---|---|---|---|---|
| | 7 | / | 1 | 2 |
| | ● | / | | |
| ● | ● | ● | ● | ● |
| | 0 | 0 | 0 | 0 |
| ① | ① | ● | ① | |
| ② | ② | ② | ● | |
| ③ | ③ | ③ | ③ | |
| ④ | ④ | ④ | ④ | |
| ⑤ | ⑤ | ⑤ | ⑤ | |
| ⑥ | ⑥ | ⑥ | ⑥ | |
| ● | ⑦ | ⑦ | ⑦ | |
| ⑧ | ⑧ | ⑧ | ⑧ | |
| ⑨ | ⑨ | ⑨ | ⑨ | |

← Fraction line

← Decimal point

Grid in result.

Answer: 2.5

| | | | |
|---|---|---|---|
| | 2 | . | 5 |
| | / | / | |
| ● | ● | ● | ● |
| | 0 | 0 | 0 |
| ① | ① | ① | ① |
| ② | ● | ② | ② |
| ③ | ③ | ③ | ③ |
| ④ | ④ | ④ | ④ |
| ⑤ | ⑤ | ⑤ | ● |
| ⑥ | ⑥ | ⑥ | ⑥ |
| ⑦ | ⑦ | ⑦ | ⑦ |
| ⑧ | ⑧ | ⑧ | ⑧ |
| ⑨ | ⑨ | ⑨ | ⑨ |

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

| | | | |
|---|---|---|---|
| | 2 | / | 3 |
| | / | ● | |
| ● | ● | ● | ● |
| | 0 | 0 | 0 |
| ① | ① | ① | ① |
| ② | ● | ② | ② |
| ③ | ③ | ③ | ● |
| ④ | ④ | ④ | ④ |
| ⑤ | ⑤ | ⑤ | ⑤ |
| ⑥ | ⑥ | ⑥ | ⑥ |
| ⑦ | ⑦ | ⑦ | ⑦ |
| ⑧ | ⑧ | ⑧ | ⑧ |
| ⑨ | ⑨ | ⑨ | ⑨ |

| | | | |
|---|---|---|---|
| . | 6 | 6 | 6 |
| | / | / | |
| ● | ● | ● | ● |
| | 0 | 0 | 0 |
| ① | ① | ① | ① |
| ② | ② | ② | ② |
| ③ | ③ | ③ | ③ |
| ④ | ④ | ④ | ④ |
| ⑤ | ⑤ | ⑤ | ⑤ |
| ⑥ | ● | ● | ● |
| ⑦ | ⑦ | ⑦ | ⑦ |
| ⑧ | ⑧ | ⑧ | ⑧ |
| ⑨ | ⑨ | ⑨ | ⑨ |

| | | | |
|---|---|---|---|
| . | 6 | 6 | 7 |
| | / | / | |
| ● | ● | ● | ● |
| | 0 | 0 | 0 |
| ① | ① | ① | ① |
| ② | ② | ② | ② |
| ③ | ③ | ③ | ③ |
| ④ | ④ | ④ | ④ |
| ⑤ | ⑤ | ⑤ | ⑤ |
| ⑥ | ● | ● | ⑥ |
| ⑦ | ⑦ | ⑦ | ● |
| ⑧ | ⑧ | ⑧ | ⑧ |
| ⑨ | ⑨ | ⑨ | ⑨ |

Answer: 201 – either position is correct

| | | | |
|---|---|---|---|
| | 2 | 0 | 1 |
| | / | / | |
| ● | ● | ● | ● |
| | 0 | ● | 0 |
| ① | ① | ① | ● |
| ② | ● | ② | ② |
| ③ | ③ | ③ | ③ |

| | | | |
|---|---|---|---|
| | 2 | 0 | 1 |
| | / | / | |
| ● | ● | ● | ● |
| | ● | 0 | 0 |
| ① | ① | ● | ① |
| ② | ● | ② | ② |
| ③ | ③ | ③ | ③ |

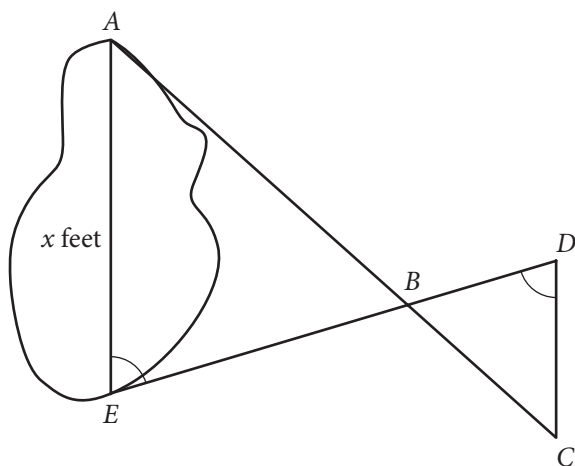
NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.



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

$$\begin{aligned}x + y &= -9 \\x + 2y &= -25\end{aligned}$$

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

19

In a right triangle, one angle measures x° , where

$$\sin x^\circ = \frac{4}{5}. \text{ What is } \cos(90^\circ - x^\circ) ?$$

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.**

No Test Material On This Page



Math Test – Calculator

55 MINUTES, 38 QUESTIONS

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

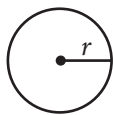
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NOTES

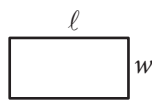
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REFERENCE

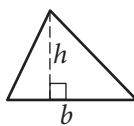


$$A = \pi r^2$$

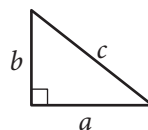
$$C = 2\pi r$$



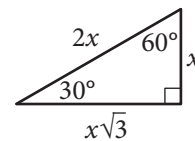
$$A = \ell w$$



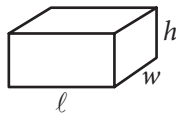
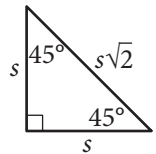
$$A = \frac{1}{2}bh$$



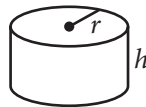
$$c^2 = a^2 + b^2$$



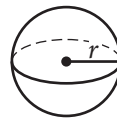
Special Right Triangles



$$V = \ell wh$$



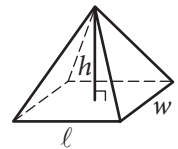
$$V = \pi r^2 h$$



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



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



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

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

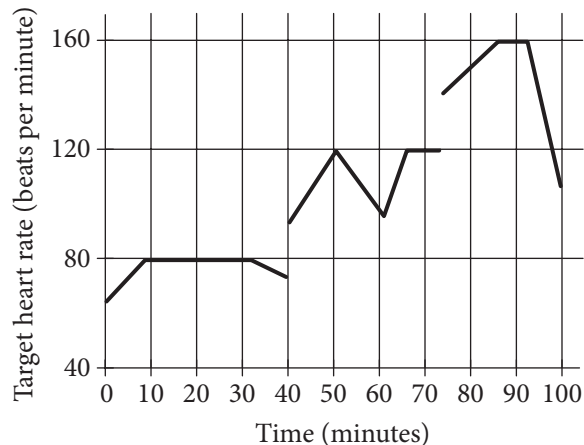
The number of radians of arc in a circle is 2π .

