Math Drill

Time yourself from start to finish and record your time below. The SAT Non-Calculator section is all about speed and practice makes perfect!

YOUR TIME: _____

Multiplication Facts to 100 (F)

Name: _____ Date: _____ Score: ____ /100

Calculate each product.

3 × 9	6 × 8	7 × 2	7 × 4	10 × 2	6 × 7	8 × 4	2 × 8	3 × 4	2 × 9
4 × 8	10 × 3	7 × 9	3 × 3	2 × 7	8 × 7	9 × 6	5 × 6	4 × 2	9 × 5
4 × 4	7 × 5	5 × 8	4 × 7	9 × 4	6 × 6	5 × 5	10 × 5	5 × 2	8 × 9
7 × 10	10 × 4	2 × 2	10 × 8	10 × 9	3 × 2	3 × 8	3 × 10	9 × 9	2 × 5
4 × 6	6 × 5	7 × 6	8 × 2	3 × 7	5 × 9	7 × 8	6 × 10	9 × 2	3 × 6
9 × 10	3 × 5	8 × 8	5 × 7	4 × 9	9 × 7	6 × 2	2 × 4	6 × 9	2 × 6
8 × 10	8 × 6	4 × 3	6 × 4	2 × 10	5 × 3	8 × 3	9 × 8	5 × 10	5 × 4
9 × 3	2 × 3	4 × 5	7 × 3	7 × 7	4 × 10	10 × 7	8 × 5	10 × 10	10 × 6
6 × 3	3 × 9	10 × 6	6 × 5	6 × 10	10 × 9	6 × 9	8 × 10	9 × 8	4 × 8
3 × 2	9 × 3	3 × 5	3 × 6	5 × 9	5 × 3	5 × 2	9 × 5	7 × 6	10 × 8

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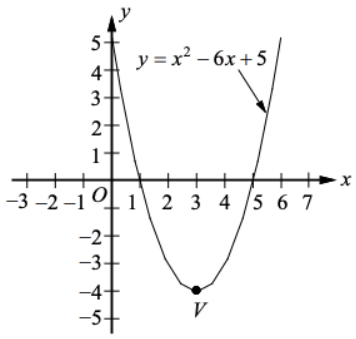
Unit 11 - Quadratic Equations

Topic: Graphs of Quadratic Equations

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?

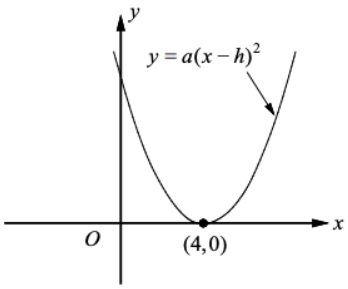
A) $y = (x-1)(x-5)$

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?

Topic: Factoring Trinomials

1

$x^2 - 2x - 24$

Which of the following is equivalent to the expression above?

A) $(x+3)(x-8)$

B) $(x-3)(x+8)$

C) $(x-6)(x+4)$

D) $(x+6)(x-4)$

2

$x^2 - 17x + 72$

Which of the following is equivalent to the expression above?

A) $(x+8)(x-9)$

B) $(x-8)(x-9)$

C) $(x-12)(x-6)$

D) $(x-12)(x+6)$

3

$-x^2 + 5x + 84$

Which of the following is equivalent to the expression above?

A) $(12-x)(x+7)$

B) $(12+x)(x-7)$

C) $(21+x)(x-4)$

D) $(21-x)(x+4)$

4

$3x^2 + 7x - 6$

Which of the following is equivalent to the expression above?

A) $(3x-2)(x+3)$

B) $(3x+2)(x-3)$

C) $(3x-1)(x+6)$

D) $(3x+1)(x-6)$

5

$2x^2 + x - 15$

Which of the following is equivalent to the expression above?

A) $(2x+3)(x-5)$

B) $(2x-3)(x+5)$

C) $(2x-5)(x+3)$

D) $(2x+5)(x-3)$

6

$-6x^2 + x + 2$

Which of the following is equivalent to the expression above?

A) $-(6x+1)(x-2)$

B) $-(6x-1)(x+2)$

C) $-(3x+2)(2x-1)$

D) $-(3x-2)(2x+1)$

Topic: Factoring Differences of Squares and Perfect Square Trinomials

1

$$3x^2 - 48$$

Which of the following is equivalent to the expression above?

