COLLEGE PREP

Unit 2-2: Writing and Graphing Quadratics

Worksheet Practice PACKET

Name:_____Period_____

Learning Targets:

Unit 2-1	**12. I can use the discriminant to determine the number and type of solutions/zeros.**
Modeling with Quadratic Functions	**1. I can identify a function as quadratic given a table, equation, or graph.**
	2. I can determine the appropriate domain and range of a quadratic equation or event.
	3. I can identify the minimum or maximum and zeros of a function with a calculator.
	4. I can apply quadratic functions to model real-life situations, including quadratic regression models from data.
Graphing	**5. I can graph quadratic functions in standard form (using properties of quadratics).**
	6. I can graph quadratic functions in vertex form (using basic transformations).
	7. I can identify key characteristics of quadratic functions including axis of symmetry, vertex, min/max, y-intercept, x-intercepts, domain and range.
Writing Equations of Quadratic Functions	**8. I can rewrite quadratic equations from standard to vertex and vice versa.**
	9. I can write quadratic equations given a graph or given a vertex and a point (without a calculator).
	10. I can write quadratic expressions/functions/equations given the roots/zeros/x-intercepts/solutions.
	11. I can write quadratic equations in vertex form by completing the square.
Applications	**4R. I can apply quadratics functions to real life situations without using the graphing calculator.**

Unit 2-2 Writing and Graphing Quadratics

Worksheets Completed

Date	LTs	Pages	Problems	Done

Quiz/Unit Test Dates(s)

Date	LTs	Score	Corrected	Retake

Quiz Retakes Dates and Rooms

CP Algebra 2 **Name**_____

Previous Unit Learning Targets **DO YOU REMEMBER for Unit 2-2?**
Unit 1 LT 1,4,5,6,8,11

1) Write an equation of the line through the points (2,-3) and (-1,0).

2) Solve: $|2x - 5| = 3$

3) Solve: $7x - 3(x - 2) = 2(5 - x)$

4) Solve the system :

$x - 2y = 16$

$-2x - y = -2$

5) Solve the system:

$y = 2x + 7$

$4x - y = -3$

6) Find the x and y intercepts of the line $3y - x = 4$

7) Evaluate: $-3x^2 + 4x$ **when** $x = -2$

8) Solve for x: $2(3 - (2x + 4)) - 5(x - 7) = 3x + 1$

ANSWERS

1) $y = -x - 1$ 5) (2,11) 2) $x = 4, 1$ 6)(0, 4/3) (-4,0)

3) $x = \frac{2}{3}$ 7) -20 4) (4, -6) 8) $x = 4$

Name: **Period _____ Date _____**

Practice 5-1 Modeling Data with Quadratic Functions

LT 1 I can identify a function as quadratic given a table, equation, or graph.
LT 2 I can determine the appropriate domain and range of a quadratic equation or event.
LT 3 I can identify the minimum or maximum and zeros of a function with a calculator.
LT 4 I can apply quadratic functions to model real-life situations, including quadratic regression models from data.

Find a quadratic model for each set of values.

1. **(–1, 1), (1, 1), (3, 9)**

2. **(–4, 8), (–1, 5), (1, 13)**

3. **(–1, 10), (2, 4), (3,–6)**

4.

x	–1	0	2
$f(x)$	1	–1	7

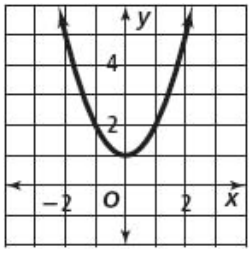
5.

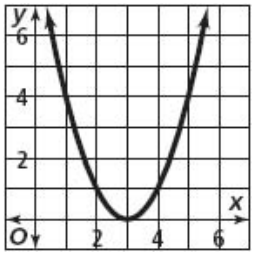
x	–4	0	1
$f(x)$	1	9	16

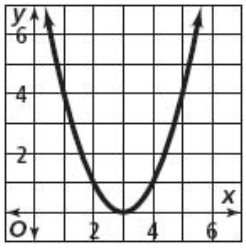
6.

x	–1	2	3
$f(x)$	12	3	4

Identify the vertex and the axis of symmetry of each parabola.

