2021 SEM EDUCATION SAT Math Prep-Advanced Level

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Course Outline

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Day 1. 6/21 Monday

Linear Equations

System of equations,
Inequalities
Finish all pages 2-16 by 6/22

Linear Equations- In Class Notes

1. Linear relationship: CONSTANT SLOPE
2. X-intercept:
3. Y-intercept:
4. Slope:
5. Point-slope form:
6. slope-intercept form:
7. parallel lines:
8. perpendicular lines:
9. system of equations:
    - 1 solution:
    - No solution:
    - Infinitely many solution:
10. Solving inequalities:

Review more: https://www.khanacademy.org/test-prep/sat/sat-math-practice/new-sat-heart-of-algebra/v/sat-math-h6-easier

Linear Equations- In Class Examples

Example 1

In 2014, County X had 783 miles of paved roads. Starting in 2015, the county has been building 8 miles of new paved roads each year. At this rate, how many miles of paved road will County X have in 2030? (Assume that no paved roads go out of service.)

Example 2

In 2014, County X had 783 miles of paved roads. Starting in 2015, the county has been building 8 miles of new paved roads each year. At this rate, if n is the number of years after 2014, which of the following functions f gives the number of miles of paved road there will be in County X? (Assume that no paved roads go out of service.)

A. $f(n) = 8 + 783n$

B. $f(n) = 2{,}014 + 783n$

C. $f(n) = 783 + 8n$

D. $f(n) = 2{,}014 + 8n$

Example 3

In 2014, County X had 783 miles of paved roads. Starting in 2015, the county has been building 8 miles of new paved roads each year. At this rate, in which year will County X first have at least 1,000 miles of paved roads? (Assume that no paved roads go out of service.)

Example 4

To edit a manuscript, Miguel charges $50 for the first 2 hours and $20 per hour after the first 2 hours. Which of the following expresses the amount, C, in dollars, Miguel charges if it takes him x hours to edit a manuscript, where $x > 2$?

A. $C = 20x$

B. $C = 20x + 10$

C. $C = 20x + 50$

D. $C = 20x + 90$

System of Linear Equations- In Class Examples

Example 1

Maizah bought a pair of pants and a briefcase at a department store. The sum of the prices of the pants and the briefcase before sales tax was $130.00. There was no sales tax on the pants and a 9% sales tax on the briefcase. The total Maizah paid, including the sales tax, was $136.75. What was the price, in dollars, of the pants?

Example 2

Each morning, John jogs at 6 miles per hour and rides a bike at 12 miles per hour. His goal is to jog and ride his bike a total of at least 9 miles in no more than 1 hour. If John jogs j miles and rides his bike b miles, which of the following systems of inequalities represents John's goal?

A. $j/6 + b/12 < 1;\ j + b \geq 9$

B. $j/6 + b/12 \geq 1;\ j + b \leq 9$

C. $6j + 12b \geq 9;\ j + b \leq 1$

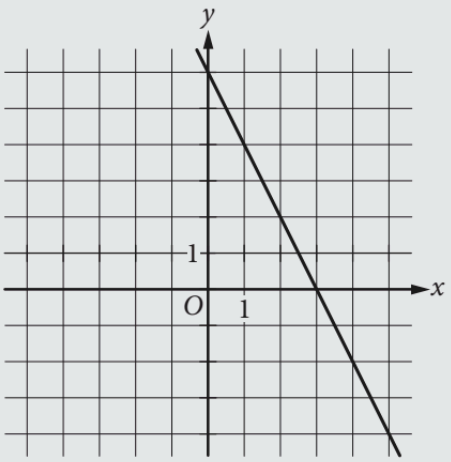
D. $6j + 12b \leq 1;\ j + b \geq 9$

of Solutions in Linear Equations- In Class Examples

1. $3s - 2t = a$
$-15s + bt = -7$

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

2.



The graph of line k is shown in the xy-plane above. Which of the following is an equation of a line that is perpendicular to line k?

A) $y = -2x + 1$

B) $y = -\frac{1}{2}x + 2$

C) $y = \frac{1}{2}x + 3$

D) $y = 2x + 4$

3. A voter registration drive was held in Town Y. The number of voters, V, registered T days after the drive began can be estimated by the equation $V = 3{,}450 + 65T$. What is the best interpretation of the number 65 in this equation?

A. The number of registered voters at the beginning of the registration drive

B. The number of registered voters at the end of the registration drive

C. The total number of voters registered during the drive

D. The number of voters registered each day during the drive

4. $9x - 14y = -3$;
$2x - ay = -6$

What value of a will result in a system with no solutions?

Linear Equations- In Class Work

1

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

Which ordered pair (x, y) satisfies the system of equations shown above?

A) $(-2, -3)$

B) $(-3, -2)$

C) $(-1, 2)$

D) $(-2, 0)$

2

$$\frac{1}{2}x + y = 1$$
$$-2x - y = 5$$

If (x, y) is a solution to the system of equations above, what is the value of $x + y$?

A) -2

B) -1

C) 1

D) 2

3

$$2x - ky = 14$$
$$5x - 2y = 5$$

In the system of equations above, k is a constant and x and y are variables. For what values of k will the system of equations have no solution?

4

Which of the following systems of equations has infinitely many solutions?

A) $x + y = 1$
$x - y = 1$

B) $-2x + y = 1$
$-2x + y = 5$

C) $\frac{1}{2}x - \frac{1}{3}y = 1$
$3x - 2y = 6$

D) $2x + 3y = 1$
$3x - 2y = 1$

5

$$ax - y = 0$$
$$x - by = 1$$

In the system of equations above, a and b are constants and x and y are variables. If the system of equations above has no solution, what is the value of $a \cdot b$?

6

$$2x - \frac{1}{2}y = 15$$
$$ax - \frac{1}{3}y = 10$$

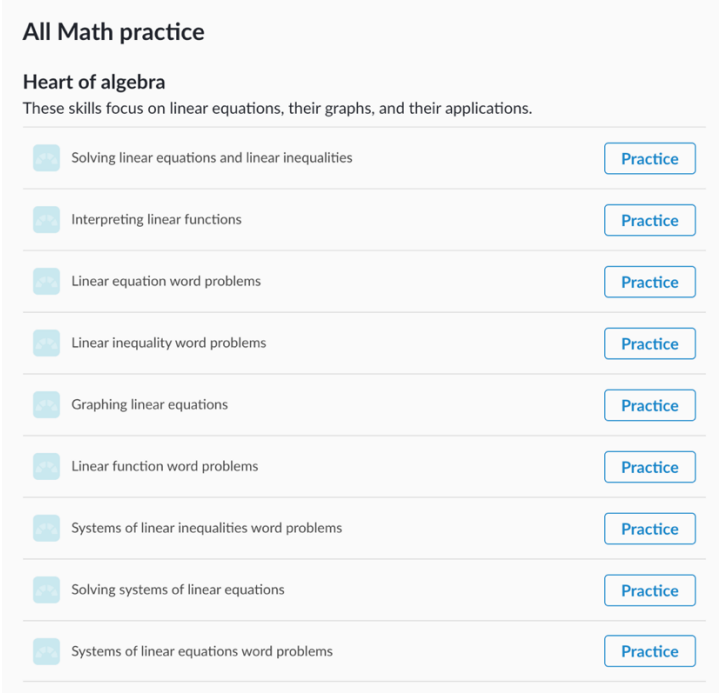
In the system of equations above, a is a constant and x and y are variables. For what values of a will the system of equations have infinitely many solution?

If you need any more extra problems,

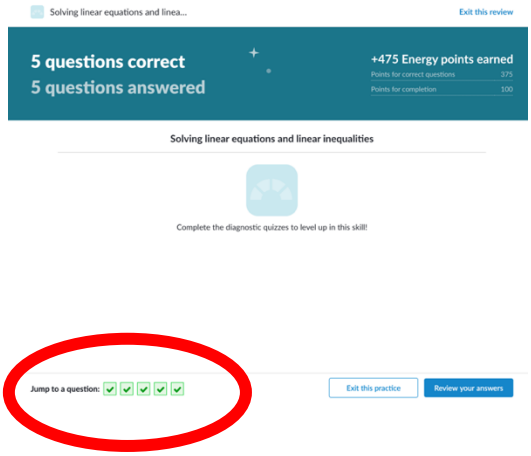
Optional by 6/23 12:00am.
Submit the answers & work to virginiasemeducation@gmail.com or (703)965-8530

1. Please go to the following link (& Log in to Khan Academy):
https://www.khanacademy.org/mission/sat/practice/math

2. and do all the following practice.



