Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

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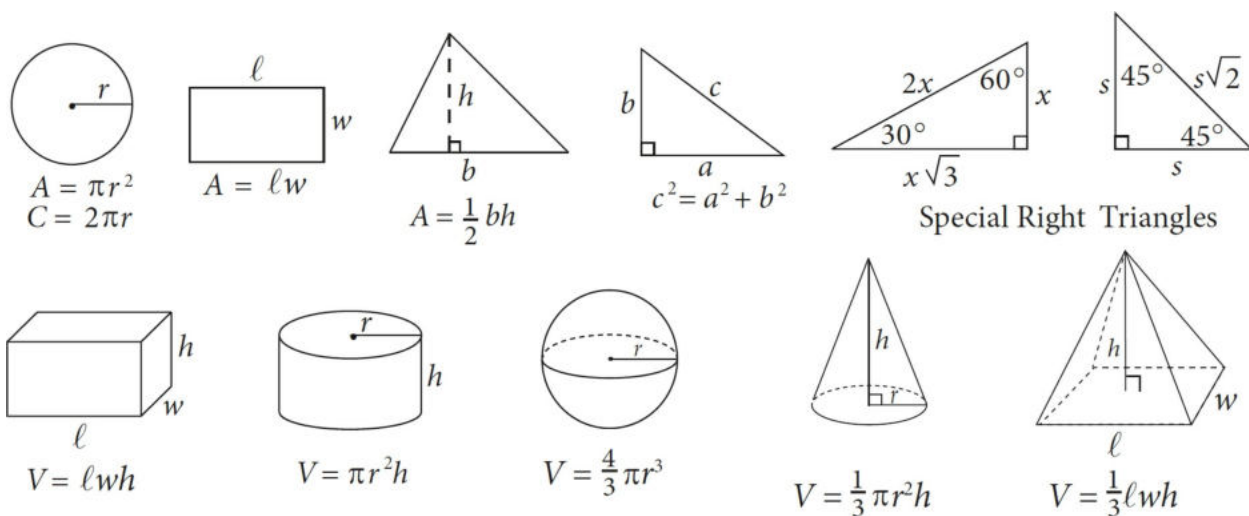

DIRECTIONS

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

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3. Figures provided in this test are drawn to scale unless otherwise indicated.

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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

$V = \ell w h$

$V = \pi r^2 h$

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

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

$V = \frac{1}{3}\ell w h$

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

Which of the following equations has a vertex of (3, −3) ?

A) $y = 5(x - 3)^2 - 3$

B) $y = 5(x + 3)^2 - 3$

C) $y = 5(x - 3)^2 + 3$

D) $y = 5(x + 3)^2 + 3$

2

A beverage store charges a base price of x dollars for one keg of root beer. A sales tax of a certain percentage is applied to the base price, and an untaxed deposit for the keg is added. If the total amount, in dollars, paid at the time of purchase for one keg is given by the expression 1.07x + 17, then what is the sales tax, expressed as a percentage of the base price?

A) 0.07%

B) 1.07%

C) 7%

D) 17%

3

Syed took out a cash advance of d dollars from a financing company. The company deducts a fee of $\frac{1}{3}$ of the original advanced amount along with a wire transfer fee of $30.00. Which of the following represents the final advanced amount that Syed receives after all applied fees, in dollars?

A) $\frac{1}{3}d - 30$

B) $\frac{1}{3}(d - 30)$

C) $\frac{2}{3}(d - 30)$

D) $\frac{2}{3}d - 30$

4

What is the equation of a line that contains the point (1, 6) and has a y-intercept of 4 ?

A) $y = \frac{1}{2}x + 4$

B) $y = x + 4$

C) $y = 2x + 4$

D) $y = 4x + 2$

5

The number of bonus points, $B(p)$, that a credit card holder receives is given by the function $B(p) = 4p + 7$, where p represents the number of purchases made. If the number of purchases is increased by 3, by how much does the number of bonus points increase?

A) 3

B) 4

C) 12

D) 19

6

Jeff tests how the total volume occupied by a fluid contained in a graduated cylinder changes when round marbles of various sizes are added. He found that the total volume occupied by the fluid, V, in cubic centimeters, can be found using the equation below, where x equals the number of identical marbles Jeff added, one at a time, to the cylinder, and r is the radius of one of the marbles.

$$V = 24\pi + x\left(\frac{4}{3}\pi r^3\right)$$

If the volume of the graduated cylinder is 96π cubic centimeters, then, what is the maximum number of marbles with a radius of 3 centimeters that Jeff can add without the volume of the fluid exceeding that of the graduated cylinder?

A) 1

B) 2

C) 3

D) 4

If b is two more than one-third of c, which of the following expresses the value of c in terms of b ?

A) $c = \dfrac{b - 2}{3}$

B) $c = \dfrac{b + 2}{3}$

C) $c = 3(b - 2)$

D) $c = 3(b - 6)$

The rotation rate of a mixing blade, in rotations per second, slows as a liquid is being added to the mixer. The blade rotates at 1,000 rotations per second when the mixer is empty. The rate at which the blade slows is four rotations per second less than three times the square of the height of the liquid. If h is the height of liquid in the mixer, which of the following represents $R(h)$, the rate of rotation?

