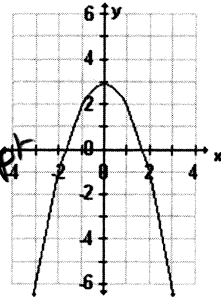


Mathematician: Key

(X+1)(Y-2)

Practice Test

1) What is an equation of the function shown in the diagram?

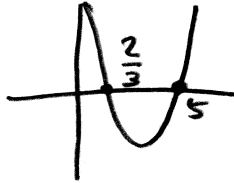


- 1. $y = x^2 + 3$
- 2. $y = -x^2 + 3$
- 3. $y = -x^2 - 3$
- 4. $y = (x - 3)^2$

Flip
y-intercept

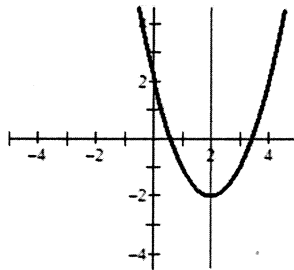
2) What is the solution set of the equation $2x^2 - 13x + 15 = 0$?

- 1. $\{-5, -\frac{3}{2}\}$
- 2. $\{-\frac{3}{2}, 5\}$
- 3. $\{5, \frac{3}{2}\}$
- 4. $\{\frac{3}{2}, -5\}$



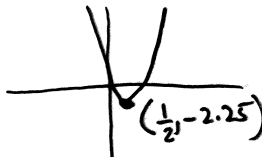
3) The axis of symmetry for the below parabola is:

- 1. $x = 2$
- 2. $x = -2$
- 3. $y = 2$
- 4. $y = -2$



4) What is the vertex of the equation $x^2 - x - 2 = 0$?

- 1. (1, -1)
- 2. (-1, 1)
- 3. $(\frac{1}{2}, -\frac{9}{4})$
- 4. $(-\frac{9}{4}, \frac{1}{2})$



5) Which of the following equations has both 7 and -1 as its solutions?

- 1. $(x + 7)(x + 1) = 0$
- 2. $(x - 7)(x - 1) = 0$
- 3. $(x + 7)(x - 1) = 0$
- 4. $(x - 7)(x + 1) = 0$

~~(x+7)(x+1)~~

6) Which of the following equations in vertex form represents completing the square of $y = 3x^2 + 6x - 9$? Check graphically

- 1. $y = 3(x + 1)^2 + 4$
- 2. $y = (3x + 3)^2 - 12$
- 3. $y = 3(x + 1)^2 - 12$
- 4. $y = 3(x + 1)^2 - 4$

vertex is (-1, -12)

$y = a(x+1) - 12$

7) Which expression is a solution for the equation $2x^2 - x = 7$?

- 1. $\frac{-1 \pm \sqrt{57}}{2}$
- 2. $\frac{1 \pm \sqrt{57}}{2}$
- 3. $\frac{-1 \pm \sqrt{57}}{4}$
- 4. $\frac{1 \pm \sqrt{57}}{4}$

$2x^2 - x - 7$
 $a = 2 \quad b = -1 \quad c = -7$
 $x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(2)(-7)}}{2(2)}$
 $x = \frac{1 \pm \sqrt{57}}{4}$

8) If $f(x) = 2x^2 - x - 4$ The values of a, b, c are

- 1. $a = 2 \quad b = -1 \quad c = -4$
- 2. $a = -2 \quad b = 1 \quad c = 4$
- 3. $a = 2 \quad b = 1 \quad c = 4$
- 4. $a = -2 \quad b = -1 \quad c = -4$

$a = 2 \quad b = -1 \quad c = -4$

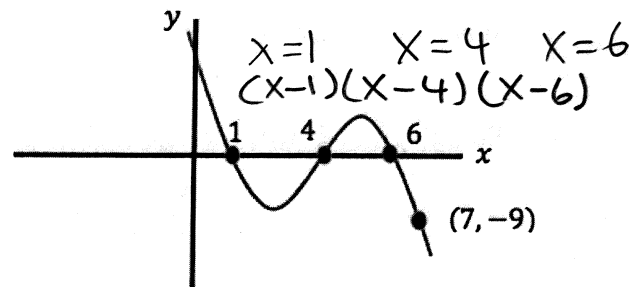
9) If Maya completes the square for $f(x) = x^2 - 6x + 13$ in order to find the minimum, she must write $f(x)$ in the general form $f(x) = (x - a)^2 + b$. What is the value of a for $f(x)$?