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



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?



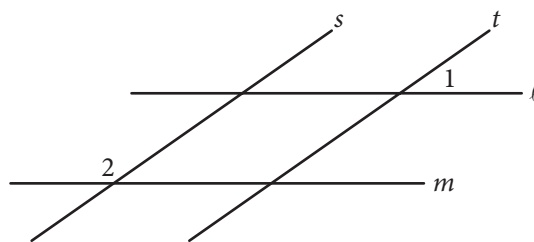
- A) Between 0 and 30 minutes
- B) Between 40 and 60 minutes
- C) Between 50 and 65 minutes
- D) Between 70 and 90 minutes

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

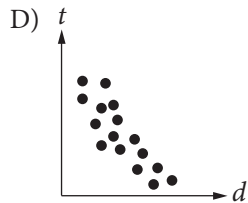
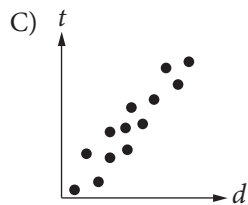
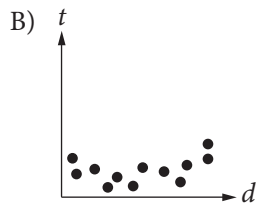
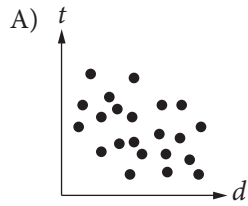
If $16 + 4x$ is 10 more than 14, what is the value of $8x$?

- A) 2
- B) 6
- C) 16
- D) 80



5

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



6

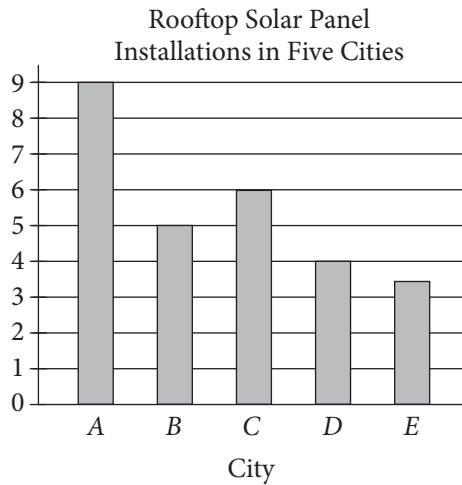
| |
|--|
| $1 \text{ decagram} = 10 \text{ grams}$ $1,000 \text{ milligrams} = 1 \text{ gram}$ |
|--|

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



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 .



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 ($^{\circ}\text{F}$).

9

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

- A) $t = \frac{a - 1,052}{1.08}$
- B) $t = \frac{a + 1,052}{1.08}$
- C) $t = \frac{1,052 - a}{1.08}$
- D) $t = \frac{1.08}{a + 1,052}$

10

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

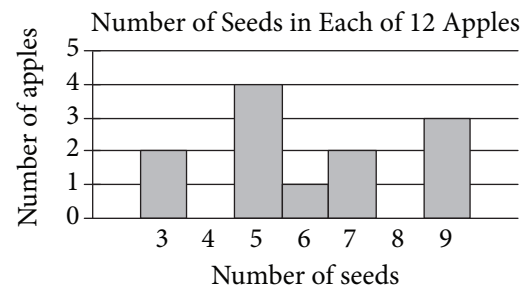
- A) -46°F
- B) -48°F
- C) -49°F
- D) -50°F

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



13

| | | Course | | | Total |
|--------|--------|-----------|----------|------------|-------|
| | | Algebra I | Geometry | Algebra II | |
| 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

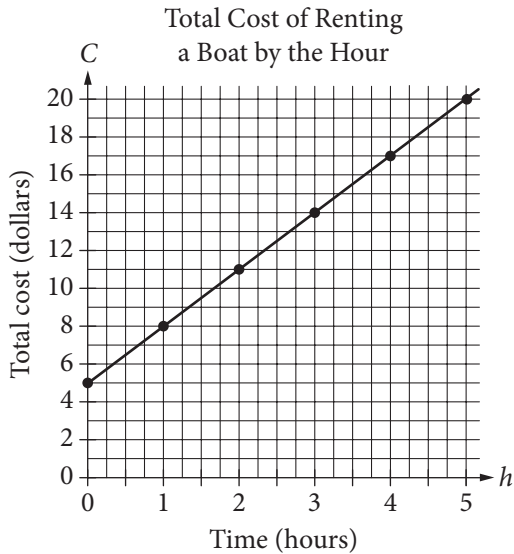
| Lengths of Fish (in inches) | | | | | | |
|-----------------------------|----|----|----|----|----|----|
| 8 | 9 | 9 | 9 | 10 | 10 | 11 |
| 11 | 12 | 12 | 12 | 12 | 13 | 13 |
| 13 | 14 | 14 | 15 | 15 | 16 | 24 |

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.



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?

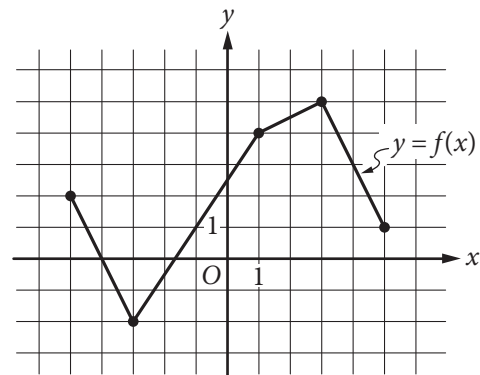
- A) The initial cost of renting the boat
- B) The total number of boats rented
- C) The total number of hours the boat is rented
- D) The increase in cost to rent the boat for each additional hour

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



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



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) $\frac{164}{200}$



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 table 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



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.