3. Take a picture or a screen shot of the score of 100% on each, and submit it to virginiasemeducation@gmail.com or (703)965-8530



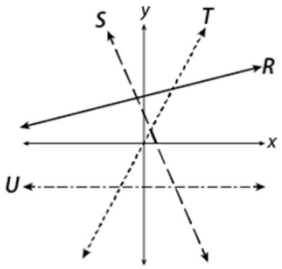
4. Go to https://student.desmos.com/join/nae7uu and do at least 10 marble slides exercises.

Linear Equations- Quiz

due 6/23 12:00am.

Submit the answers & work to virginiasemeducation@gmail.com or (703)965-8530

1. Order the lines in the figure above according to their slopes, from least to greatest?



2. Which of the following does not represent a linear relationship?

Ⓐ

x	−1	−4	−7	−10	−13
y	8	6	4	2	0

Ⓑ

x	−3	−1	1	3	5
y	5	3	1	−1	−3

Ⓒ

x	1	2	3	4	5
y	−5	−5	−5	−5	−5

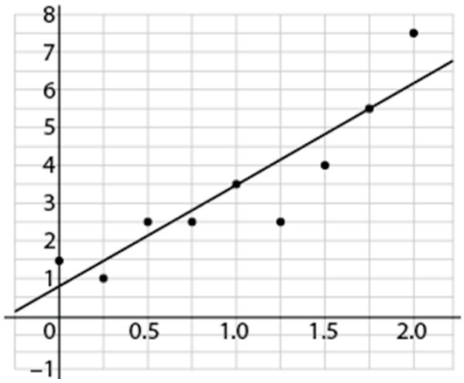
Ⓓ

x	−2	−1	0	1	2
y	4	1	0	1	4

3. If graphed, the ordered pairs in the table above would form a line. Where would this line intersect the x-axis?
   A) -2.5
   B) -.5
   C) 2.5
   D) 5

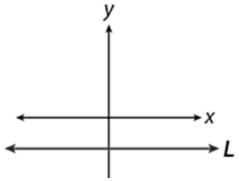
x	y
−1	7
0	5
1	3
2	1

4. Which of the following values most accurately reflects the average rate of change of the data based on the line of best fit?
A) 3/8
B) 3/4
C) 4/3
D) 8/3

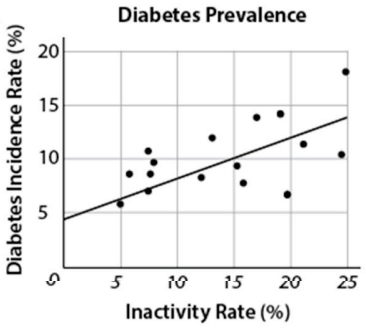


5. If y=12-x, .75y+11=-.5x. what is the value of .2x+.25y?
A) -1
B) 75/4
C) 19/4
D)33

6. Line L shown in the graph could be the graph of which equation?
A) x+y=-2
B) x+y=0
C) x+y-2=x
D) x+y+2=x



7.



Increased physical activity has been linked to a lower incidence rate of diabetes. The scatterplot above shows the relationship between the percent of people in a certain country whose daily activity qualifies them as "inactive" and the incidence rate of diabetes in that country. The line of best fit for the data is also shown. Which of the following best represents the meaning of the *y*-intercept of the line of best fit in the context of this question?

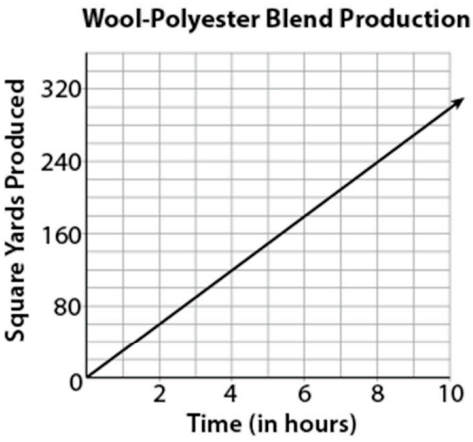
Ⓐ The predicted incidence rate of diabetes when the entire country is considered active
Ⓑ The predicted incidence rate of diabetes when the entire country is considered inactive
Ⓒ The predicted percent of people who will be active when the incidence rate of diabetes is 0%
Ⓓ The predicted percent of people who will be inactive when the incidence rate of diabetes is 0%

8.

Johanna picked 3 pounds of strawberries at a "pick-your-own" patch. At this particular patch, the cost is $1.50 for the pail and $3.99 per pound of strawberries picked. If a linear equation is created to represent the situation and written in the form $y = mx + b$, which piece of the equation would the value 13.47 in this scenario most likely represent?

Ⓐ b
Ⓑ m
Ⓒ x
Ⓓ y

9.

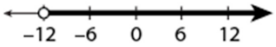


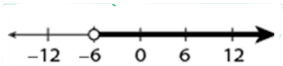
The figure above shows the rate at which a textile machine can produce a wool-polyester blend fabric. To produce a 100% polyester fabric, the same machine can produce 40 square yards per hour. Given that the company needs to fill an order for 2,400 square yards of each type of fabric, which of the following statements is true?

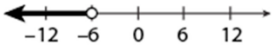
Ⓐ It will take half as long to make the blended fabric as the 100% polyester fabric.
Ⓑ It will take twice as long to make the blended fabric as the 100% polyester fabric.
Ⓒ It will take 20 more hours to make the blended fabric than the 100% polyester fabric.
Ⓓ It will take 20 fewer hours to make the blended fabric than the 100% polyester fabric.

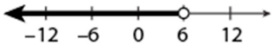
10.

Which of the following number lines represents the solution to the inequality $3x + 29 > 5 - x$?

Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

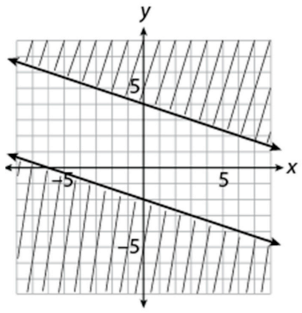
11.

$$\begin{cases} Ax - 2y = 18 \\ Bx + 6y = 26 \end{cases}$$

If the graphs of the lines in the system of equations above intersect at (4, −1), what is the value of $\frac{B}{A}$?

Ⓐ -3
Ⓑ $-\frac{1}{3}$
Ⓒ $\frac{1}{2}$
Ⓓ 2

12.



Which of the following systems of inequalities could be represented by the

Ⓐ $\begin{cases} 3x - y \geq 4 \\ 3x - y \leq -2 \end{cases}$

Ⓑ $\begin{cases} 3x + y \geq 4 \\ 3x + y \leq -2 \end{cases}$

Ⓒ $\begin{cases} x - 3y \geq 12 \\ x - 3y \leq -6 \end{cases}$

Ⓓ $\begin{cases} x + 3y \geq 12 \\ x + 3y \leq -6 \end{cases}$

13.

A mailing supply store sells small shipping boxes in packs of 8 or 20. If the store has 61 packs in stock totaling 800 small shipping boxes, how many packs have 20 boxes in them, assuming all the packs are full?

Ⓐ 26
Ⓑ 32
Ⓒ 35
Ⓓ 40

14.

Equation 1	
x	y
5	−8
4	−5
3	−2
2	1

Equation 2	
x	y
−8	3
−6	4
−4	5
−2	6

The tables above represent data points for two linear equations. If the two equations form a system, what is the x-coordinate of the solution to that system?

15.

A picture framing shop sells ready-made frames and also does custom framing using different kinds and widths of wood or metal. The shop has a three-day sale. During the sale, for an 11-inch × 14-inch frame, a ready-made frame costs $12 and a custom frame costs $30. Over the course of the three days, the shop sells ninety-two 11 × 14 frames and collects $1,788. Solving which system of equations would yield the number of 11 × 14 ready-made frames r and the number of 11 × 14 custom frames c that the shop sold during the three-day sale?