- 1. 3
- 2. -3
- 3. 13
- 4. -6

$(-\frac{6}{2}) = -3$

10) A possible function for the cube function is

- 1. $f(x) = (x - 1)(x - 4)(x - 6)$
- 2. $f(x) = (x + 1)(x + 4)(x + 6)$
- 3. $f(x) = \frac{-1}{2}(x - 1)(x - 4)(x - 6)$
- 4. $f(x) = \frac{-1}{2}(x - 2)(x - 1)(x + 4)$



21. Given two consecutive positive integers have a product of 132.

a. Write an equation that can be used to find the integers.

$$x(x+1) = 132$$

$$x^2 + x = 132$$

$$ -132 $$

b. Find the integers algebraically by any method.

$$x^2 + x - 132 = 0$$

$$(x + 12)(x - 11) = 0$$

$x + 12 = 0$	$x - 11 = 0$
$-12 $	$+11 $
$x = -12$	$x = 11$

$x \neq 11$

1st $x = 11$
 2nd $x+1 = 12$

22. The width of a rectangular window is w . the length is 7 more than the width. the area of the window is 44

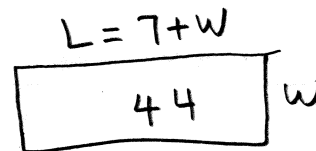
a. Write an equation that can be used to find the width of the window.

$$A = w(L)$$

$$44 = w(w+7)$$

$$44 = w^2 + 7w$$

$$ -44$$



b. Solve the equation algebraically by any method.

$$0 = w^2 + 7w - 44$$

$$0 = (w + 11)(w - 4)$$

$w + 11 = 0$	$w - 4 = 0$
$-11 $	$+4 $
$w = -11$	$w = 4$

$w = 4$

23. A rock is thrown from the top of a tall building. The distance, in feet, between the rock and the ground t seconds after it is thrown is given by $d = -16t^2 + 80t + 220$.

a. Sketch the parabola and show appropriate window used.

b. After how many minutes does the rock reaches the maximum height?

$$t = 2.5$$

c. What is the maximum height that the rock reaches?

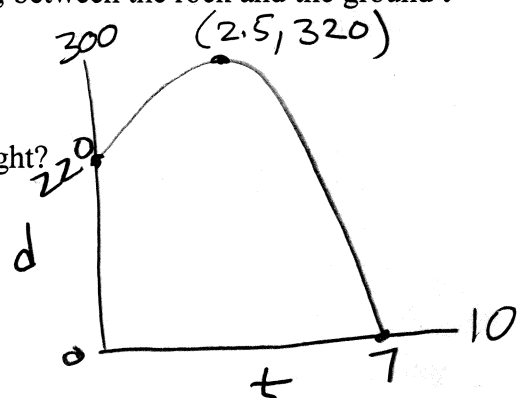
$$d = 320$$

d. When does the rock hit the ground?

$$x = 7$$

e. Find the time it will take the rock to get to that maximum height algebraically.