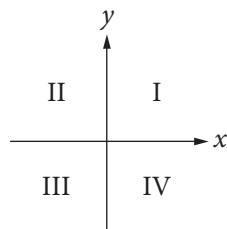
| Region | Number of earthworms | Region | Number of earthworms |
|--------|----------------------|--------|----------------------|
| A | 107 | F | 141 |
| B | 147 | G | 150 |
| C | 146 | H | 154 |
| D | 135 | I | 176 |
| E | 149 | J | 166 |

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



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?

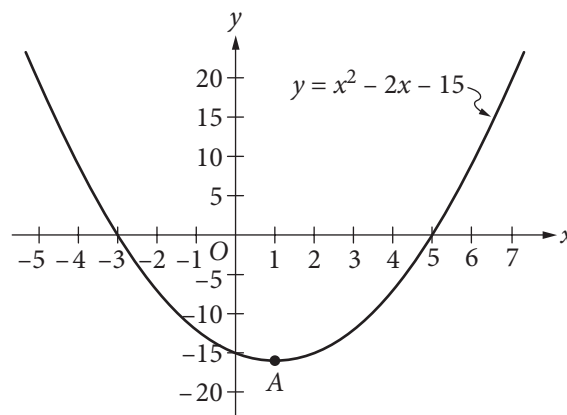
- A) Quadrant II
- B) Quadrant III
- C) Quadrant IV
- D) There are solutions in all four quadrants.

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) $y = (x - 1)^2 - 16$


DIRECTIONS

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

| | | | |
|---|---|---|---|
| 3 | 1 | / | 2 |
| • | • | • | • |

 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.

Write answer in boxes. →

← Fraction line

← Decimal point

Grid in result.

| | | | |
|------------------------|---|---|---|
| Answer: $\frac{7}{12}$ | | | |
| 7 | / | 1 | 2 |
| • | • | • | • |
| 0 | 0 | 0 | 0 |
| 1 | 1 | • | 1 |
| 2 | 2 | 2 | • |
| 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 |
| 6 | 6 | 6 | 6 |
| • | 7 | 7 | 7 |
| 8 | 8 | 8 | 8 |
| 9 | 9 | 9 | 9 |

| | | | |
|-------------|---|---|---|
| Answer: 2.5 | | | |
| 2 | . | 5 | |
| • | • | • | • |
| 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 |
| 2 | • | 2 | 2 |
| 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | • |
| 6 | 6 | 6 | 6 |
| 7 | 7 | 7 | 7 |
| 8 | 8 | 8 | 8 |
| 9 | 9 | 9 | 9 |

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

| | | | |
|---|---|---|---|
| 2 | / | 3 | |
| • | • | • | • |
| 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 |
| 2 | • | 2 | 2 |
| 3 | 3 | 3 | • |
| 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 |
| 6 | 6 | 6 | 6 |
| 7 | 7 | 7 | 7 |
| 8 | 8 | 8 | 8 |
| 9 | 9 | 9 | 9 |

| | | | |
|---|---|---|---|
| . | 6 | 6 | 6 |
| • | • | • | • |
| 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 |
| 6 | • | • | • |
| 7 | 7 | 7 | 7 |
| 8 | 8 | 8 | 8 |
| 9 | 9 | 9 | 9 |

| | | | |
|---|---|---|---|
| . | 6 | 6 | 7 |
| • | • | • | • |
| 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 |
| 6 | • | • | • |
| 7 | 7 | 7 | • |
| 8 | 8 | 8 | 8 |
| 9 | 9 | 9 | 9 |

Answer: 201 – either position is correct

| | | | |
|---|---|---|---|
| 2 | 0 | 1 | |
| • | • | • | • |
| 0 | • | 0 | 0 |
| 1 | 1 | 1 | • |
| 2 | • | 2 | 2 |
| 3 | 3 | 3 | 3 |

| | | | |
|---|---|---|---|
| 2 | 0 | 1 | |
| • | • | • | • |
| • | • | 0 | 0 |
| 1 | 1 | • | 1 |
| • | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 |

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



31

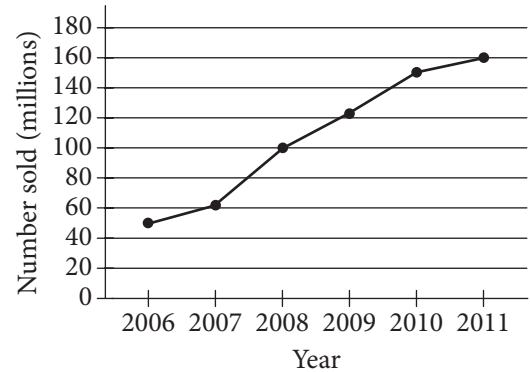
Wyatt can husk at least 12 dozen ears of corn per hour and at most 18 dozen ears of corn per hour. Based on this information, what is a possible amount of time, in hours, that it could take Wyatt to husk 72 dozen ears of corn?

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

Number of Portable Media Players Sold Worldwide Each Year from 2006 to 2011



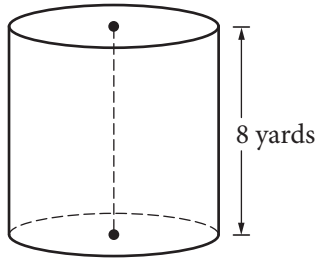
According to the line graph above, the number of portable media players sold in 2008 is what fraction of the number sold in 2011?

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?



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.**



SAT[®] Practice Test #2

IMPORTANT REMINDERS

1

**A No. 2 pencil is required for the test.
Do not use a mechanical pencil or pen.**

2

**Sharing any questions with anyone
is a violation of Test Security
and Fairness policies and may result
in your scores being canceled.**

This cover is representative of what you'll see on test day.

**THIS TEST BOOK MUST NOT BE TAKEN FROM THE ROOM. UNAUTHORIZED
REPRODUCTION OR USE OF ANY PART OF THIS TEST BOOK IS PROHIBITED.**



Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

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

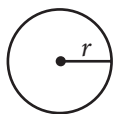
DIRECTIONS

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

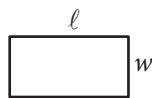
- The use of a calculator **is not permitted**.
- All variables and expressions used represent real numbers unless otherwise indicated.
- Figures provided in this test are drawn to scale unless otherwise indicated.
- All figures lie in a plane unless otherwise indicated.
- Unless otherwise indicated,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

REFERENCE

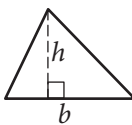


$$A = \pi r^2$$

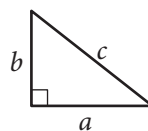
$$C = 2\pi r$$



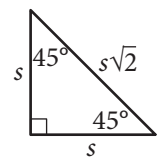
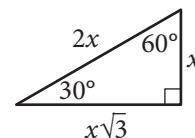
$$A = \ell w$$



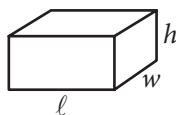
$$A = \frac{1}{2}bh$$



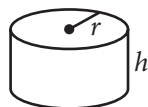
$$c^2 = a^2 + b^2$$



Special Right Triangles



$$V = \ell wh$$



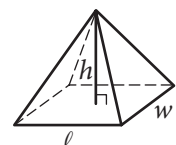
$$V = \pi r^2 h$$



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



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



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

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.