A) $4 - 9h^2$

B) $1,000 - (4 - 3h)$

C) $1,000 - (9h - 4)$

D) $1,000 - (3h^2 - 4)$

A dental hygiene company is creating a new 24-ounce tube of toothpaste by combining its most popular toothpastes, Cavity

Crusher and Bad Breath Obliterator. Cavity Crusher contains 0.25% of sodium fluoride as its active ingredient, and Bad Breath Obliterator contains 0.30% of triclosan as its active ingredient for a total of 0.069 ounces of active ingredients in both toothpastes. Solving which of the following systems of equations yields the number of ounces of Cavity Crusher, c, and the number of ounces of Bad Breath Obliterator, b, that are in the new toothpaste?

A)
$$c + b = 0.069$$
$$0.25c + 0.3b = 24$$

B)
$$c + b = 24$$
$$0.0025c + 0.003b = 0.069$$

C)
$$c + b = 24$$
$$0.025c + 0.03b = 0.069$$

D)
$$c + b = 24$$
$$0.25c + 0.3b = 0.069$$

10

$$\frac{2d^2 - d - 10}{d^2 + 7d + 10} = \frac{d^2 - 4d + 3}{d^2 + 2d - 15}$$

In the equation above, what is the value of d ?

A) −4
B) 2
C) 4
D) 6

11

Which of the following is a possible equation for a circle that is tangent to both the x-axis and the line $x = 4$?

A) $(x + 2)^2 + (y + 2)^2 = 4$
B) $(x + 2)^2 + (y - 2)^2 = 4$

C) $(x - 2)^2 + (y + 4)^2 = 4$

D) $(x - 6)^2 + (y - 2)^2 = 4$

12

Reactant A is placed in a beaker, to which Reactant B will be added. Reactants A and B will not react unless B gets to a certain concentration. Once the reaction starts, both concentrations decrease until B has been consumed. Which of the following graphs, showing concentration in moles as a function of time in seconds, represents the reaction?

A)

Conc [mol]

B

A

t

B)

Conc [mol]

A

B

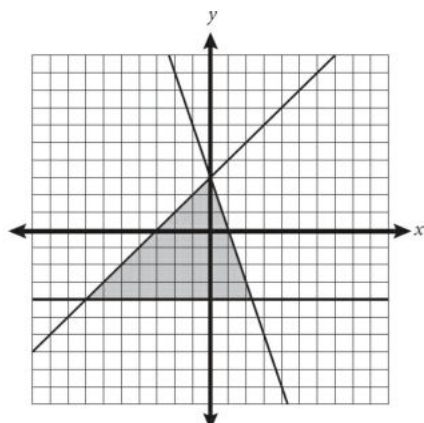t

C)

Conc [mol]

B

A

t

D)

Conc [mol]

A

B

t
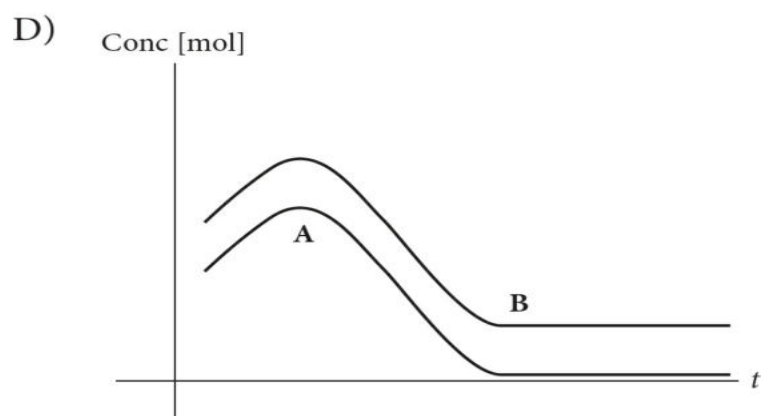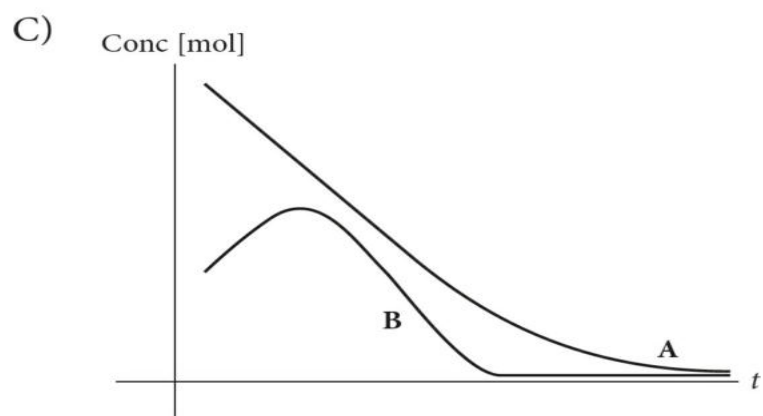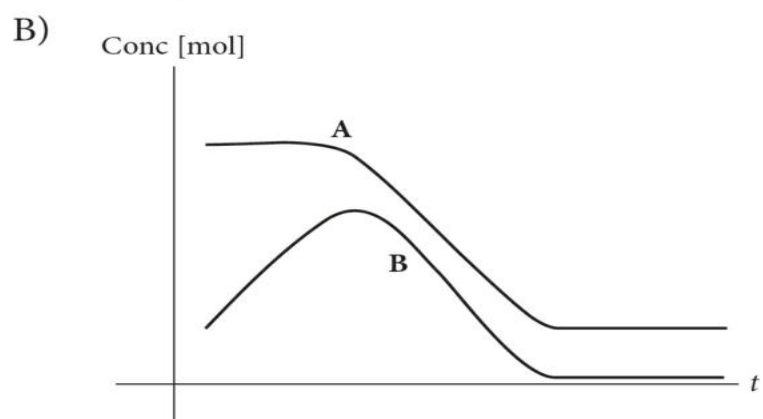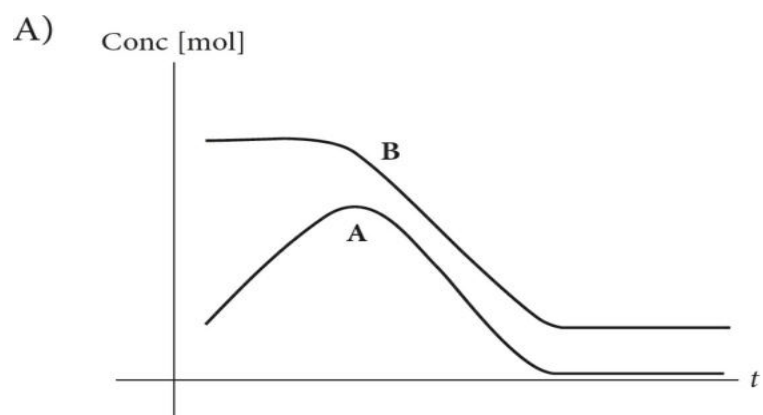
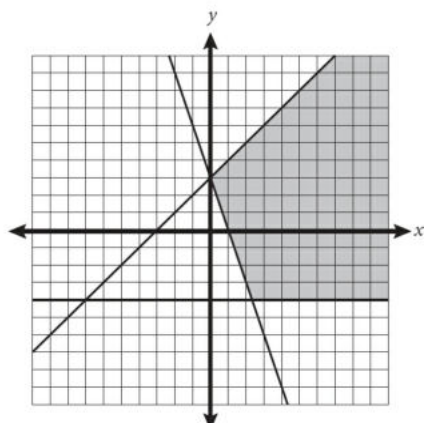$$-2y \leq 8$$
$$y - 3 \leq x$$
$$-\frac{1}{3}y + 1 \geq x$$