7. 

8. 

9. 

LT 1 I can identify a function as quadratic given a table, equation, or graph.

Determine whether each function is linear or quadratic. Identify the quadratic, linear, and constant terms.

10. $y = (x - 2)(x + 4)$

11. $y = 3x(x + 5)$

12. $y = 5x(x - 5) - 5x^2$

13. $f(x) = 7(x - 2) + 5(3x)$

14. $f(x) = 3x^2 - (4x - 8)$

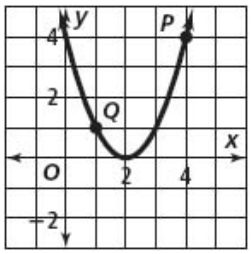
15. $y = 3x(x - 1) - (3x + 7)$

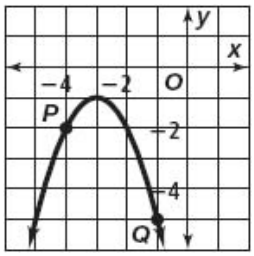
16. $y = 3x^2 - 12$

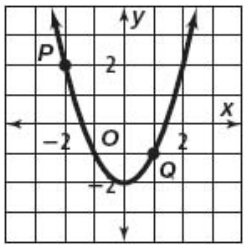
17. $f(x) = (2x - 3)(x + 2)$

18. $y = 3x - 5$

For each parabola, identify points corresponding to *P* and *Q* using symmetry.

19. 

20. 

21. 

LT 4 I can apply quadratic functions to model real-life situations, including quadratic regression models from data.
LT 2 I can determine the appropriate domain and range of a quadratic equation or event.

22. **A toy rocket is shot upward from ground level. The table shows the height of the rocket at different times.**

Time (seconds)	0	1	2	3	4
Height (feet)	0	256	480	672	832

a. **Find a quadratic model for this data.**

b. **Use the model to estimate the height of the rocket after 1.5 seconds.**

c. **Describe appropriate domain and range.**

Answers:

Practice 5-1

1. $f(x) = x^2$ **2.** $f(x) = x^2 + 4x + 8$
3. $f(x) = -2x^2 + 12$ **4.** $f(x) = 2x^2 - 1$
5. $f(x) = x^2 + 6x + 9$ **6.** $f(x) = x^2 - 4x + 7$
7. $(0, 1); x = 0$ **8.** $(3, 0); x = 3$ **9.** $(-1, -2); x = -1$
10. quadratic; quad: x^2; lin: $2x$; const: -8 **11.** quadratic; quad: $3x^2$; lin: $15x$; const: none **12.** linear; quad: none; lin: $-25x$; const: none **13.** linear; quad: none; lin: $22x$; const: -14 **14.** quadratic; quad: $3x^2$; lin: $-4x$; const: 8
15. quadratic; quad: $3x^2$; lin: $-6x$; const: -7
16. quadratic; quad: $3x^2$; lin: none; const: -12 **17.** quadratic; quad: $2x^2$; lin: x; const: -6 **18.** linear; quad: none; lin: $3x$; const: -5 **19.** $P'(0, 4), Q'(3, 1)$ **20.** $P'(-2, -2), Q'(-5, -5)$ **21.** $P'(2, 2), Q'(-1, -1)$
22a. $h = -16t^2 + 272t$ **22b.** 372 feet

Name **Period** **Date**

Practice 5-2 Properties of Parabolas

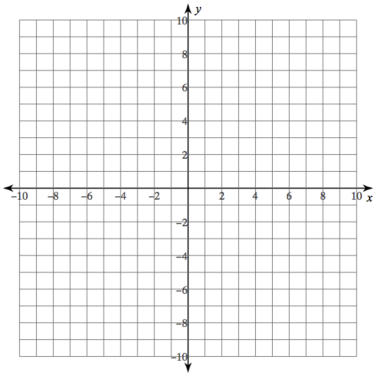
LT 5 I can graph quadratic functions in standard form (using properties of quadratics).
LT 7 I can identify key characteristics of quadratic functions including axis of symmetry, vertex, min/max, y-intercept, x-intercepts, domain and range.