1

If $5x + 6 = 10$, what is the value of $10x + 3$?

- A) 4
- B) 9
- C) 11
- D) 20

2

$$\begin{aligned}x + y &= 0 \\ 3x - 2y &= 10\end{aligned}$$

Which of the following ordered pairs (x, y) satisfies the system of equations above?

- A) $(3, -2)$
- B) $(2, -2)$
- C) $(-2, 2)$
- D) $(-2, -2)$

3

A landscaping company estimates the price of a job, in dollars, using the expression $60 + 12nh$, where n is the number of landscapers who will be working and h is the total number of hours the job will take using n landscapers. Which of the following is the best interpretation of the number 12 in the expression?

- A) The company charges \$12 per hour for each landscaper.
- B) A minimum of 12 landscapers will work on each job.
- C) The price of every job increases by \$12 every hour.
- D) Each landscaper works 12 hours a day.

4

$$9a^4 + 12a^2b^2 + 4b^4$$

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

- A) $(3a^2 + 2b^2)^2$
- B) $(3a + 2b)^4$
- C) $(9a^2 + 4b^2)^2$
- D) $(9a + 4b)^4$



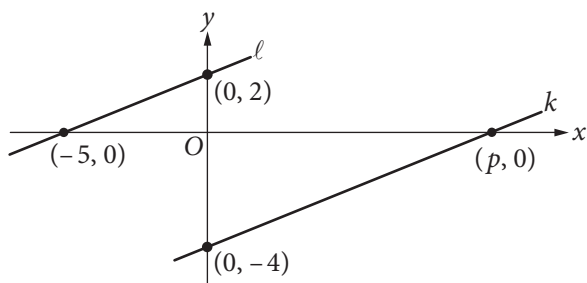
5

$$\sqrt{2k^2 + 17} - x = 0$$

If $k > 0$ and $x = 7$ in the equation above, what is the value of k ?

- A) 2
- B) 3
- C) 4
- D) 5

6



In the xy -plane above, line ℓ is parallel to line k . What is the value of p ?

- A) 4
- B) 5
- C) 8
- D) 10

7

If $\frac{x^a}{x^b} = x^{16}$, $x > 1$, and $a + b = 2$, what is the value

of $a - b$?

- A) 8
- B) 14
- C) 16
- D) 18

8

$$nA = 360$$

The measure A , in degrees, of an exterior angle of a regular polygon is related to the number of sides, n , of the polygon by the formula above. If the measure of an exterior angle of a regular polygon is greater than 50° , what is the greatest number of sides it can have?

- A) 5
- B) 6
- C) 7
- D) 8



9

The graph of a line in the xy -plane has slope 2 and contains the point $(1, 8)$. The graph of a second line passes through the points $(1, 2)$ and $(2, 1)$. If the two lines intersect at the point (a, b) , what is the value of $a + b$?

- A) 4
- B) 3
- C) -1
- D) -4

10

Which of the following equations has a graph in the xy -plane for which y is always greater than or equal to -1 ?

- A) $y = |x| - 2$
- B) $y = x^2 - 2$
- C) $y = (x - 2)^2$
- D) $y = x^3 - 2$

11

Which of the following complex numbers is equivalent to $\frac{3 - 5i}{8 + 2i}$? (Note: $i = \sqrt{-1}$)

- A) $\frac{3}{8} - \frac{5i}{2}$
- B) $\frac{3}{8} + \frac{5i}{2}$
- C) $\frac{7}{34} - \frac{23i}{34}$
- D) $\frac{7}{34} + \frac{23i}{34}$

12

$$R = \frac{F}{N + F}$$

A website uses the formula above to calculate a seller's rating, R , based on the number of favorable reviews, F , and unfavorable reviews, N . Which of the following expresses the number of favorable reviews in terms of the other variables?

- A) $F = \frac{RN}{R - 1}$
- B) $F = \frac{RN}{1 - R}$
- C) $F = \frac{N}{1 - R}$
- D) $F = \frac{N}{R - 1}$



13

What is the sum of all values of m that satisfy $2m^2 - 16m + 8 = 0$?

- A) -8
- B) $-4\sqrt{3}$
- C) $4\sqrt{3}$
- D) 8

14

A radioactive substance decays at an annual rate of 13 percent. If the initial amount of the substance is 325 grams, which of the following functions f models the remaining amount of the substance, in grams, t years later?

- A) $f(t) = 325(0.87)^t$
- B) $f(t) = 325(0.13)^t$
- C) $f(t) = 0.87(325)^t$
- D) $f(t) = 0.13(325)^t$

15

The expression $\frac{5x-2}{x+3}$ is equivalent to which of the following?

- A) $\frac{5-2}{3}$
- B) $5 - \frac{2}{3}$
- C) $5 - \frac{2}{x+3}$
- D) $5 - \frac{17}{x+3}$

**DIRECTIONS**

For questions 16–20, 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 $\begin{array}{|c|c|c|c|} \hline 3 & 1 & / & 2 \\ \hline \bullet & \bullet & / & \bullet \\ \hline \end{array}$ 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.

Write answer → in boxes.

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

| | | | | | |
|---|---|---|---|---|--|
| | 7 | / | 1 | 2 | |
| | • | • | • | • | |
| | 0 | 0 | 0 | 0 | |
| 1 | 1 | • | 1 | 1 | |
| 2 | 2 | 2 | • | 2 | |
| 3 | 3 | 3 | 3 | 3 | |
| 4 | 4 | 4 | 4 | 4 | |
| 5 | 5 | 5 | 5 | 5 | |
| 6 | 6 | 6 | 6 | 6 | |
| • | 7 | 7 | 7 | 7 | |
| 8 | 8 | 8 | 8 | 8 | |
| 9 | 9 | 9 | 9 | 9 | |

← Fraction line

Grid in result.