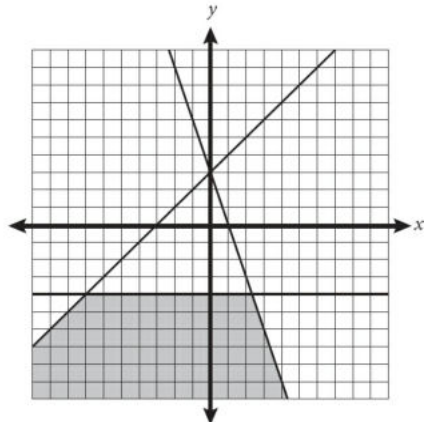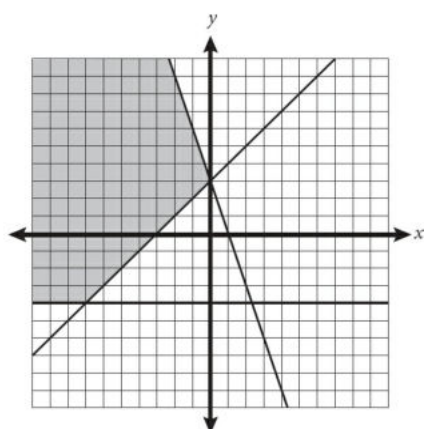Which of the following graphs shows the solution to the system of inequalities above?

A)

B)

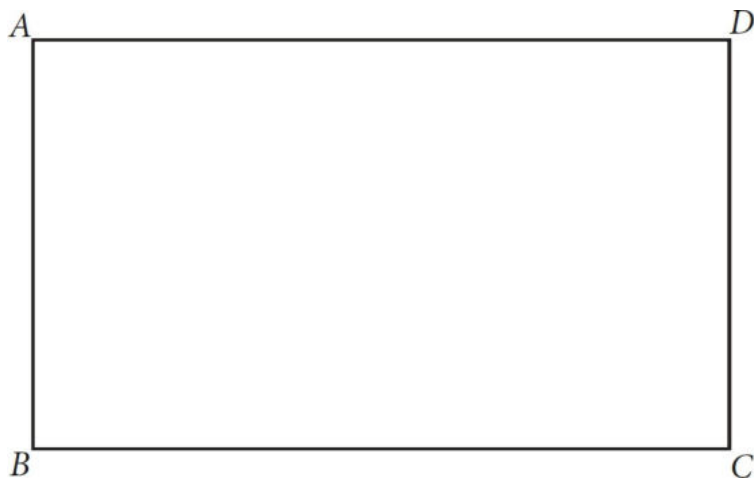C)

D)

If rectangle *ABCD* has an area of 48 and the tangent of $\angle BCA$ (not shown) is $\dfrac{3}{4}$, then which of the following is the length of $\overline{BD}$ (not shown)?

A) 5
B) 10
C) 13
D) It cannot be determined from the given information.

Which of the following is equivalent to $\dfrac{2m+6}{4} \times \dfrac{6m-36}{3m+9}$?

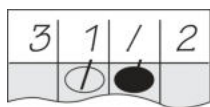A) $\dfrac{12m^2 - 216}{12m + 36}$

B) $\dfrac{8m - 30}{3m + 13}$

C) $\dfrac{m-6}{4}$

D) $m-6$

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

Write answer in boxes.

Grid in result.

← Fraction line

Answer: 2.5

← Decimal point

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.