$x = \frac{-80}{2(-16)}$	$b = 80$
	$a = -16$
$x = \frac{80}{32} = 2.5$	$x = 2.5$



24. $x^2 - 4x - 8 = 0$

a. By the Quadratic Formula:

$a = 1$ $b = -4$ $c = -8$

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-8)}}{2(1)}$$

$$x = \frac{4 \pm \sqrt{48}}{2}$$

$$x = \frac{4 \pm \sqrt{16 \cdot 3}}{2}$$

$$x = \frac{4 \pm 4\sqrt{3}}{2} \quad x = 2 \pm 2\sqrt{3}$$

b. By Completing the square.

$$x^2 - 4x - 8 = 0 \quad \frac{-4}{2} = (-2)^2 = 4$$

$$(x^2 - 4x + 4) - 4 - 8 = 0$$

$$(x-2)^2 - 12 = 0$$

$$\sqrt{(x-2)^2} = \sqrt{12}$$

$$x-2 = \sqrt{12}$$

$$x = 2 \pm \sqrt{12}$$

$$x = 2 \pm \sqrt{4 \cdot 3}$$

$$x = 2 \pm 2\sqrt{3}$$

HW Review Questions

1) If $3x$ is one factor of $3x^2 - 9x$, what is the other factor?

$$3x(x-3)$$

1. $3x$

2. $x-3$

3. $x^2 - 6x$

4. $x+3$

6) Which is an irrational number?

2. $\sqrt{9} = 3$

3. 3.14

3. $\sqrt{3}$

4. $\frac{3}{4}$

2) Which is a factor of $x^2 + 5x - 24$?

1. $(x+4)$

2. $(x+3)$

3. $(x-4)$

4. $(x-3)$

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

7) What is $\sqrt{72}$ expressed in simplest radical form?

1. $2\sqrt{18}$

2. $6\sqrt{2}$

3. $3\sqrt{8}$

4. $8\sqrt{3}$

$$\frac{\sqrt{36 \cdot 2}}{6\sqrt{2}}$$

3) One of the factors of $4x^2 - 9$ is

1. $(x+3)$

2. $(4x-3)$

3. $(2x+3)$

4. $(x-3)$

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

8) The expression $\sqrt{27} + \sqrt{12}$ is equivalent to

1. $5\sqrt{6}$

3. $13\sqrt{3}$

$$\sqrt{9\sqrt{3}} + \sqrt{4\sqrt{3}}$$

2. $5\sqrt{3}$

4. $\sqrt{39}$

4) Factor: $2x^2 - x - 3$

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

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

2. $(x-1)(2x-3)$

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

4. $(x-1)(2x-3)$

9) The domain for $f(x) = x^2 - 3$ is $0 < x < 4$. The range of $f(x)$ is

1. $0 < x < 4$

2. $0 \leq y \leq 4$

3. $-3 < y < 13$

4. $-3 \leq y \leq 13$

5) Written in simplest factored form, the binomial $2x^2 - 50$ can be expressed as

1. $2(x-5)(x-5)$

2. $2(x-5)(x+5)$

3. $(x-5)(x+5)$

4. $2x(x-50)$

$$2(x^2 - 25)$$

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

10) If $f(x) = x^2 + 3x - 5$, find the value of $f(3)$.

1. 1

3. -5

2. 10

4. 13

$$\begin{array}{r} x \quad y \\ 3 \overline{) 13} \end{array}$$

Extra:

1. Rewrite the following quadratic into the standard form equation:

$$\frac{1}{x+1} = x - 4$$

11. Assume that a producer knows that the demand for the next CD by One Direction can be modeled by the equation $S(n) = -13n^2 + 169n$, where n represents the number of weeks since the release of the CD and $S(n)$ is the dollar value in thousands of the CDs sold.

- Graph the above model using appropriate windows on the calculator. Make a sketch
- When do we expect the sales of the CD to peak?
- When will the sales reach \$0? Find the answer graphically.
- Find the answer algebraically.

12. The length of a rectangle is represented by $5a$ and the width is represented by $(a + 1)$.

- Express the area of the rectangle as a binomial in terms of a .
- Find the dimensions of the rectangle if the area is 30 graphically.
- Find the answer algebraically.

25. The length of a rectangle is represented by $7a$ and the width is represented by $(a + 5)$ and the area is 98

- Express the area of the rectangle as a binomial in terms of a .
- Find the length and width of the rectangle.