Mr. Thurlwell's Supplemental Packet

Algebra 1

2nd HALF: Unit 6: Applications of Quadratics

Name:_____

Assignment #1 (10.2) pg 631 1-10	***=quiz to follow
Assignment #2 (10.2) pg 631 16-42even (no 36)	**EQ :** What algebraic properties are used to solve quadratic equations?
Assignment #3 (9.4) pg 576 1-4,19-22	
Assignment #4 (9.4) pg 577 23-26,50,53	
Assignment #5 (9.5) pg 587 1-6,11-14 (rounding okay)	**EQ 2:** How does the graph of a quadratic function relate to the solution of a quadratic equation?
Assignment #6 (9.5)*** pg 587 19-24, 41, 43-45 (rationalize)	
Assignment #7 (9.6) pg 593 1-8	

10.2 Radical Review

I. Simplify the following radicals.

1. $\sqrt{4}$ 2. $\sqrt{16}$ 3. $\sqrt{18}$ 4. $\sqrt{75}$

5. $\sqrt{32}$ 6. $\sqrt{108}$ 7. $\sqrt{72}$ 8. $\sqrt{147}$

9. $\sqrt{80}$ 10. $\sqrt{112}$ 11. $\sqrt{125}$ 12. $\sqrt{50}$

II. Solve for the variable in simplified radical form.

13. $x^2 = 16$ 14. $x^2 = 100$ 15. $50 = m^2$

16. $-20 = -\frac{2}{3}(y^2 + 6)$ 17. $96 = 2n^2$ 18. $p^2 - 7 = 47$

10.2 Homework

For 1-12 simplify the expression. (Leave in radical form. No Decimals!!!)

1) $\sqrt{250}$

2) $\sqrt{44}$

3) $\frac{\sqrt{20}}{\sqrt{5}}$

4) $\sqrt{\frac{6}{2}}$

5) $\sqrt{4} \cdot 3\sqrt{2}$

6) $6\sqrt{8} \cdot 7\sqrt{2}$

7) $\sqrt{\frac{20}{4}}$

8) $\frac{\sqrt{120}}{\sqrt{4}}$

9) $\frac{1}{2}\sqrt{112}$

10) $\sqrt{\frac{11}{16}}$

11) $\pm\frac{\sqrt{25}}{\sqrt{100}}$

12) $\frac{2}{3}\sqrt{98}$

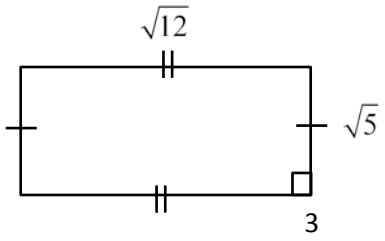
13) $\sqrt{24a^2}$

14) $\frac{\sqrt{8}}{\sqrt{24}}$

15) $\frac{8\sqrt{2}}{2\sqrt{8}}$

16) $\sqrt{\frac{75b^2c^8}{a^2}}$

17) Find the area of the figure. Give both the exact answer in simplified form and the decimal approximation rounded to the nearest hundredth. Which answer is more accurate and why? Which is more functional?



9.4 Completing the Square

Find the value of *c* that makes each trinomial a perfect square.

1. $x^2 - 24x + c$ **2.** $x^2 - 9x + c$ **3.** $x^2 - x + c$

Solve each equation by completing the square. Reduce your radical if necessary.

4. $x^2 - 14x - 24 = 0$ **5.** $b^2 + 12b = 13$ **6.** $x^2 - 30x - 56 = -25$

7. $n^2 - 10n - 8 = -7$ **8.** $x^2 + 18x - 50 = 9$ **9.** $3g^2 + 15g - 3 = 0$

10. Jaime owns a business making decorative boxes to store jewelry, mementos, and other valuables. The function $y = x^2 + 50x + 1800$ models the profit y that Jaime has made in month x for the first two years of his business.

a. Write an equation representing the month in which Jaime's profit is $2400.

b. Use completing the square to find out in which month Jaime's profit is $2400.

11. From a height of 256 feet above a lake on a cliff, Mikaela throws a rock out over the lake. The height H of the rock t seconds after Mikaela throws it is represented by the equation $H = -16t^2 + 32t + 256$. To the nearest tenth of a second, how long does it take the rock to reach the lake below? (*Hint:* Replace H with 0.)