16

A rectangular box has sides 3, 4, and x and a volume of 18. What is the value of x?

17

Jeanne babysits Chuy one day each week. Jeanne charges a $20 fee for the day, plus $5.50 for every 30 minutes of babysitting. How much has Jeanne earned after three hours of babysitting? (Disregard the $ sign when gridding your answer.)

18

The parabola $y = -x^2 + 5x + 6$ is intersected by the line $y = -\dfrac{1}{2}x + 12$. What is the y-coordinate of the intersection closest to the x-axis?

19

$$13r + 8v = 47$$
$$22v = 63 - 17r$$

Based on the system of equations above, what is the sum of r and v ?

20

A gardener has a cultivated plot that measures 4 feet by 6 feet. Next year, she wants to double the area of her plot by increasing the length and width by x feet. What is the value of x ?

S T O P

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

Do not turn to any other section in the test.

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.

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REFERENCE

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Special Right Triangles

$V = \ell wh$

$V = \pi r^2 h$

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

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

$V = \frac{1}{3}\ell wh$
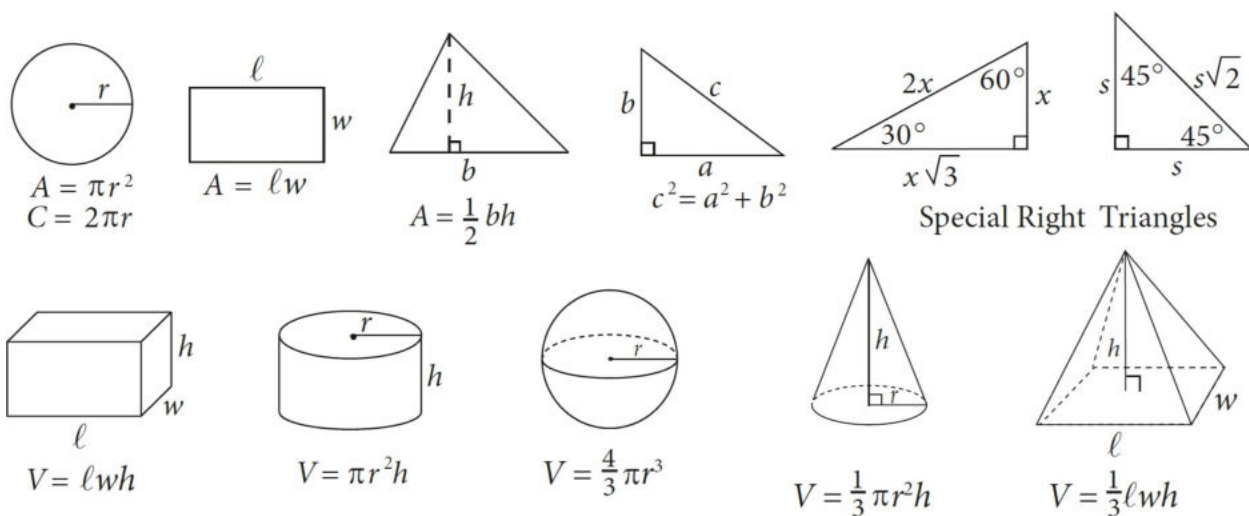
The number of degrees of arc in a circle is 360.

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 population, P, of Town Y since 1995 can be estimated by the equation $P = 1.0635x + 3{,}250$, where x is the number of years since 1995 and $0 \le x \le 20$. In the context of this equation, what does the number 1.0635 most likely represent?

A) The estimated population of town Y in 1995

B) The estimated population of town Y in 2015

C) The factor by which the population of town Y increased yearly

D) The factor by which the population of town Y decreased yearly

2

If $x^2 + 12x = 64$ and $x > 0$, what is the value of x ?

A) 2

B) 4

C) 8

D) 16

3

Sai is ordering new shelving units for his store. Each unit is 7 feet in length and extends from floor to ceiling. The total length of the walls in Sai's store is 119 feet, which includes a length of 21 feet of windows along the walls. If the shelving units cannot be placed in front of the windows, which of the following inequalities includes all possible values of r, the number of shelving units that Sai could use?

A) $r \leq \dfrac{119 - 21}{7}$

B) $r \geq \dfrac{119 + 21}{7}$

C) $r \leq 119 - 21 + 7r$

D) $r \geq 119 + 21 - 7r$

4

Truffula Tree Fruit Weight
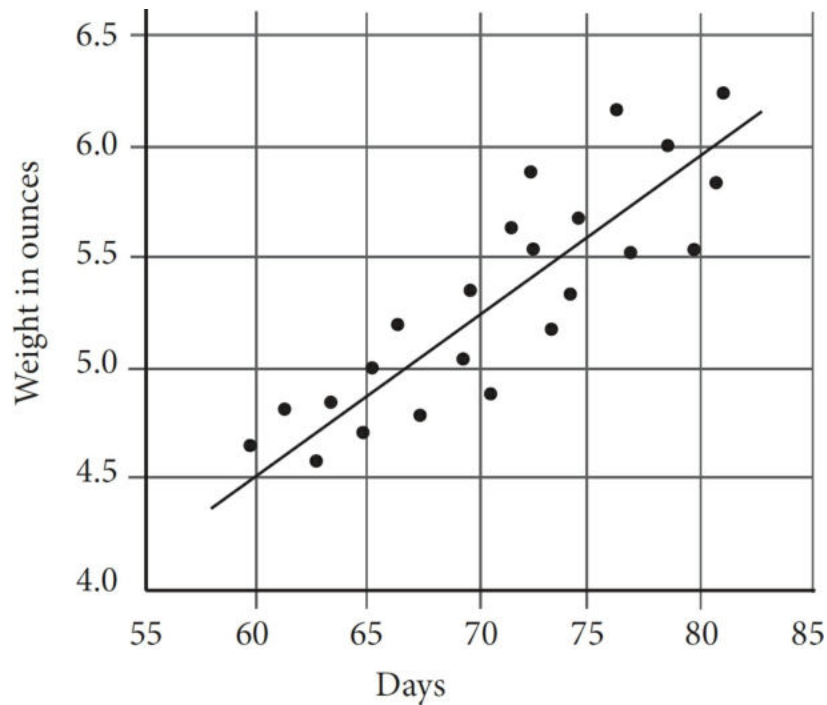
The scatterplot above shows the weight, in ounces, of the fruits on a certain truffula tree from days 55 to 85 after flowering. According to the line of best fit in the scatterplot above, which of the following is the closest approximation of the number of days after flowering of a truffula fruit that weighs 5.75 ounces?