A) $3(x-4)(x+4)$

B) $3(x-4)^2$

C) $(3x-4)(x+4)$

D) $(3x+4)(x-4)$

2

$$x - 6\sqrt{x} - 16$$

Which of the following is equivalent to the expression above?

A) $(\sqrt{x}-4)^2$

B) $(\sqrt{x}-4)(\sqrt{x}+4)$

C) $(\sqrt{x}+8)(\sqrt{x}-2)$

D) $(\sqrt{x}-8)(\sqrt{x}+2)$

3

If $x^2 + y^2 = 10$ and $xy = -3$, what is the value of $(x-y)^2$?

A) 12

B) 16

C) 20

D) 25

4

If $x+y=10$ and $x-y=4$, what is the value of $x^2 - y^2$?

A) 20

B) 24

C) 36

D) 40

5

$$6x^2 + 7x - 24 = 0$$

If r and s are two solutions of the equation above and $r > s$, which of the following is the value of $r-s$?

A) $\frac{7}{6}$

B) $\frac{16}{3}$

C) $\frac{25}{6}$

D) $\frac{20}{3}$

6

$$x^2 - 3x = 28$$

If r and s are two solutions of the equation above, which of the following is the value of $r+s$?

A) -3

B) 3

C) 6

D) 9

Topic: Solving Quadratic Equations by Completing the Square

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?

Topic: Quadratic Formula and the Discriminant

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

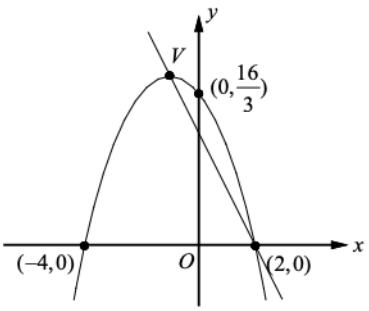
B) $4x^2+8x+4=0$

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

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

Topic: Solving Systems Consisting Linear and Quadratic Equations

1



The xy- plane above shows two x- intercepts, a y- intercept and vertex V of a parabola. If the line passes through the points $(2,0)$ and V, which of the following must be the y- intercept of the line?

A) 3

B) $\frac{7}{2}$

C) 4

D) $\frac{9}{2}$

2

$$\begin{cases} y = x^2 + x \\ y = ax - 1 \end{cases}$$

In the system of equations above, $a > 0$. If the system of equations has exactly one real solution, what is the value of a?

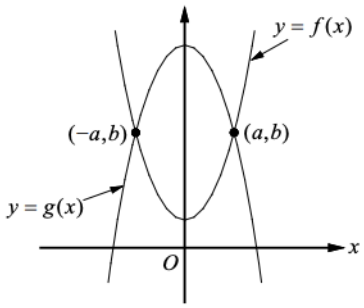
A) $\frac{5}{2}$

B) 3

C) $\frac{7}{2}$

D) 4

3



The function f and g, defined by $f(x) = 2x^2 + 2$ and $g(x) = -2x^2 + 18$, are graphed in the xy- plane above. The two graphs intersect at the points (a,b) and $(-a,b)$. What is the value of b?

A) 6

B) 8

C) 10

D) 12

4

$$\begin{cases} x^2 + y^2 = 14 \\ x^2 - y = 2 \end{cases}$$

If (x, y) is a solution to the system of equations above, what is the value of x^2?

A) 2

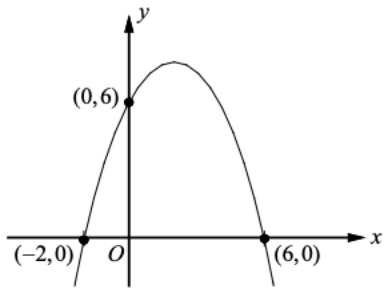
B) 3

C) 4

D) 5

Unit 11 Review Questions

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?

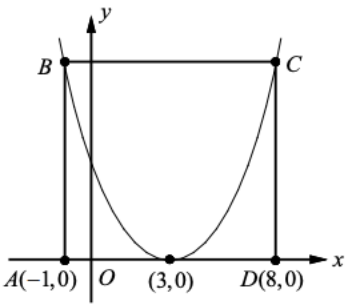
A) 33

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