Graph each function. If $a > 0$, find the minimum value. If $a < 0$, find the maximum value.

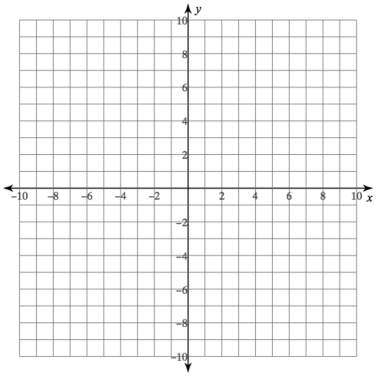
1. $y = -x^2 + 2x + 3$
2. $y = 2x^2 + 4x - 3$
3. $y = -3x^2 + 4x$
4. $y = x^2 - 4x + 1$
5. $y = -x^2 - x + 1$
6. $y = 5x^2 - 3$
7. $y = \frac{1}{2}x^2 - x - 4$
8. $y = 5x^2 - 10x - 4$
9. $y = 3x^2 - 12x - 4$

Graph each function.

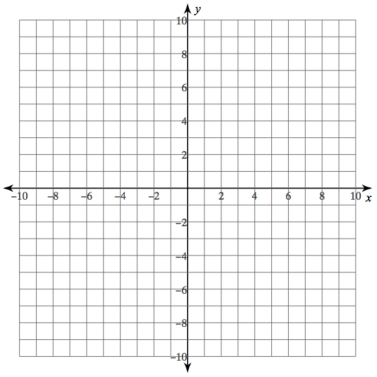
10. $y = x^2 + 3$



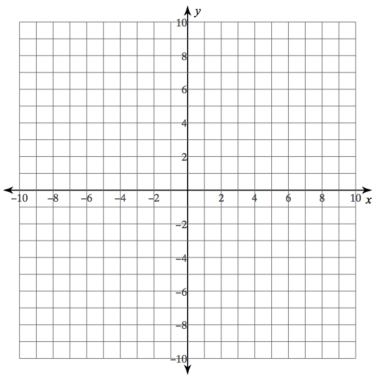
11. $y = x^2 - 4$



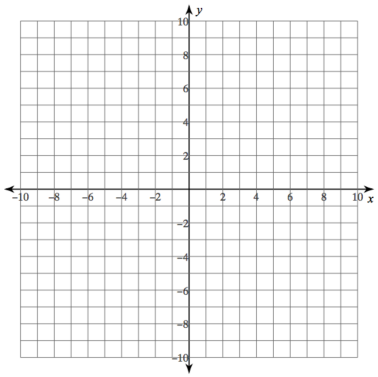
12. $y = x^2 + 2x + 1$



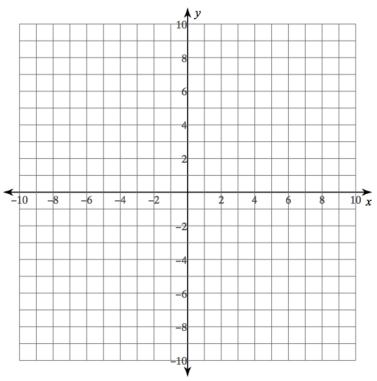
13. $y = 2x^2 - 1$



14. $y = -3x^2 + 12x - 8$



15. $y = \frac{1}{3}x^2 + 2x - 1$



Practice 5-2 continued

16. Suppose you are tossing an apple up to a friend on a third-story balcony. After t seconds, the height of the apple in feet is given by $h = -16t^2 + 38.4t + 0.96$.Your friend catches the apple just as it reaches its highest point. How long does the apple take to reach your friend, and at what height above the ground does your friend catch it?

17. The barber's profit p each week depends on his charge c per haircut. It is modeled by the equation $p = -200c^2 + 2400c - 4700$. Sketch the graph of the equation. What price should he charge for the largest profit?