A) 63

B) 65

C) 77

D) 81

5

Hannah placed an online order for shirts that cost $24.50 per shirt. A tax of 7% is added to the cost of the shirts, before a flat, untaxed shipping rate of $6 is charged. Which of the following represents Hannah's total cost for s shirts, in dollars?

A) 0.07(24.50s + 6)

B) 1.07(24.50 + 6)s

C) 1.07(24.50s) + 6

D) 1.07(24.50 + s) + 6

Once a certain plant begins to grow, its height increases at a linear rate. After six weeks, the plant is 54 centimeters tall. Which of the following functions best models the relationship between $h(w)$, the height, in centimeters, of the plant, and w, the number of weeks that the plant has been growing?

A) $h(w) = 6w$

B) $h(w) = 9w$

C) $h(w) = 54w$

D) $h(w) = 54 + w$

Which of the following is equivalent to $(12x^2 + 4x + 5y) + (3x^2 - 2x + 3y)$?

A) $2x^2 - 2x + 8y$

B) $2x^2 + 15x + 8y$

C) $15x^2 - 2x + 8y$

D) $15x^2 + 2x + 8y$

An advertisement for Royal Rat Rations states: "7 out of 8 veterinarians recommend Royal Rat Rations for your fancy rat." No other information about the data is provided by the company.

Based on this data, which of the following inferences is most valid?

A) Royal Rat Rations provides the best nutrition for fancy rats.

B) If you do not feed your rat Royal Rat Rations, your rat will be

unhealthy.

C) Only one veterinarian does not recommend Royal Rat Rations for your fancy rat.

D) Of the veterinarians surveyed by Royal Rat Rations, the majority recommend Royal Rat Rations for your fancy rat.

9

$$\frac{1}{2}t + 4 = \frac{3}{4}t - 5$$

In the equation above, what is the value of t?

A) 4

B) 9

C) 18

D) 36

10

Dogs need 8.5 to 17 ounces of water each day for every 10 pounds of their weight. Everett has two dogs—Ringo is a 35-pound black lab mix, and Elvis is a 55-pound beagle. Which of the following ranges represents the approximate total number of ounces of water, w, that Elvis and Ringo need in a week?

A) $77 \le w \le 153$

B) $109 \le w \le 218$

C) $536 \le w \le 1{,}071$

D) $765 \le w \le 1{,}530$

11

Priya is planning to send her favorite dry rub recipe to a friend who lives in France. Before sending the recipe, Priya wants to convert the American customary units in the instructions into

metric units so that her friend will easily be able to understand the measurements. If the recipe calls for a ratio of four ounces of paprika to every seven ounces of chili powder, and if Priya's friend is planning to make a large batch of dry rub with 91 total ounces of chili powder, approximately how many total grams of paprika and chili powder will the recipe require?
(1 ounce = 28.3 grams)

A) 4,047 grams

B) 4,521 grams

C) 4,925 grams

D) 5,149 grams

Luciano measured the amount of water that evaporated over a period of time from a container holding w ounces of water, where w is greater than 12. By the end of the first day, the cup had lost 2 ounces of water. By the end of the 7th day, the cup had lost an additional 8 ounces of water. By the end of the 11th day, the cup had lost half of the water that remained after the 7th day. Which of the following represents the remaining amount of water, in ounces, in Luciano's container at the end of the 11th day?

A) $\dfrac{w-2}{8}$

B) $\dfrac{w-2}{2} - 10$

C) $\dfrac{1}{2}w - 10$

D) $\dfrac{w-10}{2}$

Questions 13 and 14 refer to the following information.

In the 1990s, the park rangers at Yellowstone National Park implemented a program aimed at increasing the dwindling coyote population in Montana. Results of studies of the coyote population in the park are shown in the scatterplot below.