Ⓐ $\begin{cases} r + c = 92 \\ 12r + 30c = \frac{1,788}{3} \end{cases}$

Ⓑ $\begin{cases} r + c = 1,788 \\ 12r + 30c = 92 \times 3 \end{cases}$

Ⓒ $\begin{cases} r + c = 1,788 \\ 12r + 30c = 92 \end{cases}$

Ⓓ $\begin{cases} r + c = 92 \\ 12r + 30c = 1,788 \end{cases}$

16.

A publishing company ships books to schools, some of which are hardback textbooks and some are paperback workbooks. Each shipping box can hold a maximum of 20 textbooks or 64 workbooks. Each textbook takes up 192 cubic inches of space, and each workbook takes up 60 cubic inches of space. One box can hold a maximum of 3,840 cubic inches. The shipping department is packing a box containing both types of books. Which of the following systems of inequalities can the department use to determine how many textbooks, t, and workbooks, w, can be shipped in one box?

Ⓐ $t \le 20$
$w \le 64$
$60t + 192w \le 3,840$

Ⓑ $t \ge 20$
$w \ge 64$
$192t + 60w \ge 3,840$

Ⓒ $t \le 20$
$w \le 64$
$192t + 60w \le 3,840$

Ⓓ $t \le 192$
$w \le 60$
$20t + 64w \le 3,840$

17.

City	Cost per Square Foot
Detroit	$62.45
Atlanta	$74.19
New York City	$288.58
San Francisco	$420.99

In real estate, location is often the number one determinant of home prices. The table above shows the average price per square foot of houses in four cities. Assuming an average home size of 1,500 to 2,000 square feet, which inequality represents how much more in dollars a house in New York City would cost than in Detroit?

Ⓐ $x \ge 226.13$
Ⓑ $62.45 \le x \le 288.58$
Ⓒ $93,675 \le x \le 432,870$
Ⓓ $339,195 \le x \le 452,260$

Homework- Advanced Real Test Questions

1 If $\left(b^2 \cdot b^3\right)^x = b^{125}$ and $\left(b^y\right)^y = b^{64}$, where $b > 1$ and $y > 1$, what is the product of x and y?

(A) 24
(B) 32
(C) 96
(D) 192
(E) 200

---

2 Cube A has volume V. The edges of cube B are 3 times as long as the edges of cube A. What is the volume of cube B, in terms of V?

(A) $3V$
(B) $6V$
(C) $9V$
(D) $18V$
(E) $27V$

$$x^3, x^2, x, \frac{1}{x}, \frac{1}{x^2}$$

3 If $-1 < x < 0$, what is the median of the five numbers in the list above?

(A) x^3
(B) x^2
(C) x
(D) $\frac{1}{x}$
(E) $\frac{1}{x^2}$

4 When x is expressed as a decimal, the hundredths digit is 8. What is the greatest possible value of $\frac{1}{x}$?

(A) 0.00125
(B) 0.010101 . . .
(C) 0.98999 . . .
(D) 11.111 . . .
(E) 12.5

5 Each student in a group of 30 students studies German, Italian, or both. The total number of students studying German is three more than the total number of students studying Italian. If the number of students that study both subjects is the same as the number of students that study exactly one subject, how many students in the group study only Italian?

(A) 6
(B) 9
(C) 15
(D) 21
(E) 24

$$90n + 23p = 4523$$

6 If n and p are positive integers in the equation above, what is one possible value of $n + p$?

---

7 At a certain hospital, 89 children were born in the month of June. If more children were born on the fifteenth of June than on any other day in June, what is the least number of children that could have been born on the fifteenth of June?

8 What percent of the integers from 3 to 12, inclusive, are neither primes nor multiples of 4 ?

(A) 20%
(B) 30%
(C) 40%
(D) 60%
(E) 70%

x	$f(x)$	$g(x)$
-2	-5	7
-1	-2	6
0	-3	8
1	7	3
2	4	5

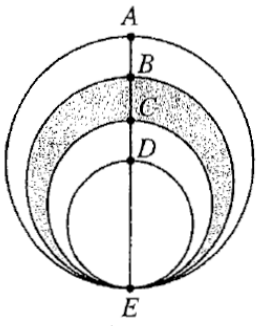
9 The functions f and g are defined for all values of x, and certain values of those functions are given in the table above. If the function h is defined by $h(x) = 2f(x) + g(2x)$ for all values of x, what is the value of $h(1)$?

---

10 In the xy-plane, line ℓ has equation $y = \frac{1}{4}x + 3$, and line m has equation $y = \frac{1}{2}x + b$. If the lines intersect at the point with coordinates $\left(t, \frac{11}{2}\right)$, what is the value of b ?

11 If $x^y = 2$ and $x^t = 16$, what does x^{y-t} equal?

(A) -14
(B) -8
(C) $\frac{1}{8}$
(D) 8
(E) 32



12 The figure above consists of four circles, each with its center on segment $\overline{AE}$. Point D is the center of the largest circle. If $AB = BC = CD = 1$, what is the area of the shaded region?

(A) 4π

(B) 5π

(C) $\frac{5\pi}{4}$

(D) $\frac{9\pi}{4}$

(E) $\frac{11\pi}{4}$

$x = 9a$

$y = 9a^2 + 1$

13 If $a > 0$ in the equations above, what is y in terms of x?

(A) $\frac{1}{9}x^2 + 1$

(B) $\frac{1}{9}x^2 + 9$

(C) $\frac{1}{3}x^2 + 1$

(D) $x^2 + 1$

(E) $x^2 + 9$

14 A salesman started at Town S and traveled 28 miles due east to Town X. He then traveled back 40 miles due west to Town Y. The salesman then traveled 55 miles due south to Town P, and then traveled back 60 miles due north to Town Q. What is the distance, in miles, between Town Q and Town S ?

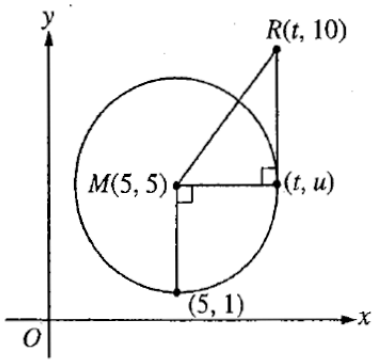
(A) 5
(B) 12
(C) 13
(D) 15
(E) 20

---

15 $$\frac{3}{\sqrt{x-2}} = 2$$

For $x > 2$, which of the following equations is equivalent to the equation above?

(A) $3 = 2(x-2)$
(B) $3 = 4(x-2)$
(C) $9 = 2(x-4)$
(D) $9 = 2(x-2)$
(E) $9 = 4(x-2)$



16 In the figure above, point M is the center of the circle. What is the slope of segment $\overline{MR}$?

(A) $\frac{3}{4}$
(B) $\frac{4}{5}$
(C) 1
(D) $\frac{5}{4}$
(E) $\frac{6}{5}$

---

17 Let the function p be defined by $p(x) = a(x-k)^2$, where a and k are positive constants. For what value of x will the function p have its minimum value?

(A) $-a$
(B) $-k$
(C) 0
(D) a
(E) k

Day 2. 6/23 Wednesday

Quadratic Equations

Discriminant

Completing square

Finish all pages 16-31 by 6/24

Quadratic Equations

1.Standard form	2.Factored form	3.Vertex form

- Zeroes of the function= =
- Quadratic formula=
- Vertex: Minimum/maximum
- Discriminant

1. discriminant<0	2. discriminant=0	3. discriminant>0

- Completing square

- Learn More: https://www.khanacademy.org/test-prep/sat/sat-math-practice/new-sat-passport-advanced-mathematics/v/sat-math-p5-easier

Quadratic Equations - *In Class Examples*

1. $(x^2 + bx - 2)(x + 3) = x^3 + 6x^2 + 7x - 6$

In the equation above, b is a constant. If the equation is true for all values of x, what is the value of b?

A. 2

B. 3

C. 7

D. 9

2. Which of the following is equivalent to $16s^4 - 4t^2$?

A. $4(s^2 - t)(4s^2 + t)$

B. $4(4s^2 - t)(s^2 + t)$

C. $4(2s^2 - t)(2s^2 + t)$

D. $(8s^2 - 2t)(8s^2 + 2t)$

3. $y^5 - 2y^4 - cxy + 6x$

In the polynomial above, c is a constant. If the polynomial is divisible by $y - 2$, what is the value of c?