When a ≠ 1 for <u>completing the square</u>:

Together:

1) $3x^2 + 12x - 180 = 0$

You try:

2) $2t^2 - 4t = 46$

<u>Converting from standard form to vertex form</u>:

Together:

3) $y = x^2 + 6x - 1$

You try:

4) $g(x) = x^2 - 8x + 11$

For 1-4, simplify:

1. $\sqrt{72}$ **2.** $\sqrt{99}$ **3.** $\sqrt{2} \cdot \sqrt{10}$ **4.** $\sqrt{5} \cdot \sqrt{60}$

5. $3\sqrt{5} \cdot \sqrt{5}$ **6.** $\sqrt{6} \cdot 4\sqrt{24}$ **7.** $2\sqrt{3} \cdot 3\sqrt{15}$ **8.** $\sqrt{16b^4}$

9. $\sqrt{81a^2d^4}$ **10.** $\sqrt{40x^4y^5}$ **11.** $\sqrt{\frac{q}{12}}$ **12.** $\sqrt{\frac{4h}{5}}$

13. $\sqrt{\frac{12}{b^2}}$ **14.** $\sqrt{\frac{45}{4m^4}}$

Solve each equation by completing the square.

15. $x^2 + 12x + 21 = 10$ 16. $2x^2 + 20x = -2$ 17. $x^2 - 2x = 15$

Convert from standard form to vertex form:

18. $y = x^2 - 4x - 2$ 19. $y = x^2 - 8x + 9$

9.5 (discriminant included)

Find the value of the discriminant and determine the number of solutions.

1) $4m^2 + 2m - 2 = 0$

2) $15x^2 - 10x = 1$

3) $-20x = 4x^2 + 3x$

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

Use the quadratic formula to solve the equation.

5) $0 = -5x^2 + 7x - 2$

6) $8x^2 - 2 = 5x$

Find the roots of the graph.

7) $-6p^2 + 4p - \frac{1}{3} = y$

8) $y = -4x^2 + x + 14$

Find the x-intercepts of the quadratic.

9) $y = 6x^2 - x - 12$

10) $x^2 + 2x - 2 = y$

Find the zeros of the function.

11) $g(x) = 4x^2 + 3x - 1$

12) $h(x) = 4x^2 + 4x - 1$

10.2,9.4 & 9.5 Review

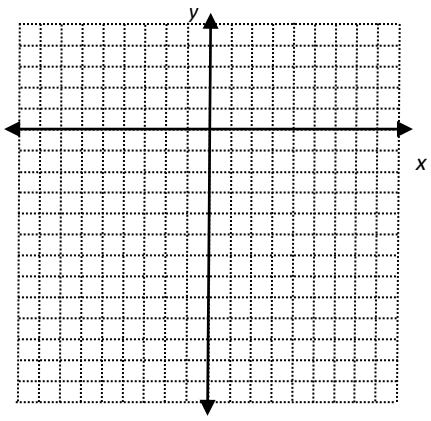
1) Given the equation: $\mathbf{y = -10 + 3x + x^2}$

a) Determine the number of solutions.

b) Find the zeros algebraically using:

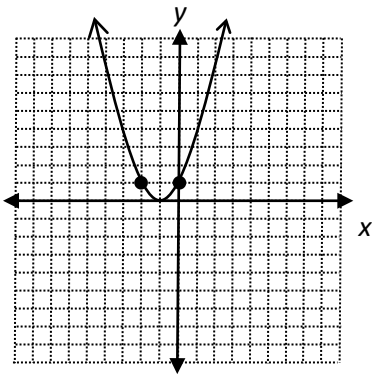
Factoring:	Completing the Square:	Quadratic Formula:

c) Graph the function using any form.



d) Describe how parts a-c correlate.

2) Given the graph. Write as much information you can deduce as possible:



3) During World War I, mortars were fired from trenches 3 feet down. The mortars had a velocity of 150 ft/s. Determine how long it will take for the mortar shell to strike its target.

4) While performing the quadratic formula a student got the equation down to the following: $x = \frac{-(-6) \pm 10\sqrt{27}}{18}$

a) Simplify it and **b)** what are the roots as a decimal (round to the nearest hundredth)?

5) Reduce $\sqrt{198}$ (how do you check it?)