Answer: 2.5

| | | | | |
|---|---|---|---|---|
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| 2 | • | 2 | 2 | |
| 3 | 3 | 3 | 3 | |
| 4 | 4 | 4 | 4 | |
| 5 | 5 | 5 | • | |
| 6 | 6 | 6 | 6 | |
| 7 | 7 | 7 | 7 | |
| 8 | 8 | 8 | 8 | |
| 9 | 9 | 9 | 9 | |

← Decimal point

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

| | | | | |
|---|---|---|---|---|
| | 2 | / | 3 | |
| | • | • | • | • |
| | 0 | 0 | 0 | |
| 1 | 1 | 1 | 1 | |
| 2 | • | 2 | 2 | |
| 3 | 3 | 3 | • | |
| 4 | 4 | 4 | 4 | |
| 5 | 5 | 5 | 5 | |
| 6 | 6 | 6 | 6 | |
| 7 | 7 | 7 | 7 | |
| 8 | 8 | 8 | 8 | |
| 9 | 9 | 9 | 9 | |

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|---|---|---|---|---|
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| | • | • | • | • |
| | 0 | 0 | 0 | |
| 1 | 1 | 1 | 1 | |
| 2 | 2 | 2 | 2 | |
| 3 | 3 | 3 | 3 | |
| 4 | 4 | 4 | 4 | |
| 5 | 5 | 5 | 5 | |
| 6 | • | • | • | |
| 7 | 7 | 7 | 7 | |
| 8 | 8 | 8 | 8 | |
| 9 | 9 | 9 | 9 | |

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| . | 6 | 6 | 7 | |
| | • | • | • | • |
| | 0 | 0 | 0 | |
| 1 | 1 | 1 | 1 | |
| 2 | 2 | 2 | 2 | |
| 3 | 3 | 3 | 3 | |
| 4 | 4 | 4 | 4 | |
| 5 | 5 | 5 | 5 | |
| 6 | • | • | • | |
| 7 | 7 | 7 | • | |
| 8 | 8 | 8 | 8 | |
| 9 | 9 | 9 | 9 | |

Answer: 201 – either position is correct

| | | | | |
|---|---|---|---|---|
| | 2 | 0 | 1 | |
| | • | • | • | • |
| | 0 | • | 0 | |
| 1 | 1 | 1 | • | |
| 2 | • | 2 | 2 | |
| 3 | 3 | 3 | 3 | |

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| | 2 | 0 | 1 | |
| | • | • | • | • |
| | • | 0 | 0 | |
| 1 | 1 | • | 1 | |
| 2 | • | 2 | 2 | |
| 3 | 3 | 3 | 3 | |

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



16

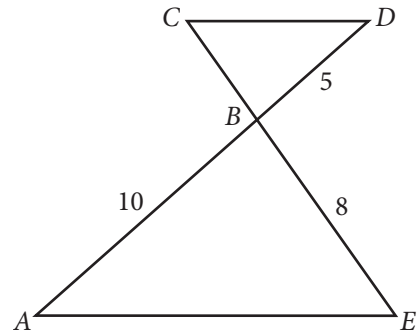
The sales manager of a company awarded a total of \$3000 in bonuses to the most productive salespeople. The bonuses were awarded in amounts of \$250 or \$750. If at least one \$250 bonus and at least one \$750 bonus were awarded, what is one possible number of \$250 bonuses awarded?

17

$$2x(3x + 5) + 3(3x + 5) = ax^2 + bx + c$$

In the equation above, a , b , and c are constants. If the equation is true for all values of x , what is the value of b ?

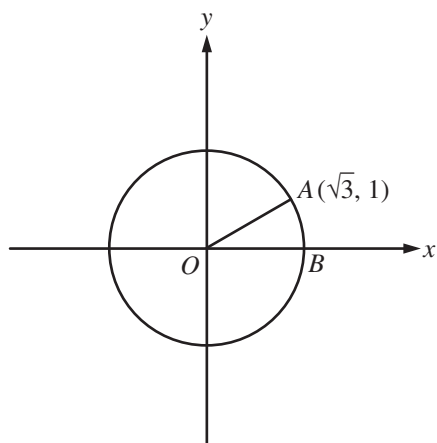
18



In the figure above, $\overline{AE} \parallel \overline{CD}$ and segment AD intersects segment CE at B . What is the length of segment CE ?



19



In the xy -plane above, O is the center of the circle, and the measure of $\angle AOB$ is $\frac{\pi}{a}$ radians. What is the value of a ?

20

$$ax + by = 12$$

$$2x + 8y = 60$$

In the system of equations above, a and b are constants. If the system has infinitely many solutions, what is the value of $\frac{a}{b}$?

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

55 MINUTES, 38 QUESTIONS

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

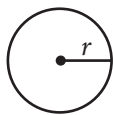
DIRECTIONS

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

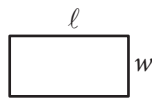
- The use of a calculator **is permitted**.
- All variables and expressions used represent real numbers unless otherwise indicated.
- Figures provided in this test are drawn to scale unless otherwise indicated.
- All figures lie in a plane unless otherwise indicated.
- Unless otherwise indicated, the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

REFERENCE

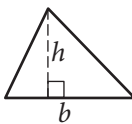


$$A = \pi r^2$$

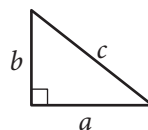
$$C = 2\pi r$$



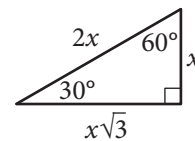
$$A = \ell w$$



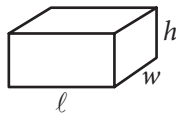
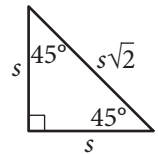
$$A = \frac{1}{2}bh$$



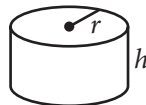
$$c^2 = a^2 + b^2$$



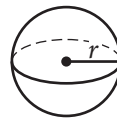
Special Right Triangles



$$V = \ell wh$$



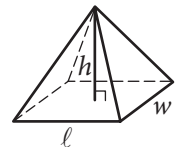
$$V = \pi r^2 h$$



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



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



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

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.



1

A musician has a new song available for downloading or streaming. The musician earns \$0.09 each time the song is downloaded and \$0.002 each time the song is streamed. Which of the following expressions represents the amount, in dollars, that the musician earns if the song is downloaded d times and streamed s times?

- A) $0.002d + 0.09s$
- B) $0.002d - 0.09s$
- C) $0.09d + 0.002s$
- D) $0.09d - 0.002s$

2

A quality control manager at a factory selects 7 lightbulbs at random for inspection out of every 400 lightbulbs produced. At this rate, how many lightbulbs will be inspected if the factory produces 20,000 lightbulbs?

- A) 300
- B) 350
- C) 400
- D) 450

3

$$\ell = 24 + 3.5m$$

One end of a spring is attached to a ceiling. When an object of mass m kilograms is attached to the other end of the spring, the spring stretches to a length of ℓ centimeters as shown in the equation above. What is m when ℓ is 73?