18. A skating rink manager finds that revenue R based on an hourly fee F for skating is represented by the function $R = -480F^2 + 3120F$. What hourly fee will produce maximum revenues?

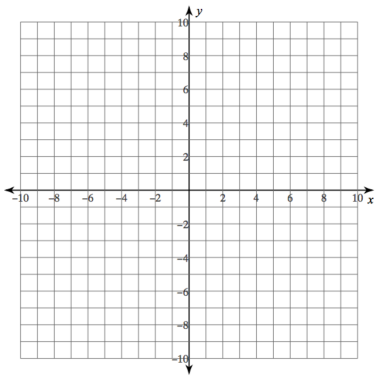
19. The path of a baseball after it has been hit is modeled by the function $h = -0.0032d^2 + d + 3$, where h is the height in feet of the baseball and d is the distance in feet the baseball is from home plate. What is the maximum height reached by the baseball? How far is the baseball from home plate when it reaches its maximum height?

20. A lighting fixture manufacturer has daily production costs of $C = 0.25n^2 - 10n + 800$, where C is the total daily cost in dollars and n is the number of light fixtures produced. How many fixtures should be produced to yield a minimum cost?

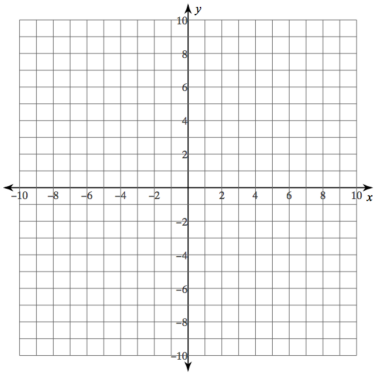
Practice 5-2 continued

Graph each function. Label the vertex and the axis of symmetry. Plot 5 key points.