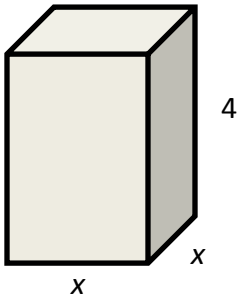
6) If there are x-intercepts of the graph of $10x - 5 = -2x^2$, find the exact value(s). (round to the nearest hundredth if necessary)

7) How many ways can you solve $-3x^2 = -2.43$? Choose one method from the list you made. Solve and check it.

8) What is the discriminant of the quadratic equation $y = -5x^2 + 4x - 20$? What does this result tell you?

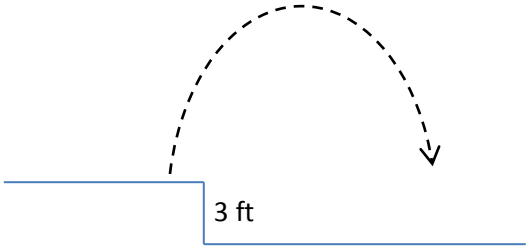
Unit 6 Review (applications)

1) The surface area of a rectangular box with a square base is 56 square inches. The surface area is given by $\mathbf{A = 2x^2 + 4xh}$. Find the width.



2) Fireworks are shot upward with an initial velocity of 125 feet per second from a platform 3 feet above the ground. Use the vertical motion model $\boldsymbol{h = -16t^2 + vt + s}$ to find how long it will take the rocket to hit the ground.

In the model, ***t*** represents time in motion [seconds], ***v*** represents initial velocity for an object going up [feet per second], ***h*** is the height[feet] and ***s*** represents initial height [feet].

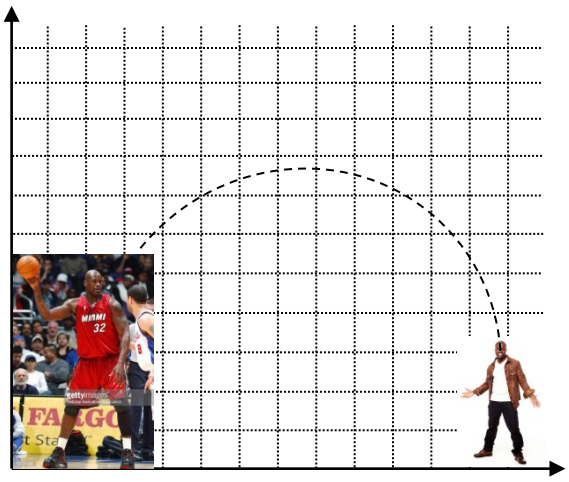


3) An eagle circling a field at a height of 250 feet sees a rabbit below. The eagle dives at an initial speed of 110 feet per second. Estimate the time the rabbit has to escape.

A 1.7 sec
B 1.8 sec
C 1.6 sec
D 1.9 sec
E 2.0 sec

Unit 6 (Part II) Application

Shaquille O'Neal is throwing a ball to Kevin Hart. Shaq is 7'1" tall (approximately 7.083 ft). Kevin Hart is 5'4" feet tall (approximately 5.33 ft). Using the vertical motion model $h(t) = -16t^2 + vt + s$, if Shaq throws the ball at 40 ft/sec, at what second (rounded to the nearest hundredth) will Kevin catch it? NOTE: You can assume that they throw and catch the ball at their height.



9.6 Do you know the difference?

Examine the information in each section. Then, label each as linear, exponential or quadratic. Explain how you arrived at that conclusion.

1) Table of values:

a)

x	y
-1	0
0	3
1	8
2	15
3	24

b)

x	y
-1	-3.5
0	-0.5
1	2.5
2	5.5
3	8.5

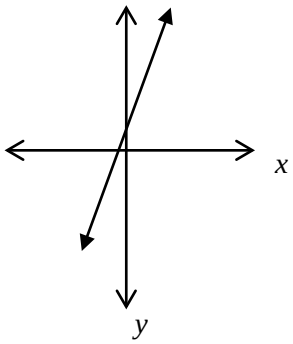
c)

x	y
-1	5/6
0	5
1	30
2	180
3	1080

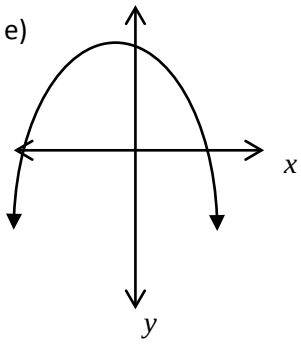
Explanation:

2) Sketch of a graph:

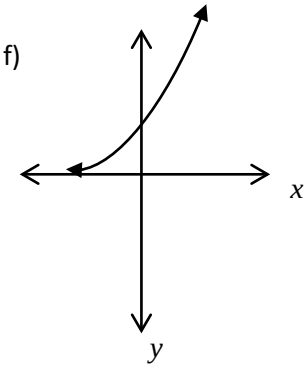
d)



e)



f)



Explanation:

3) Equation:

g) $3x + 2y = 10$

h) $2y = 3(8.9)^x$

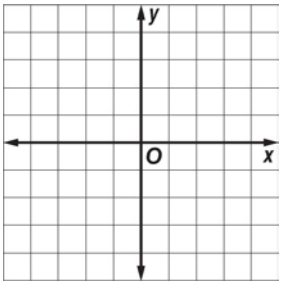
i) $y - 1 = 5x^2 + 10x$

Explanation:

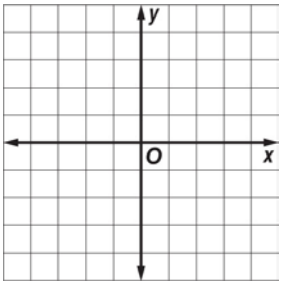
9.6 Analyzing Functions with Successive Differences

Graph each set of ordered pairs. Determine whether the ordered pairs represent a *linear* function, a *quadratic* function, an *exponential* function or *none of these*.

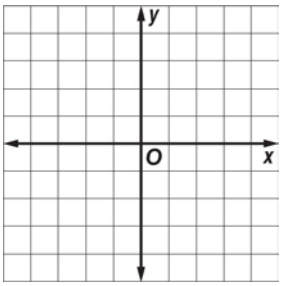
1. (2, 3), (1, 1), (0, –1), (–1, –3), (–2, –5)



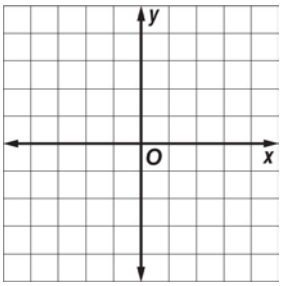
2. (–1, 0.5), (0, 1), (1, 2), (2, 4)



3. (–2, 4), (–1, 1), (0, 0), (1, 1), (2, 4)



4. (–3, 5), (–2, 2), (–1, 1), (0, 2), (1, 5)



Look for a pattern in each table of values to determine which model best describes the data.

5.

x	–3	–2	–1	0	1	2
y	32	16	8	4	2	1

6.

x	–1	0	1	2	3
y	7	3	–1	–5	–9

7.

x	–3	–2	–1	0	1
y	–27	–12	–3	0	–3

8.

x	0	1	2	3	4
y	0.5	1.5	4.5	13.5	40.5

9.

x	–4	–2	0	2	4
y	–16	–8	0	8	16

Unit 6 (part II) Review

1. Evaluate the expression: $\sqrt{121}$

2. Evaluate the expression: $-\sqrt{196}$

3. Evaluate the expression: $\sqrt{b^2-4ac}$ when $a = 4$, $b = 6$, $c = -2$

4. Given the function $y = 3x^2 - 4x + 1$, determine the number of solutions.

5. Evaluate the expression: $\frac{-5 \pm \sqrt{6}}{2}$.

(Round answers to the nearest hundredth.)

6. Solve the equation: $x^2 = 100$

7. Solve the equation: $3x^2 - 6 = 21$

8. Solve the equation: $-5x^2 + 8 = 22$

9. Simplify the expression: $\sqrt{32}$

10. Simplify the expression: $\pm\sqrt{275}$

11. Simplify the expression: $\sqrt{\frac{36}{49}}$

12. Simplify the expression: $\sqrt{\frac{7}{144}}$

13. Simplify the expression: $\frac{\sqrt{11} \bullet \sqrt{169}}{\sqrt{11}}$

14. Simplify the expression: $\sqrt{-80}$

15. $3\sqrt{72}$

16. $\sqrt{\frac{9}{4}}$

17. $60\sqrt{\frac{2}{25}}$

18. Solve by completing the square:

$p^2 - 14p + 30 = 6$

19. Solve by completing the square.

$15 = -6x + 3x^2$

20. Solve the quadratic: $0 = x^2 - x - 15$

21. Find the x-intercept(s) of: $h^2 + 10h = -24$

22. Determine the roots of $12n = 12n^2 + 3$

23. Convert $y = x^2 - 12x + 30$ to vertex form.

For 24 & 25, look for a pattern in each table of values to determine which model best describes the data.