- A) 14
- B) 27.7
- C) 73
- D) 279.5

**Questions 4 and 5 refer to the following information.**

The amount of money a performer earns is directly proportional to the number of people attending the performance. The performer earns \$120 at a performance where 8 people attend.

4

How much money will the performer earn when 20 people attend a performance?

- A) \$960
- B) \$480
- C) \$300
- D) \$240

5

The performer uses 43% of the money earned to pay the costs involved in putting on each performance. The rest of the money earned is the performer's profit. What is the profit the performer makes at a performance where 8 people attend?

- A) \$51.60
- B) \$57.00
- C) \$68.40
- D) \$77.00

6

When 4 times the number x is added to 12, the result is 8. What number results when 2 times x is added to 7?

- A) -1
- B) 5
- C) 8
- D) 9

7

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

The equation above represents a parabola in the xy -plane. Which of the following equivalent forms of the equation displays the x -intercepts of the parabola as constants or coefficients?

- A) $y - 8 = x^2 - 6x$
- B) $y + 1 = (x - 3)^2$
- C) $y = x(x - 6) + 8$
- D) $y = (x - 2)(x - 4)$



8

In a video game, each player starts the game with k points and loses 2 points each time a task is not completed. If a player who gains no additional points and fails to complete 100 tasks has a score of 200 points, what is the value of k ?

- A) 0
- B) 150
- C) 250
- D) 400

9

A worker uses a forklift to move boxes that weigh either 40 pounds or 65 pounds each. Let x be the number of 40-pound boxes and y be the number of 65-pound boxes. The forklift can carry up to either 45 boxes or a weight of 2,400 pounds. Which of the following systems of inequalities represents this relationship?

- A) $\begin{cases} 40x + 65y \leq 2,400 \\ x + y \leq 45 \end{cases}$
- B) $\begin{cases} \frac{x}{40} + \frac{y}{65} \leq 2,400 \\ x + y \leq 45 \end{cases}$
- C) $\begin{cases} 40x + 65y \leq 45 \\ x + y \leq 2,400 \end{cases}$
- D) $\begin{cases} x + y \leq 2,400 \\ 40x + 65y \leq 2,400 \end{cases}$

10

A function f satisfies $f(2) = 3$ and $f(3) = 5$. A function g satisfies $g(3) = 2$ and $g(5) = 6$. What is the value of $f(g(3))$?

- A) 2
- B) 3
- C) 5
- D) 6

11

| | |
|--|---------|
| Number of hours Tony plans to read the novel per day | 3 |
| Number of parts in the novel | 8 |
| Number of chapters in the novel | 239 |
| Number of words Tony reads per minute | 250 |
| Number of pages in the novel | 1,078 |
| Number of words in the novel | 349,168 |

Tony is planning to read a novel. The table above shows information about the novel, Tony's reading speed, and the amount of time he plans to spend reading the novel each day. If Tony reads at the rates given in the table, which of the following is closest to the number of days it would take Tony to read the entire novel?

- A) 6
- B) 8
- C) 23
- D) 324



12

On January 1, 2000, there were 175,000 tons of trash in a landfill that had a capacity of 325,000 tons. Each year since then, the amount of trash in the landfill increased by 7,500 tons. If y represents the time, in years, after January 1, 2000, which of the following inequalities describes the set of years where the landfill is at or above capacity?

- A) $325,000 - 7,500 \leq y$
- B) $325,000 \leq 7,500y$
- C) $150,000 \geq 7,500y$
- D) $175,000 + 7,500y \geq 325,000$

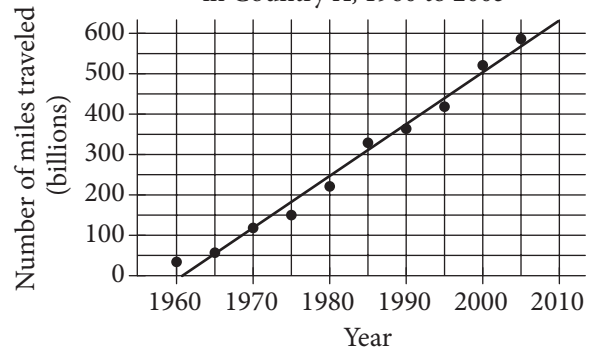
13

A researcher conducted a survey to determine whether people in a certain large town prefer watching sports on television to attending the sporting event. The researcher asked 117 people who visited a local restaurant on a Saturday, and 7 people refused to respond. Which of the following factors makes it least likely that a reliable conclusion can be drawn about the sports-watching preferences of all people in the town?

- A) Sample size
- B) Population size
- C) The number of people who refused to respond
- D) Where the survey was given

14

Miles Traveled by Air Passengers
in Country X, 1960 to 2005



According to the line of best fit in the scatterplot above, which of the following best approximates the year in which the number of miles traveled by air passengers in Country X was estimated to be 550 billion?

- A) 1997
- B) 2000
- C) 2003
- D) 2008



15

The distance traveled by Earth in one orbit around the Sun is about 580,000,000 miles. Earth makes one complete orbit around the Sun in one year. Of the following, which is closest to the average speed of Earth, in miles per hour, as it orbits the Sun?

- A) 66,000
- B) 93,000
- C) 210,000
- D) 420,000

16

Results on the Bar Exam of Law School Graduates

| | Passed bar exam | Did not pass bar exam |
|----------------------------|-----------------|-----------------------|
| Took review course | 18 | 82 |
| Did not take review course | 7 | 93 |

The table above summarizes the results of 200 law school graduates who took the bar exam. If one of the surveyed graduates who passed the bar exam is chosen at random for an interview, what is the probability that the person chosen did not take the review course?

- A) $\frac{18}{25}$
- B) $\frac{7}{25}$
- C) $\frac{25}{200}$
- D) $\frac{7}{200}$

17

The atomic weight of an unknown element, in atomic mass units (amu), is approximately 20% less than that of calcium. The atomic weight of calcium is 40 amu. Which of the following best approximates the atomic weight, in amu, of the unknown element?

- A) 8
- B) 20
- C) 32
- D) 48

18

A survey was taken of the value of homes in a county, and it was found that the mean home value was \$165,000 and the median home value was \$125,000. Which of the following situations could explain the difference between the mean and median home values in the county?

- A) The homes have values that are close to each other.
- B) There are a few homes that are valued much less than the rest.
- C) There are a few homes that are valued much more than the rest.
- D) Many of the homes have values between \$125,000 and \$165,000.



Questions 19 and 20 refer to the following information.