4. A car is traveling at x feet per second. The driver sees a red light ahead, and after 1.5 seconds reaction time, the driver applies the brake. After the brake is applied, the car takes $x/24$ seconds to stop, during which time the average speed of the car is $x/2$ feet per second. If the car travels 165 feet from the time the driver saw the red light to the time it comes to a complete stop, which of the following equations can be used to find the value of x?

A. $x^2 + 48x - 3{,}960 = 0$

B. $x^2 + 48x - 7{,}920 = 0$

C. $x^2 + 72x - 3{,}960 = 0$

D. $x^2 + 72x - 7{,}920 = 0$

5. What are the solutions x of $x^2 - 3 = x$?

A) $\frac{-1 \pm \sqrt{11}}{2}$

B) $\frac{-1 \pm \sqrt{13}}{2}$

C) $\frac{1 \pm \sqrt{11}}{2}$

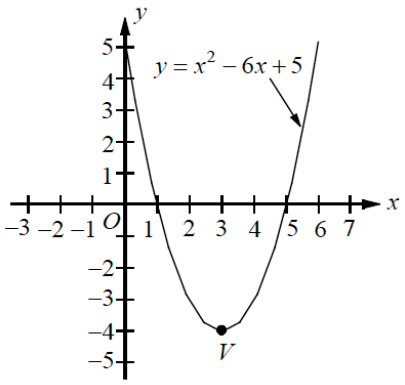
D) $\frac{1 \pm \sqrt{13}}{2}$

6. If $x > 0$ *and* $2x^2 + 3x - 2 = 0$, what is the value of x?

7. What is the sum of the solutions of $(2x - 1)^2 = (x + 2)^2$?

Quadratic Equations - *In Class Work*

Questions 1 and 2 refer to the following information.



The graph of quadratic function $y = x^2 - 6x + 5$ is shown above.

1

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

A) $y = (x-1)(x-5)$

B) $y = (x+1)(x+5)$

C) $y = x(x-6)+5$

D) $y = (x-3)^2 - 4$

2

Which of the following is an equivalent form of the equation of the graph shown above, that displays the x- intercepts of the parabola as constants?

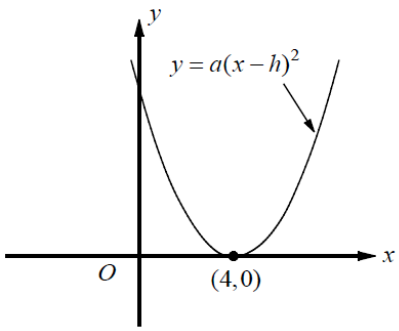
A) $y = (x-1)(x-5)$

B) $y = (x+1)(x+5)$

C) $y = x(x-6)+5$

D) $y = (x-3)^2 - 4$

3



In the xy- plane above, the parabola $y = a(x-h)^2$ has one x- intercept at $(4,0)$. If the y- intercept of the parabola is 9, what is the value of a?

4

In the xy- plane, if the parabola with equation $y = a(x+2)^2 - 15$ passes through $(1,3)$, what is the value of a?

5

The graph of the equation $y = a(x-1)(x+5)$ is a parabola with vertex (h,k). If the minimum value of y is -12, what is the value of a?

Quadratic Equations – *Homework*

1

If $x^2 - 10x = 75$ and $x < 0$, what is the value of $x + 5$?

A) -15

B) -10

C) -5

D) 0

2

If $x^2 - kx = 20$ and $x - \frac{k}{2} = 6$, which of the following is a possible value of x?

A) 2

B) 4

C) 6

D) 8

3

$$x^2 - \frac{k}{3}x = 5$$

Which of the following is an equivalent form of the equation shown above, from which the equation could be solved by completing the square?

A) $x^2 - \frac{k}{3}x + \frac{k}{6} = \frac{k}{6} + 5$

B) $x^2 - \frac{k}{3}x + \frac{k^2}{9} = \frac{k^2}{9} + 5$

C) $x^2 - \frac{k}{3}x + \frac{k^2}{36} = \frac{k^2}{36} + 5$

D) $x^2 - \frac{k}{3}x + \frac{k^2}{6} = \frac{k^2}{6} + 5$

4

$$x^2 - rx = \frac{k^2}{4}$$

In the quadratic equation above, k and r are are constants. What are the solutions for x?

A) $x = \frac{r}{4} \pm \frac{\sqrt{k^2 + 2r^2}}{4}$

B) $x = \frac{r}{2} \pm \frac{\sqrt{k^2 + 8r^2}}{4}$

C) $x = \frac{r}{4} \pm \frac{\sqrt{k^2 + r^2}}{2}$

D) $x = \frac{r}{2} \pm \frac{\sqrt{k^2 + r^2}}{2}$

5

If $(x - 7)(x - s) = x^2 - rx + 14$ for all values of x, what is the value of $r + s$?

6

If $x^2 - \frac{3}{2}x + c = (x - k)^2$, what is the value of c?

1

$$(p-1)x^2-2x-(p+1)=0$$

In the quadratic equation above, p is a constant. What are the solutions for x?

A) $\frac{1+\sqrt{2-p^2}}{p-1}$ and $\frac{1-\sqrt{2-p^2}}{p-1}$

B) $\frac{1+2p}{p-1}$ and -1

C) $\frac{p+1}{p-1}$ and -1

D) $\frac{p+1}{p-1}$ and $\frac{2p+1}{p-1}$

2

What is the sum of all values of x that satisfy $3x^2+12x-29=0$?

A) -4

B) -2

C) 2

D) 4

3

If the quadratic equation $kx^2+6x+4=0$ has exactly one solution, what is the value of k?

A) $\frac{3}{2}$

B) $\frac{5}{2}$

C) $\frac{7}{4}$

D) $\frac{9}{4}$

4

$$\begin{cases} y=bx-3 \\ y=ax^2-7x \end{cases}$$

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) $a=3,\ b=-2$

B) $a=5,\ b=0$

C) $a=7,\ b=2$

D) $a=9,\ b=4$

5

What are the solutions to $x^2+4=-6x$?

A) $-3\pm\sqrt{13}$

B) $-3\pm\sqrt{5}$

C) $-6\pm\sqrt{5}$

D) $-6\pm\sqrt{13}$

6

Which of the following equations has no real solution?

A) $5x^2-10x=6$

B) $4x^2+8x+4=0$

C) $3x^2-5x=-3$

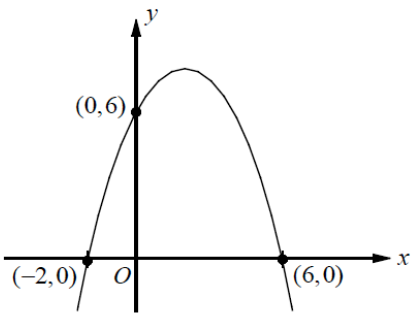
D) $-\frac{1}{3}x^2+2x-2=0$

Quadratic Equations- Quiz 1

due 6/25 12:00am.

Submit the answers & work to virginiasemeducation@gmail.com or (703)965-8530

1



The graph of the quadratic function above shows two x- intercepts and a y- intercept. Which of the following equations represents the graph of the quadratic function above?

A) $y=-\frac{1}{2}(x-1)^2+9$

B) $y=-\frac{1}{2}(x-2)^2+8$

C) $y=-\frac{1}{2}(x-2)^2+9$

D) $y=-\frac{1}{2}(x-3)^2+8$

2

If $(x+y)^2=324$ and $(x-y)^2=16$, what is the value of xy ?

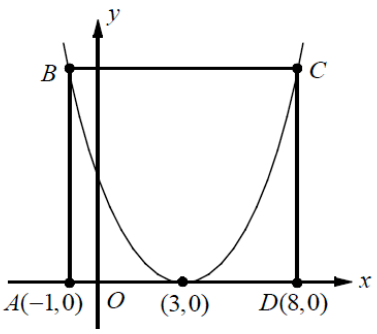
A) 33

B) 55

C) 77

D) 99

3



In the figure above, the vertex of the graph of the quadratic function is at $(3,0)$. The points B and C lie on the parabola. If $ABCD$ is a rectangle with perimeter 38, which of the following represents the equation of the parabola?

A) $y=\frac{2}{5}(x-3)^2$

B) $y=\frac{5}{8}(x-3)^2$

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

D) $y=\frac{7}{8}(x-3)^2$

4

If $(ax+b)(2x-5)=12x^2+kx-10$ for all values of x, what is the value of k ?