24.

x	–1	0	1	2	3
y	6	0	6	24	54

25.

x	–2	–1	0	1	2
y	18	9	0	–9	–18

26. The local zoo keeps track of the number of dragonflies breeding in their insect exhibit each day. Determine which function best models the data.

Day	1	2	3	4	5
Dragonflies	9	18	36	72	144

27. At liftoff, the space shuttle Discovery has a constant acceleration of 16.4 feet per second squared and an initial velocity of 1341 feet per second due to the rotation of Earth. The distance Discovery has traveled t seconds after liftoff is given by the equation $d(t) = 1341t + 8.2t^2$. How long after liftoff has Discovery traveled 40,000 feet? Round your answer to the nearest hundredth.

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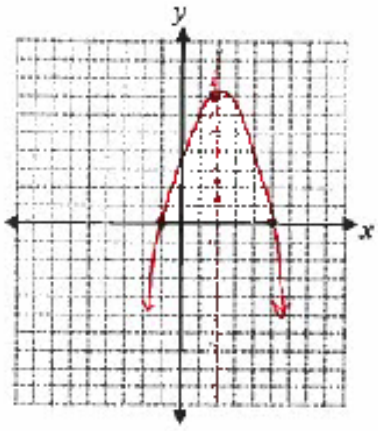
Algebra 1
9.4 – 9.6 Quiz
SHOW ALL WORK!

Name: Mr. Thurlwell

For number 1, solve the equation graphically.

1. $x^2 + 4x - 5 = 0$

x	0	1	-1	2	
y	-5	0	-10	7	



$(x-5)(x+1) = 0$

$5, -1$ ← x-intercepts

1. 5, -1 (5pts)

In numbers 2 – 3, use the quadratic formula to solve the equation.

2. $x^2 + 6x + 9 = 0$

$$\frac{6 \pm \sqrt{6^2 - 4(1)(9)}}{2(1)}$$

$$\frac{6 \pm \sqrt{0}}{2}$$

2. -3 (3pts)

3. $2t^2 + 13t = -6$

$$\frac{-(13) \pm \sqrt{(13)^2 - 4(2)(-6)}}{}$$

$$-13 \pm \sqrt{169 + 48}$$

$$-13 \pm \sqrt{217}$$

3. $-13 \pm \sqrt{217}$ (4pts)

4. Find the x-intercepts of the graph of the equation $0 = -1 - 2x^2 - 4x$

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

$$\frac{4 \pm \sqrt{16 - 8}}{-4}$$

$$\frac{4 \pm \sqrt{-24}}{-4}$$

no solution

4. no solution (5pts)

In numbers 5 – 6, tell if the equation has *two solutions*, *one solution*, or *no real solution*. **(2 pts each)**

5. $4 + c^2 - 3c = 0$

$\sqrt{(-3)^2 - 4(1)(4)}$

$\sqrt{9-16}$

$\sqrt{-7}$

5. no real solution

6. $x^2 + 8x + 16 = 0$

$(8)^2 - 4(1)(16)$

$64 - 64$

0

6. no real solution

7. Solve: $\sqrt{64} = \sqrt{4x^2}$

$\frac{8}{2} = \frac{2x}{2}$

$x = 4$

7. $x = 4$ **(2pts)**

8. Simplify the radical: $\sqrt{72}$

$2 \quad 36$

$8 \quad 9$

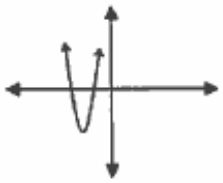
$2 \quad 3$

8. $5\sqrt{2}$ **(1pt)**

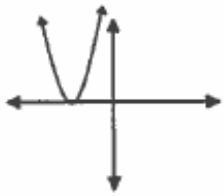
9. Which graph would match the discriminant of given the values $a = -2$, $b = 10$ & $c = \frac{1}{2}$?