A sociologist chose 300 students at random from each of two schools and asked each student how many siblings he or she has. The results are shown in the table below.

Students' Sibling Survey

| Number of siblings | Lincoln School | Washington School |
|--------------------|----------------|-------------------|
| 0 | 120 | 140 |
| 1 | 80 | 110 |
| 2 | 60 | 30 |
| 3 | 30 | 10 |
| 4 | 10 | 10 |

There are a total of 2,400 students at Lincoln School and 3,300 students at Washington School.

19

What is the median number of siblings for all the students surveyed?

- A) 0
- B) 1
- C) 2
- D) 3

20

Based on the survey data, which of the following most accurately compares the expected total number of students with 4 siblings at the two schools?

- A) The total number of students with 4 siblings is expected to be equal at the two schools.
- B) The total number of students with 4 siblings at Lincoln School is expected to be 30 more than at Washington School.
- C) The total number of students with 4 siblings at Washington School is expected to be 30 more than at Lincoln School.
- D) The total number of students with 4 siblings at Washington School is expected to be 900 more than at Lincoln School.

21

A project manager estimates that a project will take x hours to complete, where $x > 100$. The goal is for the estimate to be within 10 hours of the time it will actually take to complete the project. If the manager meets the goal and it takes y hours to complete the project, which of the following inequalities represents the relationship between the estimated time and the actual completion time?

- A) $x + y < 10$
- B) $y > x + 10$
- C) $y < x - 10$
- D) $-10 < y - x < 10$



Questions 22 and 23 refer to the following information.

$$I = \frac{P}{4\pi r^2}$$

At a large distance r from a radio antenna, the intensity of the radio signal I is related to the power of the signal P by the formula above.

22

Which of the following expresses the square of the distance from the radio antenna in terms of the intensity of the radio signal and the power of the signal?

- A) $r^2 = \frac{IP}{4\pi}$
- B) $r^2 = \frac{P}{4\pi I}$
- C) $r^2 = \frac{4\pi I}{P}$
- D) $r^2 = \frac{I}{4\pi P}$

23

For the same signal emitted by a radio antenna, Observer A measures its intensity to be 16 times the intensity measured by Observer B. The distance of Observer A from the radio antenna is what fraction of the distance of Observer B from the radio antenna?

- A) $\frac{1}{4}$
- B) $\frac{1}{16}$
- C) $\frac{1}{64}$
- D) $\frac{1}{256}$

24

$$x^2 + y^2 + 4x - 2y = -1$$

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

- A) 2
- B) 3
- C) 4
- D) 9

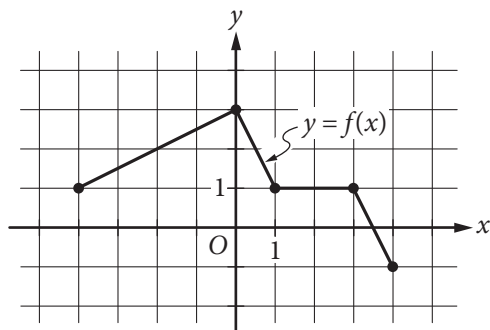


25

The graph of the linear function f has intercepts at $(a, 0)$ and $(0, b)$ in the xy -plane. If $a + b = 0$ and $a \neq b$, which of the following is true about the slope of the graph of f ?

- A) It is positive.
- B) It is negative.
- C) It equals zero.
- D) It is undefined.

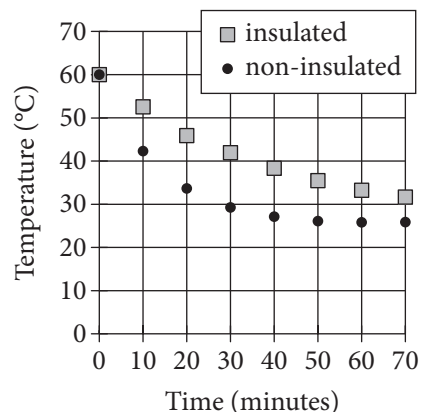
26



The complete graph of the function f is shown in the xy -plane above. Which of the following are equal to 1?

- I. $f(-4)$
 - II. $f\left(\frac{3}{2}\right)$
 - III. $f(3)$
- A) III only
 - B) I and III only
 - C) II and III only
 - D) I, II, and III

27

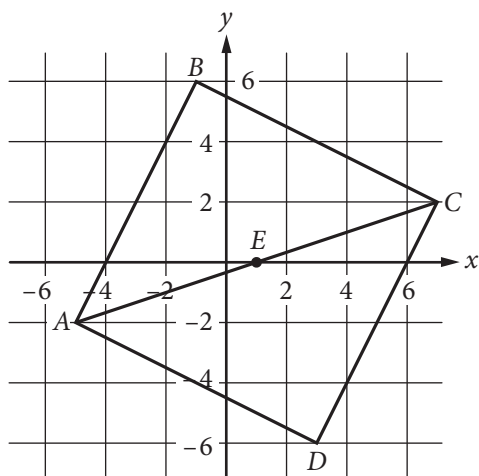


Two samples of water of equal mass are heated to 60 degrees Celsius ($^{\circ}\text{C}$). One sample is poured into an insulated container, and the other sample is poured into a non-insulated container. The samples are then left for 70 minutes to cool in a room having a temperature of 25°C . The graph above shows the temperature of each sample at 10-minute intervals. Which of the following statements correctly compares the average rates at which the temperatures of the two samples change?

- A) In every 10-minute interval, the magnitude of the rate of change of temperature of the insulated sample is greater than that of the non-insulated sample.
- B) In every 10-minute interval, the magnitude of the rate of change of temperature of the non-insulated sample is greater than that of the insulated sample.
- C) In the intervals from 0 to 10 minutes and from 10 to 20 minutes, the rates of change of temperature of the insulated sample are of greater magnitude, whereas in the intervals from 40 to 50 minutes and from 50 to 60 minutes, the rates of change of temperature of the non-insulated sample are of greater magnitude.
- D) In the intervals from 0 to 10 minutes and from 10 to 20 minutes, the rates of change of temperature of the non-insulated sample are of greater magnitude, whereas in the intervals from 40 to 50 minutes and from 50 to 60 minutes, the rates of change of temperature of the insulated sample are of greater magnitude.



28



In the xy -plane above, $ABCD$ is a square and point E is the center of the square. The coordinates of points C and E are $(7, 2)$ and $(1, 0)$, respectively. Which of the following is an equation of the line that passes through points B and D ?