A) -26

B) -10

C) 24

D) 32

Questions 5-8 refer to the following information.

$$h = -\frac{1}{2}gt^2 + v_0t + h_0$$

The equation above describes the motion of an object thrown upward into the air. In the equation, g is the acceleration due to gravity (9.8m/s^2), t is the time elapsed since the object was thrown upward, v_0 is the initial speed of the object, h_0 is the initial height from which the object was thrown, and h is the height of the object above the ground t seconds after the object was thrown.

5

Which of the following equations represents the motion of the object, if the object was thrown upward from 40 meters above the ground with an initial speed of 35 meters per second (m/s)?

A) $h = -9.8t^2 + 40t + 35$

B) $h = -9.8t^2 + 35t + 40$

C) $h = -4.9t^2 + 40t + 35$

D) $h = -4.9t^2 + 35t + 40$

6

How many seconds will it take the object to reach its maximum height? (hint: The function has a maximum point at $t = -\frac{b}{2a}$.)

A) $\frac{15}{7}$

B) $\frac{20}{7}$

C) $\frac{25}{7}$

D) $\frac{30}{7}$

7

What is the maximum height from the ground the object will reach, to the nearest meter?

A) 103

B) 112

C) 125

D) 133

8

How long will it take the object to hit the ground, to the nearest second? (hint: Height of the object is zero when the object hits the ground.)

A) 7

B) 8

C) 9

D) 10

9

$$h = -16t^2 + h_0$$

The equation above describes the height of an object t seconds after it dropped from a height of h_0 feet above the ground. If a hiker dropped a water bottle from a cliff 150 feet above the ground, how many seconds will it take to hit the ground? (Round your answer to the nearest second.)

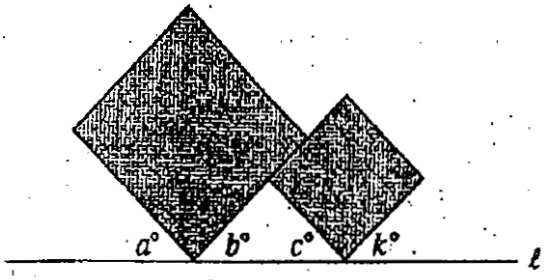
A) 2

B) 3

C) 4

D) 5

Homework - Advanced Real Test Questions



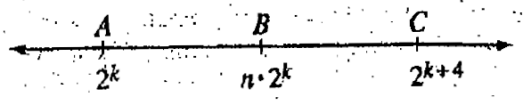
Note: Figure not drawn to scale.

7. In the figure above, the two shaded regions are squares. Which of the following must be true?

(A) $a = b$
(B) $a = k$
(C) $b = c$
(D) $b = k$
(E) $c = k$

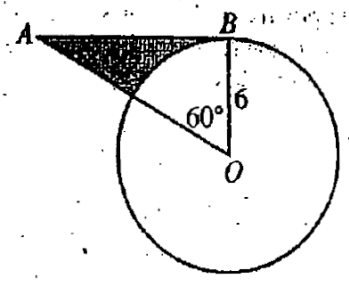
8. For a certain tire, the manufacturer recommends that the air pressure be between 30 and 34 pounds per square inch. If x pounds per square inch is the air pressure in a tire that meets this recommendation, which of the following represents all possible values of x?

(A) $|x - 32| < 2$
(B) $|x + 32| < 2$
(C) $|x - 32| > 2$
(D) $|x + 32| > 2$
(E) $|x - 32| = 2$



19. On the number line above, point B is the midpoint of $\overline{AC}$. If k is positive, what is the value of n?

(A) 4
(B) 8
(C) 17
(D) $\frac{5}{2}$
(E) $\frac{17}{2}$



20. In the figure above, the center of the circle is O and $\overline{AB}$ is tangent to the circle at point B. What is the area of the shaded region?

(A) $9\sqrt{3} - 6\pi$
(B) $9\sqrt{3} - 12\pi$
(C) $18\sqrt{3} - 6\pi$
(D) $18\sqrt{3} - 12\pi$
(E) $36\sqrt{3} - 12\pi$

15. If one of the positive factors of 40 is to be chosen at random, what is the probability that the chosen factor will not be a multiple of 10 ?

(A) $\frac{3}{7}$

(B) $\frac{5}{7}$

(C) $\frac{3}{8}$

(D) $\frac{5}{8}$

(E) $\frac{7}{8}$

16. For all numbers x, let the function f be defined as $f(x) = 2x + 4$. Which of the following is equal to $f(4) + f(3)$?

(A) $f(7)$

(B) $f(9)$

(C) $f(12)$

(D) $f(16)$

(E) $f(22)$

17. The length of each side of an equilateral triangle will be tripled to create a second triangle. The area of the second triangle will be how many times the area of the original triangle?

(A) 3

(B) 6

(C) 9

(D) 12

(E) 27

$$\frac{2}{x} > 3$$

18. In which of the following intervals does every value of x satisfy the inequality above?

(A) $-1 < x < -\frac{1}{2}$

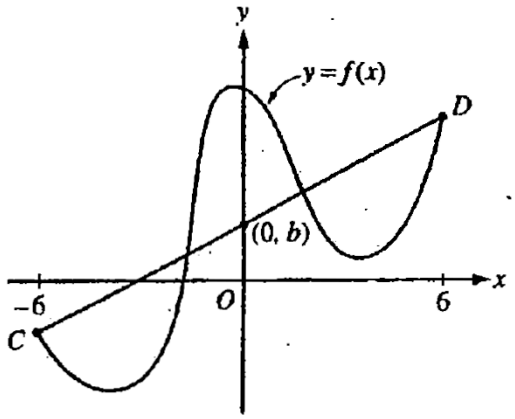
(B) $-\frac{1}{2} < x < -\frac{1}{4}$

(C) $\frac{1}{4} < x < \frac{1}{2}$

(D) $\frac{1}{2} < x < \frac{3}{4}$

(E) $\frac{3}{4} < x < 1$

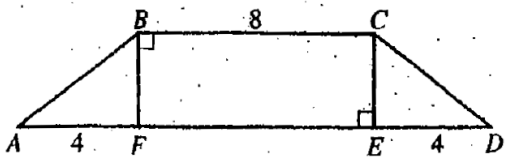
15. A spherical ball of clay with a radius of 2 inches contains exactly enough clay to make a brick. How many such bricks could be made using the amount of clay in a spherical ball with a radius of 4 inches? (The volume V of a sphere with radius r is given by $V = \frac{4}{3}\pi r^3$.)



16. The figure above shows the graph of the function f and line segment $\overline{CD}$, which has a y-intercept of b. For how many values of x between -6 and 6 does $f(x) = b$?

17. Set S consists of n integers, and the difference between the greatest integer in S and the least integer in S is 550. A new set of n integers, set T, is formed by multiplying each integer in S by 4 and then adding 5 to the product. What is the difference between the greatest integer in T and the least integer in T?

18. For any real numbers a and b such that $a \neq -b$, let $a \blacktriangledown b$ be defined by $a \blacktriangledown b = \frac{a-b}{a+b}$. If $a - b = 64$ and $a \blacktriangledown b = 16$, what is the value of a?



11. In the figure above, the perimeter of trapezoid $ABCD$ is 34. What is the perimeter of rectangle $FBCE$?

(A) 26
(B) 25
(C) 24
(D) 22
(E) 16

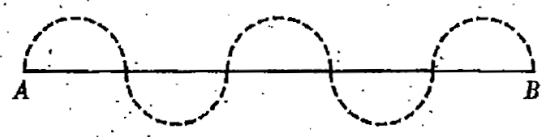
12. The function h is defined by $h(x) = x^2 + tx - 10$, where t is a constant. In the xy-plane, the graph of $y = h(x)$ crosses the x-axis where $x = 5$. What is the value of t ?

(A) -7
(B) -3
(C) -2
(D) 2
(E) 5

2, 4, 8, . . .

13. The first term of the sequence above is 2, and each term after the first is twice the preceding term. Which of the following expressions represents the nth term of the sequence?

(A) 2^n
(B) 2^{n-1}
(C) n^2
(D) $(n-1)^2$
(E) $2n$



14. In the figure above, the diameters of the 5 dotted semicircles are equal and lie on line segment $\overline{AB}$. If the length of line segment $\overline{AB}$ is 20, what is the length of the dotted curve from A to B ?