9. C **(1pt)**

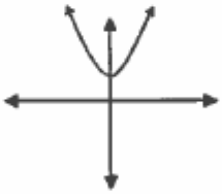
a)



b)



c)



$(10)^2 - 4(-2)\left(\frac{1}{2}\right)$

$100 - 4(-2)\left(\frac{1}{2}\right)$

$96(-2)\left(\frac{1}{2}\right)$

-96

10. What effect does increasing the value of c by 2 have on the number of solutions for the graph of: $5x^2 - 2x - 1 = 0$

10. _____ **(1pt)**

a) Increases the number of solutions by 2

b) Decreases the number of solutions by 2

c) Increases the number of solutions by 1

d) Has no effect on the number of solutions

Cornell Notes Lecture, reading/chapter/novel/article during class, power point, movies (if need to collect info.) **Topic:**_____ _____	**Name:** _____ **Class:** _____ **Period:** _____ **Date:** _____

Essential Question:

Questions/Main Ideas:	**Notes:**

Summary:

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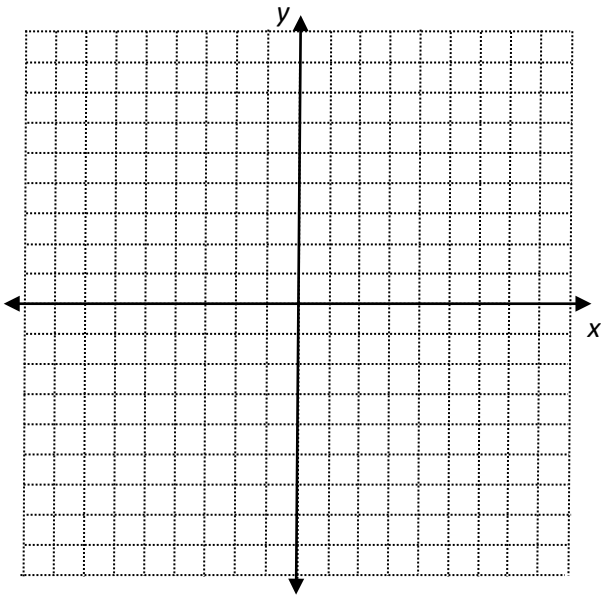
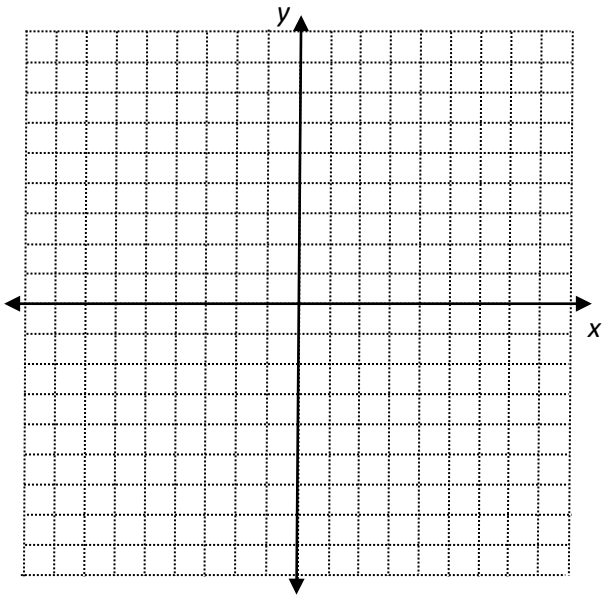
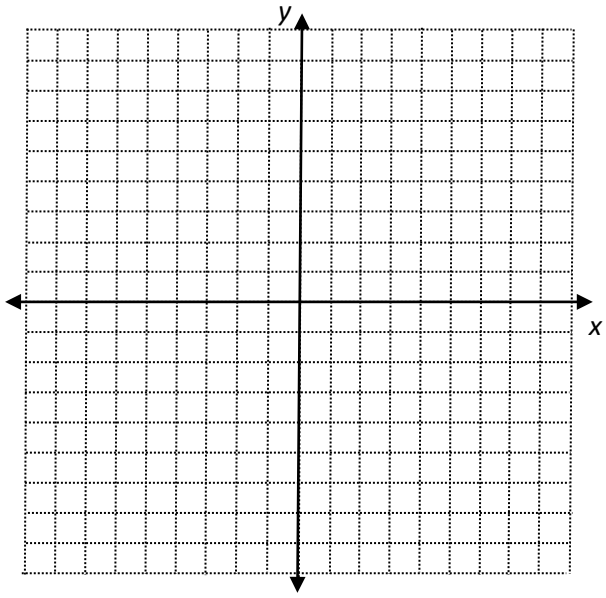
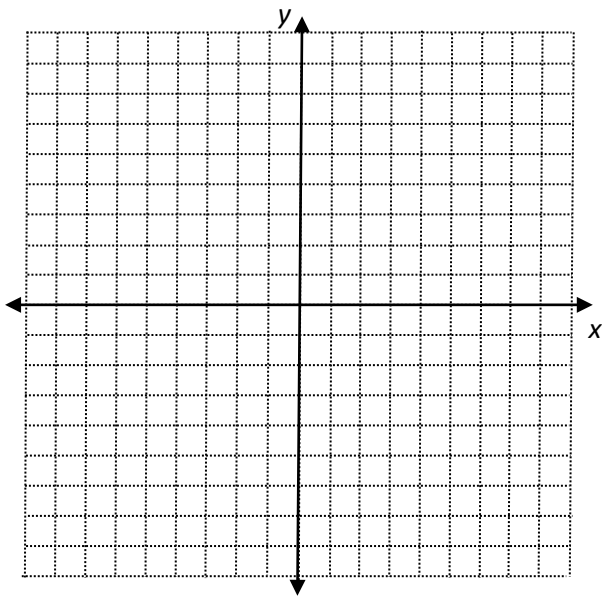
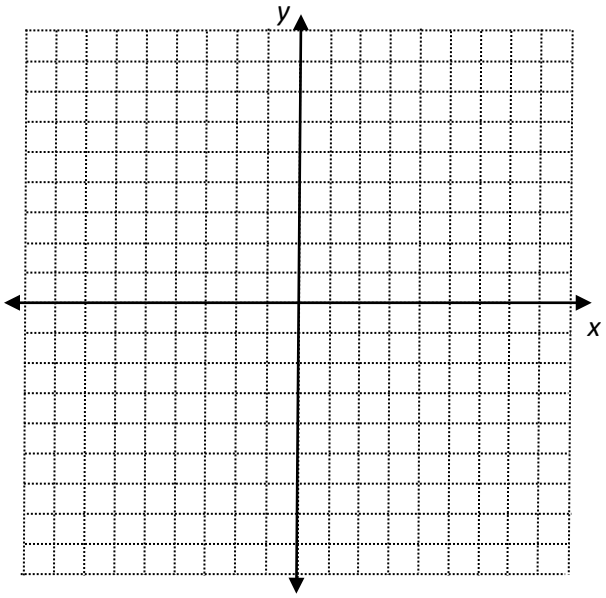
Extra Graphs

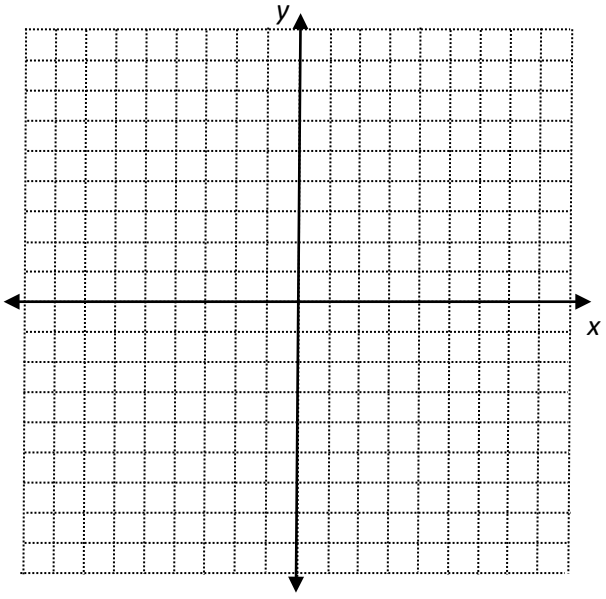












Add on problems or addition examples:

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