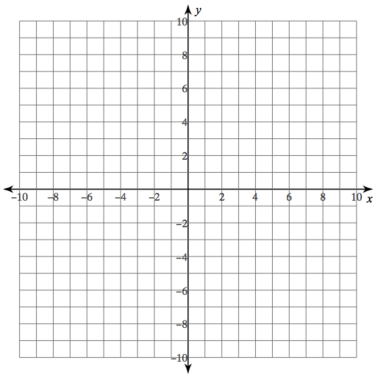
21. $y = x^2 - 2x - 3$



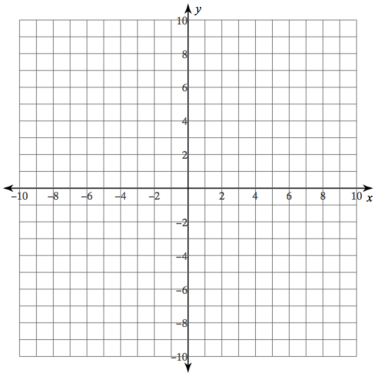
22. $y = 2x - \frac{1}{4}x^2$



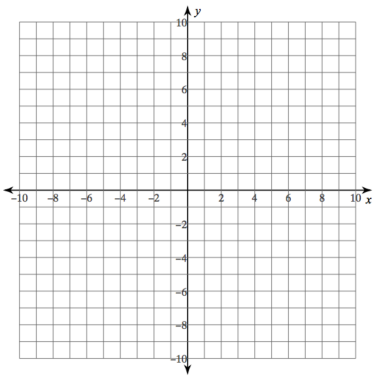
23. $y = x^2 + 6x + 7$



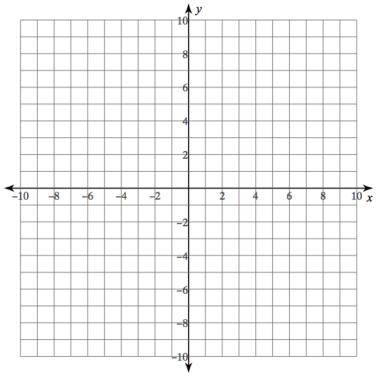
24. $y = x^2 + 2x - 6$



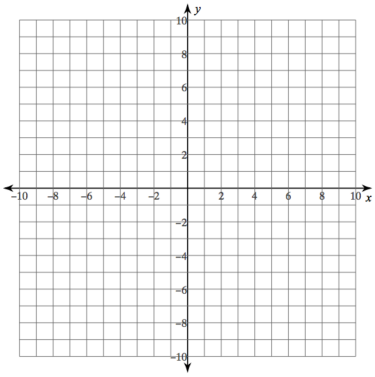
25. $y = x^2 - 8x$



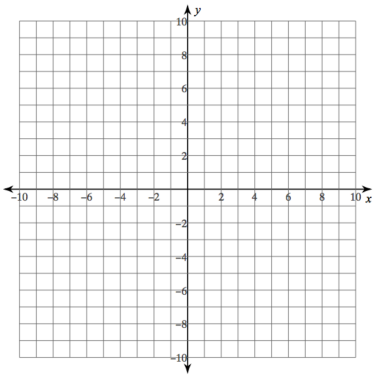
26. $y = 2x^2 + 12x + 5$



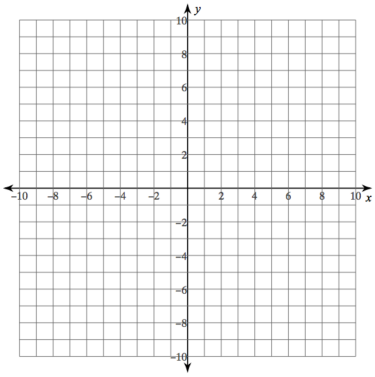
27. $y = -3x^2 - 6x + 5$



28. $y = -2x^2 + 3$

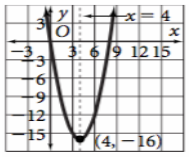


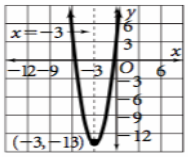
29. $y = x^2 - 6$

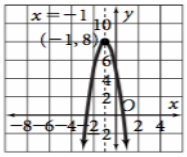


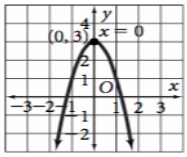
Practice 5-2 Answers:

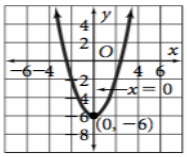
Practice 5-2

25. 

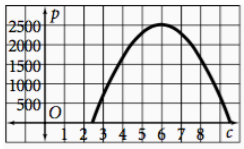
26. 

27. 

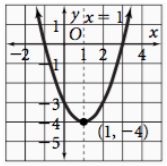
28. 

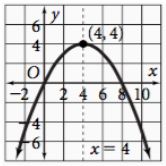
29. 

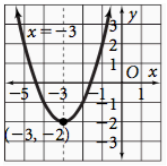
16. 1.2 s; 24 ft

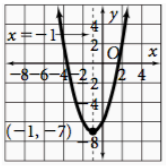
17.  ; $6

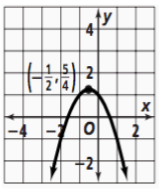
18. $3.25 **19.** 81.125 ft; 156.25 ft **20.** 20 fixtures per day

21. 

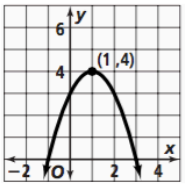
22. 

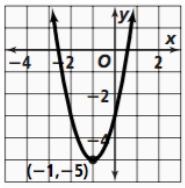
23. 

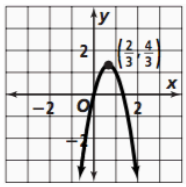
24. 