(A) 4π
(B) 8π
(C) 10π
(D) 12.5π
(E) 20π

15. For which of the following functions is it true that $-f(x) = f(-x)$ for all values of x ?

(A) $f(x) = x + 4$
(B) $f(x) = x^2 + 4$
(C) $f(x) = x^3 + 4$
(D) $f(x) = x^2 + x$
(E) $f(x) = x^3 + x$

16. If n can be any integer such that $6 < \sqrt{n} < 10$, what is the difference between the largest possible value of n and the smallest possible value of n ?

(A) 2
(B) 4
(C) 16
(D) 62
(E) 64

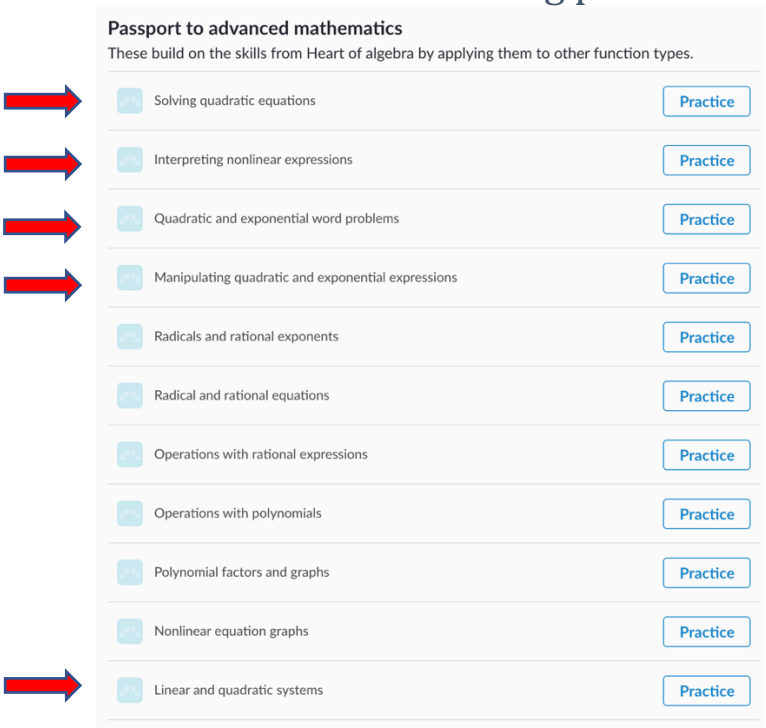
Quadratic Equations- Optional Homework

due 6/25 12:00am.

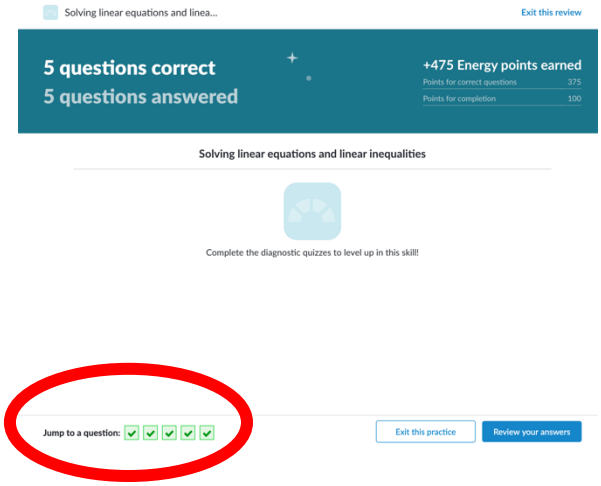
Submit the answers & work to virginiasemeducation@gmail.com or (703)965-8530

1. Please go to the following link (& Log in to Khan Academy): https://www.khanacademy.org/mission/sat/practice/math

2. and do the following practice.



3. Take a picture or a screen shot of the score of 100% on each, and submit it to virginiasemeducation@gmail.com or (703)965-8530



4. Go to https://student.desmos.com/join/56k54t and do at least 7 exercises

Quadratic Equations- Quiz 2

due 6/25 12:00am.

Submit the answers & work to virginiasemeducation@gmail.com or (703)965-8530

Solve each equation (use the method provided)

1. Square Roots Method

$(x + 3)^2 + 2 = -10$

2. Factor to solve.

$x^2 - 2x - 15 = 0$

3. Complete the Square.

$x^2 - 8x + 3 = 0$

4. Quadratic Formula.

$6x^2 + 2x + 1 = 0$

Find the **discriminant** and determine the **number and type** of solutions.

	Discriminant	Number and Type of Solutions
5. $y = 3x^2 - 3x + 2$		
6. $y = x^2 - 10x + 1$		
7. $y = x^2 - 4x + 4$		

Find the vertex of each quadratic function:

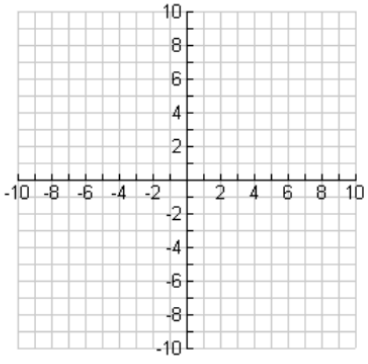
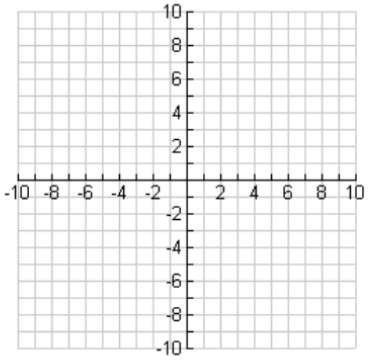
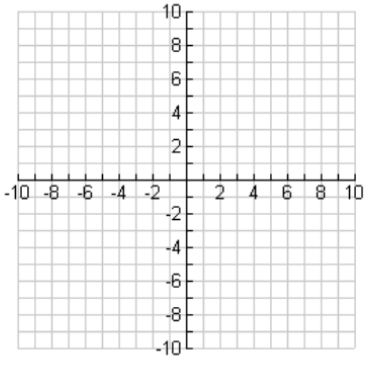
1. $f(x) = (x+2)^2 + 5$	(,)	2. $f(x) = -2x^2 - 3$	(,)
3. $f(x) = (x-1)^2$	(,)	4. $f(x) = 5x^2$	(,)
5. $f(x) = (x+10)(x-2)$	(,)	6. $f(x) = x^2 + 2x + 5$	(,)
7. $f(x) = 2(x-5)(x+3)$	(,)	8. $f(x) = 2x^2 + 8x + 5$	(,)

9. $y = -3(x-1)^2 + 10$ **Opens Up or Opens Down** **Stretched, Shrink, Standard**

10. $y = (x+4)^2 + 4$ **Opens Up or Opens Down** **Stretched, Shrink, Standard**

11. Name 3 synonyms for "solution": _____, _____, _____

Graph.

12. $y = 2(x+5)^2 - 3$	13. $y = -\frac{1}{2}(x+5)(x-3)$	14. $y = x^2 + 4x - 6$
		

6/25 Friday

Homework

Finish all pages 32-43 by 6/27

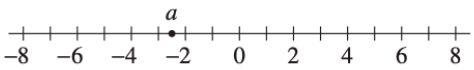
Homework- ACT Practice Test Questions

2 △ △ △ △ △ △ △ △ △ **2**

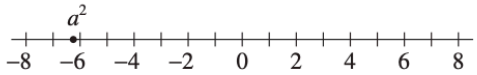
28. The average of a list of 4 numbers is 90.0. A new list of 4 numbers has the same first 3 numbers as the original list, but the fourth number in the original list is 80, and the fourth number in the new list is 96. What is the average of this new list of numbers?

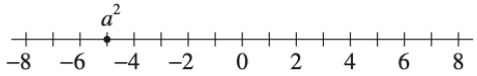
F. 90.0
G. 91.5
H. 94.0
J. 94.5
K. 94.8

29. The number a is located at -2.5 on the number line below.



One of the following number lines shows the location of a^2. Which number line is it?

A.


B.