- A) $y = -3x - 1$
- B) $y = -3(x - 1)$
- C) $y = -\frac{1}{3}x + 4$
- D) $y = -\frac{1}{3}x - 1$

29

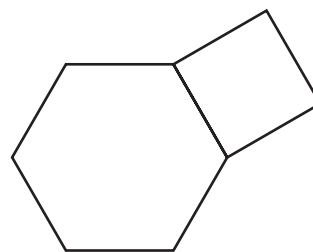
$$y = 3$$

$$y = ax^2 + b$$

In the system of equations above, a and b are constants. For which of the following values of a and b does the system of equations have exactly two real solutions?

- A) $a = -2, b = 2$
- B) $a = -2, b = 4$
- C) $a = 2, b = 4$
- D) $a = 4, b = 3$

30



The figure above shows a regular hexagon with sides of length a and a square with sides of length a . If the area of the hexagon is $384\sqrt{3}$ square inches, what is the area, in square inches, of the square?

- A) 256
- B) 192
- C) $64\sqrt{3}$
- D) $16\sqrt{3}$


DIRECTIONS

For questions 31-38, 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 $\begin{array}{|c|c|c|c|} \hline 3 & 1 & / & 2 \\ \hline \bullet & \bullet & / & \bullet \\ \hline \end{array}$ 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.

Write answer → in boxes.

Grid result.

← Fraction line

← Decimal point

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

| | | | | |
|---|---|---|---|---|
| | 7 | / | 1 | 2 |
| • | • | • | • | • |
| | 0 | 0 | 0 | 0 |
| ① | ① | • | ① | ① |
| ② | ② | ② | • | ② |
| ③ | ③ | ③ | ③ | ③ |
| ④ | ④ | ④ | ④ | ④ |
| ⑤ | ⑤ | ⑤ | ⑤ | ⑤ |
| ⑥ | ⑥ | ⑥ | ⑥ | ⑥ |
| • | ⑦ | ⑦ | ⑦ | ⑦ |
| ⑧ | ⑧ | ⑧ | ⑧ | ⑧ |
| ⑨ | ⑨ | ⑨ | ⑨ | ⑨ |

Answer: 2.5

| | | | |
|---|---|---|---|
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| ② | • | ② | ② |
| ③ | ③ | ③ | ③ |
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| ⑤ | ⑤ | ⑤ | • |
| ⑥ | ⑥ | ⑥ | ⑥ |
| ⑦ | ⑦ | ⑦ | ⑦ |
| ⑧ | ⑧ | ⑧ | ⑧ |
| ⑨ | ⑨ | ⑨ | ⑨ |

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

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| ③ | ③ | ③ | • |
| ④ | ④ | ④ | ④ |
| ⑤ | ⑤ | ⑤ | ⑤ |
| ⑥ | ⑥ | ⑥ | ⑥ |
| ⑦ | ⑦ | ⑦ | ⑦ |
| ⑧ | ⑧ | ⑧ | ⑧ |
| ⑨ | ⑨ | ⑨ | ⑨ |

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| ② | ② | ② | ② |
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| ⑤ | ⑤ | ⑤ | ⑤ |
| ⑥ | • | • | • |
| ⑦ | ⑦ | ⑦ | ⑦ |
| ⑧ | ⑧ | ⑧ | ⑧ |
| ⑨ | ⑨ | ⑨ | ⑨ |

| | | | |
|---|---|---|---|
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| ② | ② | ② | ② |
| ③ | ③ | ③ | ③ |
| ④ | ④ | ④ | ④ |
| ⑤ | ⑤ | ⑤ | ⑤ |
| ⑥ | • | • | ⑥ |
| ⑦ | ⑦ | ⑦ | • |
| ⑧ | ⑧ | ⑧ | ⑧ |
| ⑨ | ⑨ | ⑨ | ⑨ |

Answer: 201 – either position is correct

| | | | |
|---|---|---|---|
| | 2 | 0 | 1 |
| • | • | • | • |
| | 0 | • | 0 |
| ① | ① | ① | • |
| ② | • | ② | ② |
| ③ | ③ | ③ | ③ |

| | | | |
|---|---|---|---|
| | 2 | 0 | 1 |
| • | • | • | • |
| | • | 0 | 0 |
| ① | ① | • | ① |
| ② | • | ② | ② |
| ③ | ③ | ③ | ③ |

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



31

A coastal geologist estimates that a certain country's beaches are eroding at a rate of 1.5 feet per year. According to the geologist's estimate, how long will it take, in years, for the country's beaches to erode by 21 feet?

32

If h hours and 30 minutes is equal to 450 minutes, what is the value of h ?

33

In the xy -plane, the point $(3, 6)$ lies on the graph of the function $f(x) = 3x^2 - bx + 12$. What is the value of b ?

34

In one semester, Doug and Laura spent a combined 250 hours in the tutoring lab. If Doug spent 40 more hours in the lab than Laura did, how many hours did Laura spend in the lab?

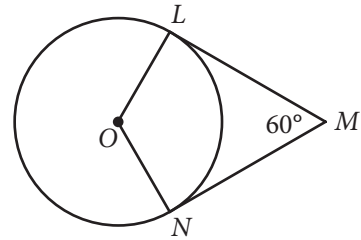


35

$$a = 18t + 15$$

Jane made an initial deposit to a savings account. Each week thereafter she deposited a fixed amount to the account. The equation above models the amount a , in dollars, that Jane has deposited after t weekly deposits. According to the model, how many dollars was Jane's initial deposit? (Disregard the \$ sign when gridding your answer.)

36



In the figure above, point O is the center of the circle, line segments LM and MN are tangent to the circle at points L and N , respectively, and the segments intersect at point M as shown. If the circumference of the circle is 96, what is the length of minor arc \widehat{LN} ?



Questions 37 and 38 refer to the following information.

A botanist is cultivating a rare species of plant in a controlled environment and currently has 3000 of these plants. The population of this species that the botanist expects to grow next year, $N_{\text{next year}}$, can be estimated from the number of plants this year, $N_{\text{this year}}$, by the equation below.

$$N_{\text{next year}} = N_{\text{this year}} + 0.2 \left(N_{\text{this year}} \right) \left(1 - \frac{N_{\text{this year}}}{K} \right)$$

The constant K in this formula is the number of plants the environment is able to support.

37

According to the formula, what will be the number of plants two years from now if $K = 4000$? (Round your answer to the nearest whole number.)

38

The botanist would like to increase the number of plants that the environment can support so that the population of the species will increase more rapidly. If the botanist's goal is that the number of plants will increase from 3000 this year to 3360 next year, how many plants must the modified environment support?

STOP

If you finish before time is called, you may check your work on this section only.

Do not turn to any other section.