Coyote Population in Yellowstone Park
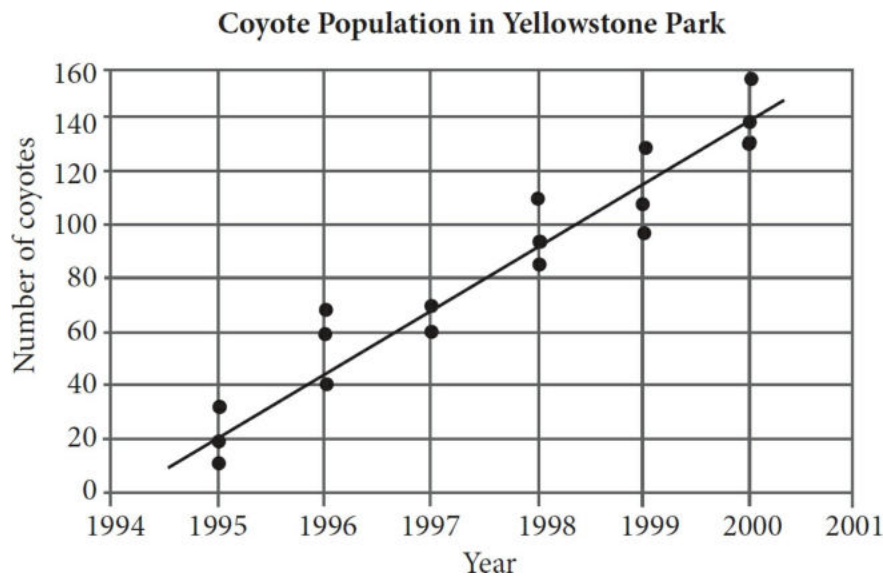
13

Based on the line of best fit in the scatterplot above, which of the following is the closest to the average annual increase in coyotes in Yellowstone Park between 1995 and 2000 ?

A) 22

B) 24

C) 26

D) 28

14

According to the data in the scatterplot, which of the following best represents the percent increase between the median of the results of the studies from 1995 and the median of the results of

the studies from 1996 ?

A) 50%

B) 100%

C) 150%

D) 200%

———————————— ▲ ————————————

15

Bailey's Boutique Clothing is having a 20% off sale during which

shirts cost $30.00 and pants cost $60.00. On the day of the sale,

Bailey's sells a total of 60 shirts and pants and earned a total of

$2,250. On a regular day, Bailey's sells $\frac{2}{3}$ the number of shirts

and pants sold during the sale and earns a total of $1,875. Solving

which of the following systems of equations yields the number of

shirts, s, and the number of pants, p, sold during a regular day?

A) $s + p = 40$
    $37.5s + 75p = 1,875$

B) $s + p = 40$
    $30s + 60p = 2,250$

C) $s + p = 60$
    $30s + 60p = 2,250$

D) $s + p = 2,250$
    $30s + 60p = 60$

16

Bryan, who works in a high-end jewelry store, earns a base pay of
$10.00 per hour plus a certain percent commission on the sales

that he helps to broker in the store. Bryan worked an average of 35 hours per week over the past two weeks and helped to broker sales of $5,000.00 worth of jewelry during that same two-week period. If Bryan's earnings for the two-week period were $850.00, what percent commission on sales does Bryan earn?

A) 1%

B) 2%

C) 3%

D) 4%

17

If $\dfrac{(C+x)}{x-3} = \dfrac{x+8}{3}$, which of the following could be an expression of C in terms of x ?

A) $3(1 + x)$

B) $x^2 + 2x - 24$

C) $\dfrac{1}{3}(x+6)(x-4)$

D) $\dfrac{1}{3}(x-3)(x+8)$

18

Lennon has 6 hours to spend in Ha Ha Tonka State Park. He plans to drive around the park at an average speed of 20 miles per hour, looking for a good trail to hike. Once he finds a trail he likes, he will spend the remainder of his time hiking it. He hopes to travel more than 60 miles total while in the park. If he hikes at an average speed of 1.5 miles per hour, which of the following

systems of inequalities can be solved for the number of hours Lennon spends driving, d, and the number of hours he spends hiking, h, while he is at the park?

A) $1.5h + 20d > 60$
$\qquad h + d \leq 6$

B) $1.5h + 20d > 60$
$\qquad h + d \geq 6$

C) $1.5h + 20d < 60$
$\qquad h + d \geq 360$

D) $20h + 1.5d > 6$
$\qquad h + d \leq 60$

19

In a certain sporting goods manufacturing company, a quality control expert tests a randomly selected group of 1,000 tennis balls in order to determine how many contain defects. If this quality control expert discovered that 13 of the randomly selected tennis balls were defective, which of the following inferences would be most supported?

A) 98.7% of the company's tennis balls are defective.

B) 98.7% of the company's tennis balls are not defective.

C) 9.87% of the company's tennis balls are defective.

D) 9.87% of the company's tennis balls are not defective.

20

If $-\dfrac{20}{7} < -3z + 6 < -\dfrac{11}{5}$, what is the greatest possible integer value of $9z - 18$?

A) 6

B) 7

C) 8

D) 9

$$-24 - 8j = 12k$$
$$3 + \frac{5}{3}k = -\frac{7}{6}j$$

Which of the following ordered pairs (j, k) is the solution to the system of equations above?

A) $(6, -6)$
B) $(3, 0)$
C) $(0, 2)$
D) $(-4, 1)$

United States Investment in Alternative Energy Sources

	Actual 2007 Investment	Projected 2017 Investment
Biofuels	0.31	0.34
Wind	0.40	0.32
Solar	0.27	0.30
Fuel Cells	0.02	0.04
Total	1.00	1.00

The table above shows the relative investment in alternative energy sources in the United States by type. One column shows the relative investment in 2007 of $75 million total invested in alternative energy. The other column shows the projected relative investment in 2017 given current trends. The total projected investment in alternative energy in 2017 is $254 million. Suppose that a new source of alternative energy, Cold Fusion, is perfected.