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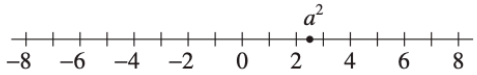

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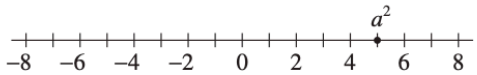

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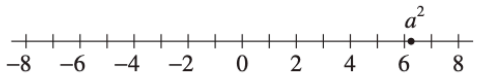


30. Maria ordered a pizza. She ate only $\frac{2}{9}$ of it and gave the remaining pizza to her 3 brothers. What fraction of the whole pizza will each of Maria's brothers receive, if they share the remaining pizza equally?

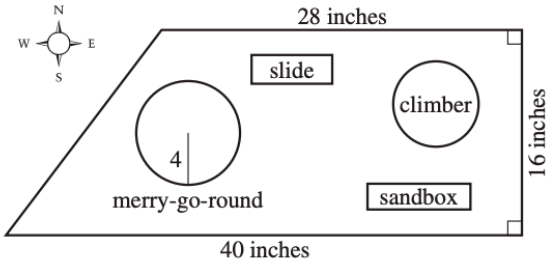
F. $\frac{7}{9}$
G. $\frac{3}{7}$
H. $\frac{1}{3}$
J. $\frac{7}{27}$
K. $\frac{2}{27}$

31. The number 1,001 is the product of the prime numbers 7, 11, and 13. Knowing this, what is the prime factorization of 30,030 ?

A. $3 \cdot 7 \cdot 10 \cdot 13$
B. $30 \cdot 7 \cdot 11 \cdot 13$
C. $2 \cdot 5 \cdot 7 \cdot 11 \cdot 13$
D. $3 \cdot 7 \cdot 10 \cdot 11 \cdot 13$
E. $2 \cdot 3 \cdot 5 \cdot 7 \cdot 11 \cdot 13$

Use the following information to answer questions 32–34.

Mikea, an intern with the Parks and Recreation Department, is developing a proposal for the new trapezoidal Springdale Park. The figure below shows her scale drawing of the proposed park with 3 side lengths and the radius of the merry-go-round given in inches. In Mikea's scale drawing, 1 inch represents 1.5 feet.



32. What is the area, in square inches, of the scale drawing of the park?

F. 448
G. 544
H. 640
J. 672
K. 1,088

33. Mikea's proposal includes installing a fence on the perimeter of the park. What is the perimeter, in *feet*, of the park?

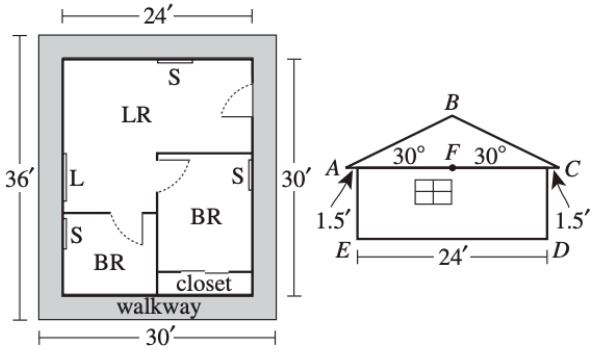
A. 84
B. 88
C. 104
D. 126
E. 156

34. The length of the south side of the park is what percent of the length of the north side?

F. 112%
G. 124%
H. $142\frac{6}{7}\%$
J. 175%
K. 250%

Use the following information to answer questions 35–37.

The Smith family is planning to build a 3-room cabin which consists of 2 bedrooms (BR) and 1 living room (LR). Shown below are the rectangular floor plan (left figure) and a side view of the cabin (right figure). In the side view, the roof forms an isosceles triangle ($\triangle ABC$), the walls are perpendicular to the level floor ($\overline{ED}$), $\overline{AC} \parallel \overline{ED}$, F is the midpoint of $\overline{AC}$, and $\overline{BF} \perp \overline{AC}$.



During the week the Smiths plan to roof the cabin, there is a 20% chance of rain each day.

35. Mr. Smith plans to build a 3-foot-wide walkway around the outside of the cabin, as shown in the floor plan. What will be the area, in square feet, of the top surface of the walkway?

A. 171
B. 324
C. 360
D. 396
E. 720

36. Mrs. Smith will install a ceiling fan in each room of the cabin and will place curtains over the 4 windows. Each of the ceiling fans has a price of $52.00. The price of curtains for each small window (S) is $39.50, and the price of curtains for the large window (L) is twice that for the small window. Based on this information, which of the following values is closest to the total price Mrs. Smith will pay for curtains and ceiling fans?

F. $262
G. $302
H. $341
J. $354
K. $393

37. Mr. and Mrs. Smith plan to roof the cabin on 2 consecutive days. Assuming that the chance of rain is independent of the day, what is the probability that it will rain both days?

A. 0.04
B. 0.08
C. 0.16
D. 0.20
E. 0.40

---

38. Which of the following expressions, when evaluated, equals an irrational number?

F. $\frac{\sqrt{2}}{\sqrt{8}}$

G. $\frac{\sqrt{8}}{\sqrt{2}}$

H. $(\sqrt{8})^2$

J. $\sqrt{2} \times \sqrt{8}$

K. $\sqrt{2} + \sqrt{8}$

39. A line through the origin and (10,4) is shown in the standard (x,y) coordinate plane below. The acute angle between the line and the positive x-axis has measure θ. What is the value of $\tan \theta$?

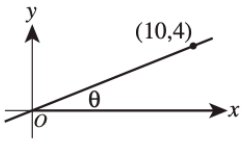
A. $\frac{\sqrt{29}}{2}$

B. $\frac{2}{\sqrt{29}}$

C. $\frac{5}{\sqrt{29}}$

D. $\frac{2}{5}$

E. $\frac{5}{2}$



40. The equation $|2x - 8| + 3 = 5$ has 2 solutions. Those solutions are equal to the solutions to which of the following pairs of equations?

F. $2x - 5 = 5$
$-2x - 5 = -5$

G. $2x - 8 = 2$
$-2x - 8 = 2$

H. $2x - 8 = 8$
$-(2x - 8) = 8$

J. $2x - 8 = 2$
$-(2x - 8) = 8$

K. $2x - 8 = 2$
$-(2x - 8) = 2$

41. The frequency chart below shows the cumulative number of Ms. Hernandez's science students whose test scores fell within certain score ranges. All test scores are whole numbers.

Score range	Cumulative number of students
65–70	12
65–80	13
65–90	19
65–100	21

How many students have a test score in the interval 71–80 ?

A. 1
B. 6
C. 8
D. 12
E. 13

42. The number of decibels, d, produced by an audio source can be modeled by the equation $d = 10 \log\left(\frac{I}{K}\right)$, where I is the sound intensity of the audio source and K is a constant. How many decibels are produced by an audio source whose sound intensity is 1,000 times the value of K ?

F. 4
G. 30
H. 40
J. 100
K. 10,000

43. Mario plays basketball on a town league team. The table below gives Mario's scoring statistics for last season. How many points did Mario score playing basketball last season?

Type of shot	Number attempted	Percent successful
1-point free throw	80	75%
2-point field goal	60	90%
3-point field goal	60	25%

A. 129
B. 190
C. 213
D. 330
E. 380

44. The graph of $y = |x - 6|$ is in the standard (x,y) coordinate plane. Which of the following transformations, when applied to the graph of $y = |x|$, results in the graph of $y = |x - 6|$?

F. Translation to the right 6 coordinate units
G. Translation to the left 6 coordinate units
H. Translation up 6 coordinate units
J. Translation down 6 coordinate units
K. Reflection across the line $x = 6$

45. Toby wants to find the volume of a solid toy soldier. He fills a rectangular container 8 cm long, 6 cm wide, and 10 cm high with water to a depth of 4 cm. Toby totally submerges the toy soldier in the water. The height of the water with the submerged toy soldier is 6.6 cm. Which of the following is closest to the volume, in cubic centimeters, of the toy soldier?

A. 125
B. 156
C. 192
D. 208
E. 317

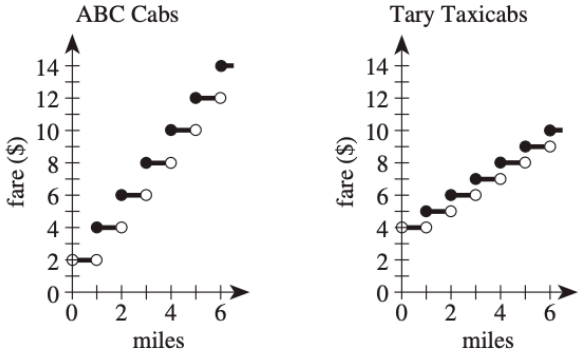
46. A box in the shape of a cube has an interior side length of 18 inches and is used to ship a right circular cylinder with a radius of 6 inches and a height of 12 inches. The interior of the box not occupied by the cylinder is filled with packing material. Which of the following numerical expressions gives the number of cubic inches of the box filled with packing material?