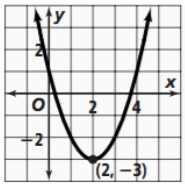
5.  ; max. $\left(-\frac{1}{2}, \frac{5}{4}\right)$

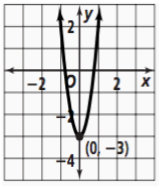
Practice 5-2

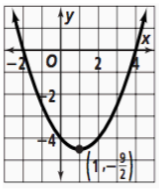
1.  ; max. (1, 4)

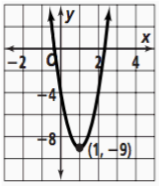
2.  ; min. (−1, −5)

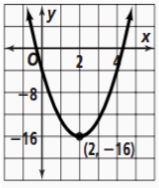
3.  ; max. $\left(\frac{2}{3}, \frac{4}{3}\right)$

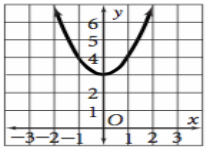
4.  ; min. (2, −3)

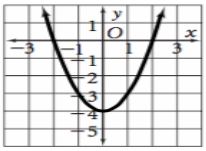
6.  ; min. (0, −3)

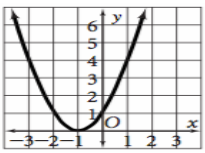
7.  ; min. $\left(1, -\frac{9}{2}\right)$

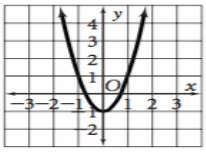
8.  ; min. (1, −9)

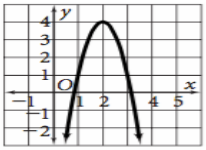
9.  ; min. (2, −16)

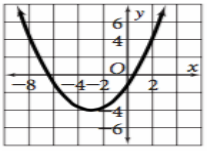
10. 

11. 

12. 

13. 

14. 

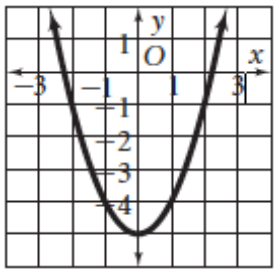
15. 

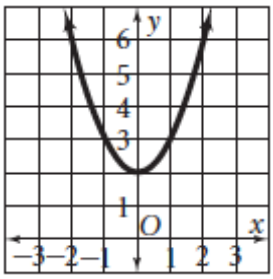
Name _____ **Class** _____ **Date** _____

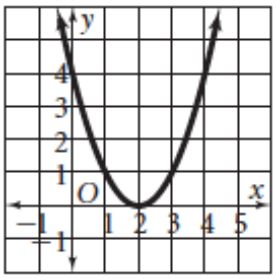
Practice 5-3 Transforming Parabolas

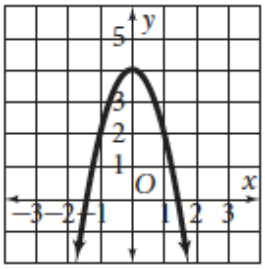
LT6. I can graph quadratic functions in vertex form (using basic transformations).
LT7. I can identify key characteristics of quadratic functions including axis of symmetry, vertex, min/max, y-intercept, x-intercepts, domain and range.
LT 8 I can rewrite quadratic equations from standard to vertex and vice versa.
LT 4 I can apply quadratic functions to model real-life situations, including quadratic regression models from data.

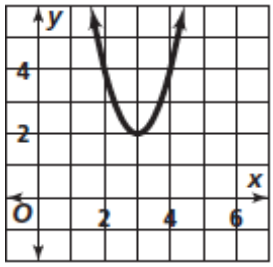
Write the equation of the parabola in vertex form.

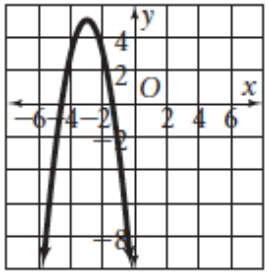
1. 

2. 

3. 

4. 

5. 

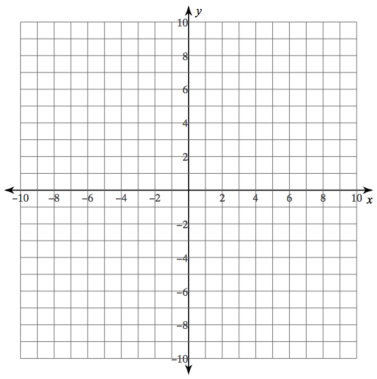
6. 