It is projected that by 2017 that $57 million will be invested in Cold Fusion in the United States, without any corresponding reduction in investment for any other form of alternative energy. What portion of the total investment of alternative energy in the United States will be spent on biofuels?
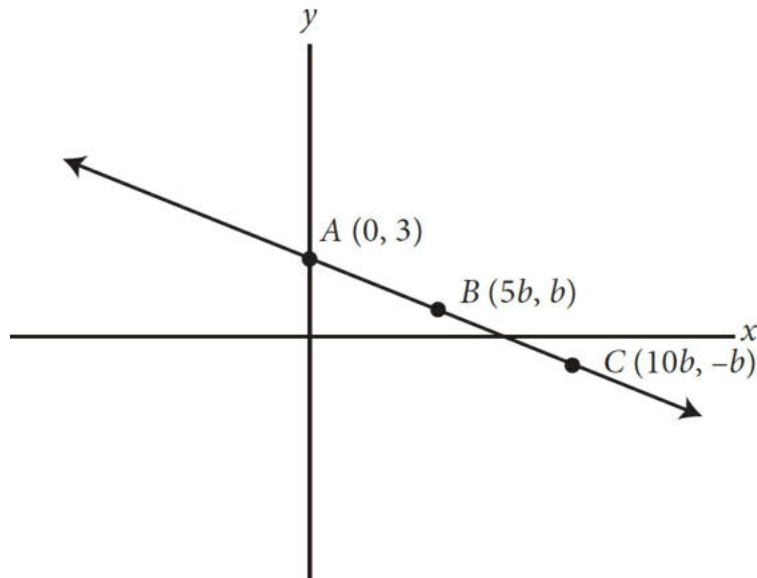
A) 0.18

B) 0.22

C) 0.28

D) 0.34

$$(x - 2)^2 + y^2 = 36$$
$$y = -x + 2$$

The equations above represent a circle and a line that intersects the circle across its diameter. What is the point of intersection of the two equations that lies in Quadrant II ?

A) $\left(-3\sqrt{2}, 3\sqrt{2}\right)$

B) $(-4, 2)$

C) $\left(2+\sqrt{3}, 2\right)$

D) $\left(2-3\sqrt{2}, 3\sqrt{2}\right)$

The graph of f(x) is shown above in the xy-plane. The points (0, 3), (5b, b), and (10b, −b) are on the line described by f(x). If b is a positive constant, what are the coordinates of point C ?

A) (5, 1)

B) (10, −1)

C) (15, −0.5)

D) (20, −2)

Melanie puts $1,100 in an investment account that she expects will make 5% interest for each three-month period. However, after a year she realizes she was wrong about the interest rate and she has $50 less than she expected. Assuming the interest rate the account earns is constant, which of the following equations expresses the total amount of money, x, she will have after t years using the actual rate?

A) $x = 1,100(1.04)^{4t}$

B) $x = 1,100(1.05)^{4t-50}$

C) $x = 1,100(1.04)^{t/3}$

D) $x = 1,100(1.035)^{4t}$
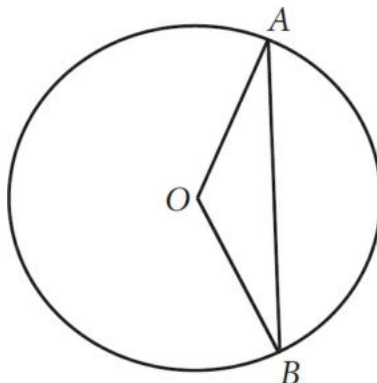
If the radius of the circle above is x, $\angle AOB = 120°$, and O is the center of the circle, what is the length of chord AB, in terms of x ?

A) $\sqrt{2}x$

B) $\sqrt{3}x$

C) $\dfrac{x}{\sqrt{2}}$

D) $\dfrac{x}{\sqrt{3}}$

Students in a physics class are studying how the angle at which a projectile is launched on level ground affects the projectile's hang time and horizontal range. Hang time can be calculated using the formula $t = \dfrac{2v \cdot \sin(\theta)}{g}$, where t is the hang time in seconds, v is the initial launch velocity, θ is the projectile angle with respect to

level ground, and g is the acceleration due to gravity, defined as 9.8 m/s². Horizontal range can be calculated using the formula $R = \dfrac{v^2 \sin(2\theta)}{g}$, where R is the distance the projectile travels from the launch site, in feet. Which of the following gives the value of v, in terms of R, t, and θ ?

A) $v = \dfrac{t \sin(\theta)}{2R \sin(\theta)}$

B) $v = \dfrac{2t \sin(\theta)}{R \sin(\theta)}$

C) $v = \dfrac{2R \sin(\theta)}{t \sin(2\theta)}$

D) $v = \dfrac{2R \sin(2\theta)}{t \sin(\theta)}$

28

If $(i^{413})(i^x) = 1$, then what is one possible value of x ?
A) 0
B) 1
C) 2
D) 3

29

The function g is defined by $g(x) = 2x^2 - dx - 6$, where d is a constant. If one of the zeros of g is 6, what is the value of the other zero of g ?

A)   2

B) $\dfrac{1}{2}$

C) $-\dfrac{1}{2}$

D)   −2

30

The flu shot for a flu season is created from four strains of the flu virus, named Strain A, B, C, and D, respectively. Medical researchers use the following data to determine the effectiveness of the vaccine over the flu season. Table 1 shows the effectiveness of the vaccine against each of these strains individually. The graph below the table shows the prevalence of each of these strains during each month of the flu season, represented as a percentage of the overall cases of flu that month.