F. $6(18)^2 - 2\pi(6)(12) - 2\pi(6)^2$
G. $6(18)^2 - 2\pi(6)(12)$
H. $18^3 - \pi(6)(12)^2$
J. $18^3 - \pi(6)^2(12)$
K. $18^3 - \pi(12)^3$

47. A room has a rectangular floor that is 15 feet by 21 feet. What is the area of the floor in square *yards* ?

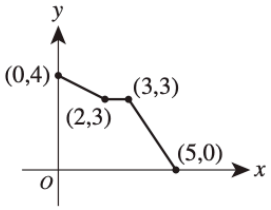
A. 24
B. 35
C. 36
D. 105
E. 144

48. ABC Cabs and Tary Taxicabs both have an initial fare of a whole number of dollars for 1 passenger. The fare increases a whole number of dollars at each whole number of miles traveled. The graphs below show the 1-passenger fares, in dollars, for both cab companies for trips up to 6 miles. When the fares of the 2 cab companies are compared, what is the cheaper fare for a 5-mile trip?



F. $ 8
G. $ 9
H. $10
J. $11
K. $12

49. The graph of a function $y = f(x)$ consists of 3 line segments. The graph and the coordinates of the endpoints of the 3 line segments are shown in the standard (x,y) coordinate plane below. What is the area, in square coordinate units, of the region bounded by the graph of $y = f(x)$, the positive y-axis, and the positive x-axis?



A. 10
B. 13
C. 14
D. 15
E. 20

50. The sum of 2 positive numbers is 151. The lesser number is 19 more than the square root of the greater number. What is the value of the greater number minus the lesser number?

F. 19
G. 66
H. 85
J. 91
K. 121

51. The list of numbers 41, 35, 30, X, Y, 15 has a median of 25. The mode of the list of numbers is 15. To the nearest whole number, what is the mean of the list?

A. 20
B. 25
C. 26
D. 27
E. 30

52. You are given the following system of equations:

$$y = x^2$$
$$rx + sy = t$$

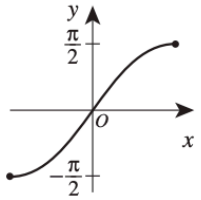
where r, s, and t are integers. For which of the following will there be more than one (x,y) solution, with real-number coordinates, for the system?

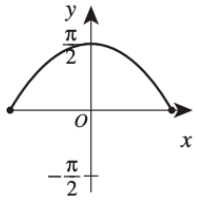
F. $r^2 + 4st > 0$
G. $s^2 - 4rt > 0$
H. $r^2 - 4st < 0$
J. $s^2 - 4rt < 0$
K. $s^2 + 4rt < 0$

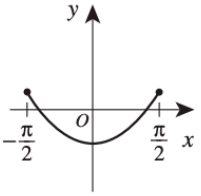
53. The 3rd and 4th terms of an arithmetic sequence are 13 and 18, respectively. What is the 50th term of the sequence?

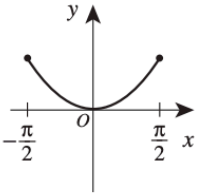
A. 248
B. 250
C. 253
D. 258
E. 263

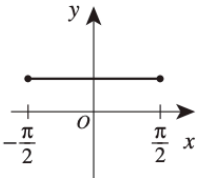
54. One of the following graphs in the standard (x,y) coordinate plane is the graph of $y = \sin^2 x + \cos^2 x$ over the domain $-\frac{\pi}{2} \le x \le \frac{\pi}{2}$. Which one?

F.


J.


G.


K.


H.


55. What is the period of the function $f(x) = \csc(4x)$?

A. π

B. 2π

C. 4π

D. $\frac{\pi}{4}$

E. $\frac{\pi}{2}$

56. At the school carnival, Mike will play a game in which he will toss a penny, a nickel, and a dime at the same time. He will be awarded 3 points for each coin that lands with heads faceup. Let the random variable x represent the total number of points awarded on any toss of the coins. What is the expected value of x ?

F. 1

G. $\frac{3}{2}$

H. $\frac{9}{2}$

J. 6

K. 9

57. For what positive real value of k, if any, is the determinant of the matrix $\begin{bmatrix} k & 4 \\ 3 & k \end{bmatrix}$ equal to k ?

(Note: The determinant of matrix $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ equals $ad - bc$.)

A. 3

B. 4

C. 12

D. $\sqrt{12}$

E. There is no such value of k.

58. Given a positive integer n such that $i^n = 1$, which of the following statements about n must be true?

(Note: $i^2 = -1$)

F. When n is divided by 4, the remainder is 0.
G. When n is divided by 4, the remainder is 1.
H. When n is divided by 4, the remainder is 2.
J. When n is divided by 4, the remainder is 3.
K. Cannot be determined from the given information

59. For $-\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$, $|\sin\theta| \ge 1$ is true for all and only the values of θ in which of the following sets?

A. $\left\{-\frac{\pi}{2}, \frac{\pi}{2}\right\}$

B. $\left\{\frac{\pi}{2}\right\}$

C. $\left\{\theta \mid -\frac{\pi}{2} < \theta < \frac{\pi}{2}\right\}$

D. $\left\{\theta \mid -\frac{\pi}{2} \le \theta \le \frac{\pi}{2}\right\}$

E. The empty set

60. Ray $\overrightarrow{PK}$ bisects $\angle LPM$, the measure of $\angle LPM$ is $11x°$, and the measure of $\angle LPK$ is $(4x + 18)°$. What is the measure of $\angle KPM$?

F. 12°

G. $28\frac{2}{7}°$

H. 42°

J. $61\frac{1}{5}°$

K. 66°

END OF TEST 2

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO THE PREVIOUS TEST.

Homework- SAT Practice Test Questions

due 6/28 12:00am.

Submit the answers & work to virginiasemeducation@gmail.com or (703)965-8530

4 4

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?

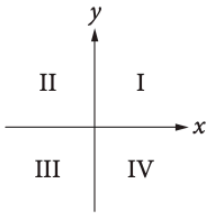
A) 150

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?

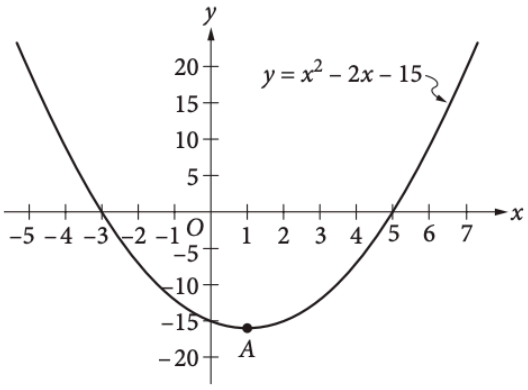
A) Quadrant II
B) Quadrant III
C) Quadrant IV
D) There are solutions in all four quadrants.

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

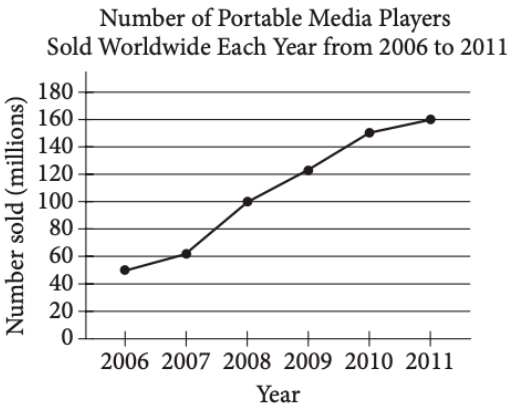
31

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

32

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

33

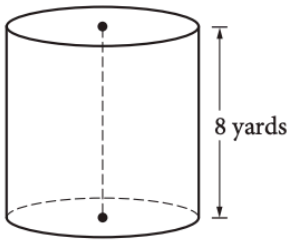


According to the line graph above, the number of portable media players sold in 2008 is what fraction of the number sold in 2011 ?

34

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

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.)