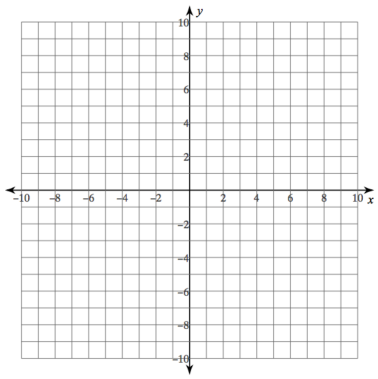
Graph each function.

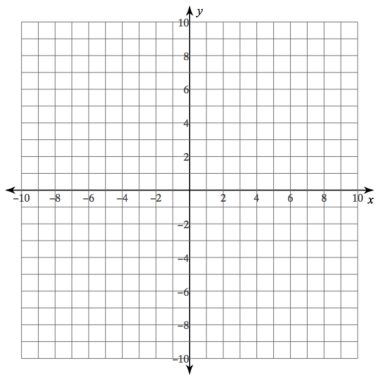
7. $y = (x - 2)^2 - 3$

8. $y = (x - 6)^2 + 6$

9. $y = \frac{1}{2}(x - 1)2 - 1$

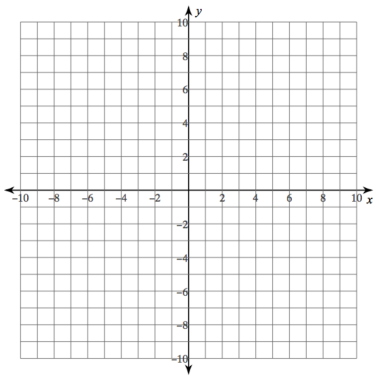




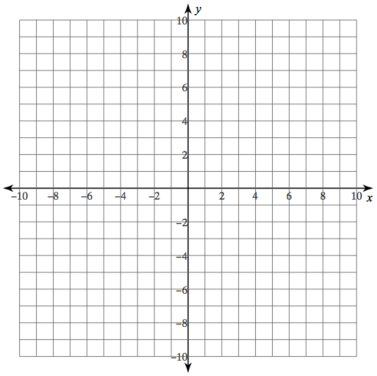


Practice 5-3 continued

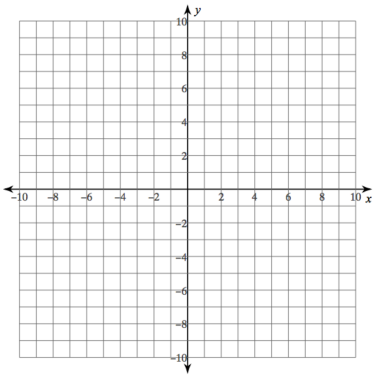
10. $y = 8(x + 1)^2 - 2$



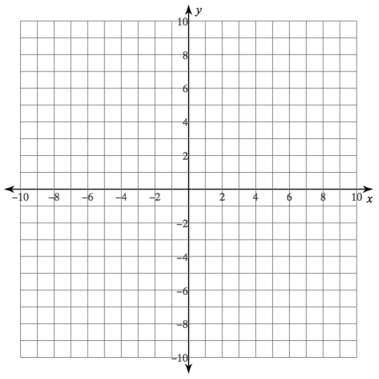
11. $y = -3(x - 1)^2 + 3$



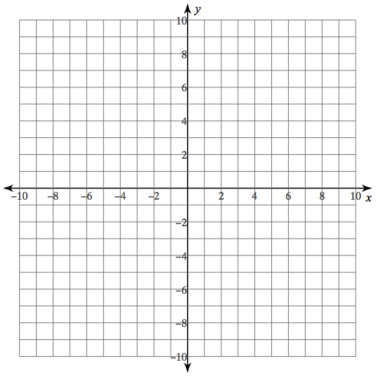
12. $y = 3(x + 2)^2 + 4$



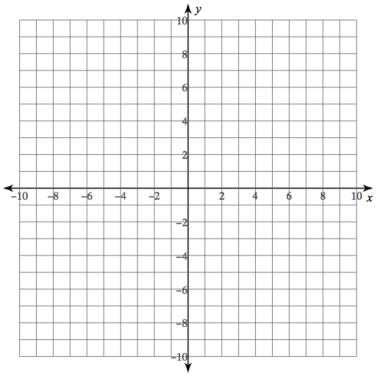
13. $y = (1/8)(x + 1)^2 - 1$



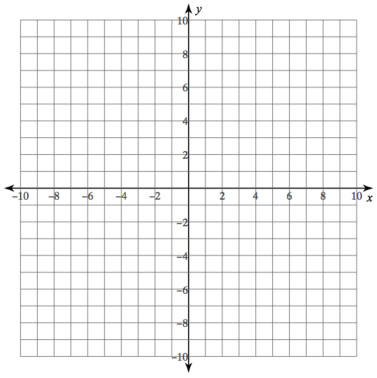
14. $y = ½(x + 6)^2 - 2$



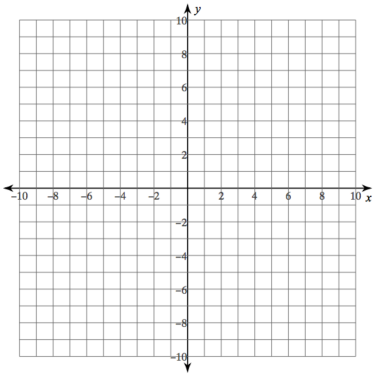
15. $y = 2(x + 3)^2 - 3$



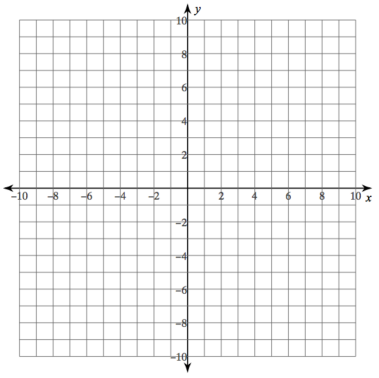
16. $y = 4(x - 2)^2$



17. $y = -2(x + 1)^2 - 5$



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



Practice 5-3 continued

Write each function in vertex form.

19. $y = x^2 + 4x$

20. $y = 2x^2 + 8x + 3$

21. $y = -2x^2 - 8x$

22. $y = -x^2 + 4x + 4$

23. $y = x^2 - 4x - 4$

24. $y = x^2 + 5x$

25. $y = 2x^2 - 6$

26. $y = -3x^2 - x - 8$

27. $y = x^2 + 7x + 1$

28. $y = x^2 + 8x + 3$