Table 1

Strain	Effectiveness
A	35%
B	13%
C	76%
D	68%
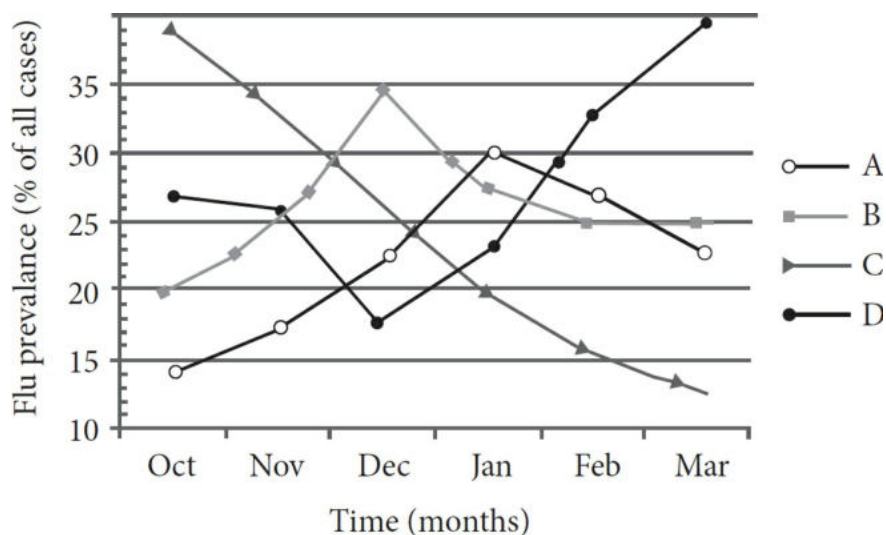
For the strain against which the flu shot was the most effective, approximately how effective was the shot overall during the month that strain was least prevalent?

A) 13%

B) 20%

C) 27%

D) 48%

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
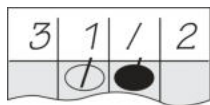
 is entered into the grid, it will be interpreted as $\frac{31}{2}$, not

as $3\frac{1}{2}$.)

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.

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

Answer: 2.5

Write answer in boxes.

← Fraction line

| 7 | / | 1 | 2 |

← Decimal point

| 2 | . | 5 |

Grid in result.

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

| 2 | / | 3 |

| . | 6 | 6 | 6 |

| . | 6 | 6 | 7 |

Answer: 201 – either position is correct

| 2 | 0 | 1 | |

| 2 | 0 | 1 | |

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

31

If $9 > 3v - 3$, what is the greatest possible integer value of v ?

32

In the expression $\dfrac{\dfrac{6}{5}}{\dfrac{12}{2y} - \dfrac{5}{y}} = 1$, what is the value of y ?

33

During a presidential election, a high school held its own mock election. Students had the option to vote for Candidate A, Candidate B, or several other candidates. They could also choose to spoil their ballot. The table below displays a summary of the election results.

	Candidate A	Candidate B	Other	Total
10th grade	0.32	0.58	0.10	1.00
11th grade	0.50	0.42	0.08	1.00
12th grade	0.63	0.32	0.05	1.00
Total	0.48	0.44	0.08	1.00

614 students voted for Candidate A. Approximately how many students attend the school?

34

If $\tan \theta = \dfrac{12}{5}$, then $\cos \theta =$

35

Marcellus is traveling abroad in Ghana and using traveler's checks, which he has acquired from Easy Traveler's Savings Bank. Easy Traveler's Savings Bank charges a 7% fee on traveler's checks, which can then be used like cash at any location overseas at the same exchange rate, and any change will then be returned to Marcellus in local currency. For this trip, Marcellus bought a 651 Cedi traveler's check and paid a fee of 32.30 USD (United States dollars) for the check.

While in Ghana, Marcellus finds Leon's Pawnshop and Barter, which offers store credit for Marcellus's briefcase equal to its value in Cedis. If Marcellus's briefcase is worth 5,000 USD at the same exchange rate at which he bought his traveler's check, then how much store credit, to the closest Cedi, will Marcellus receive for the briefcase?

36

A square is inscribed in a circle. The area of the square is what percent of the area of the circle? (Disregard the percent symbol when gridding your answer.)

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Questions 37 and 38 refer to the following information.

Professor Malingowski, a chemist and teacher at a community college, is organizing his graduated cylinders in the hopes of keeping his office tidy and setting a good example for his students. He has beakers with diameters, in inches, of $\frac{1}{2}$, $\frac{3}{4}$, $\frac{4}{5}$, 1, and $\frac{5}{4}$.

37

Professor Malingowski notices one additional cylinder lying on the ground, and can recall certain facts about it, but not its actual diameter. If he knows that the value of the additional graduated cylinder's diameter, x, will not create any modes and will make the mean of the set equal to $\frac{5}{6}$ what is the value of the additional cylinder's diameter?

38

With his original five cylinders, Professor Malingowski realizes that he is missing a cylinder necessary for his upcoming lab demonstration for Thursday's class. He remembers that the cylinder he needs, when added to the original five, will create a median diameter value of $\frac{9}{10}$ for the set of six total cylinders. He also knows that the measure of the sixth cylinder will exceed the value of the range of the current five cylinders by a width of anywhere from $\frac{1}{4}$ inches to $\frac{1}{2}$ inches, inclusive. Based on the above data, what is one possible value of y, the diameter of this missing sixth cylinder?

————————▲————————

S T O P