29. $y = 2x^2 + 6x + 10$

30. $y = x^2 + 4x - 3$

Write each function in standard form.

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

32. $y = -(1/3)(x + 6)^2 + 5$

33. $y = 2(x - 1)^2 - 1$

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

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

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

Practice 5-3 continued

37. $y = 4(x - 5)^2 + 1$ 38. $y = -2(x + 5)^2 - 3$ 39. $y = -5(x + 2)^2 + 5$

49.A model of the daily profits p of a gas station based on the price per gallon g is $p = -15{,}000g^2 + 34{,}500g - 16{,}800$.

Find the price that will the maximum profits.

What is the maximum profit?

What are the prices that will create a profit of $2000 per day.

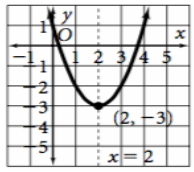
What is the lowest price needed to break even?

Answers: Practice 5-3

Practice 5-3

1. $y = x^2 - 5$ **2.** $y = x^2 + 2$ **3.** $y = (x - 2)^2$
4. $y = -2x^2 + 4$ **5.** $y = 2(x - 3)^2 + 2$
6. $y = -2(x + 3)^2 + 5$

7.



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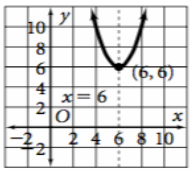

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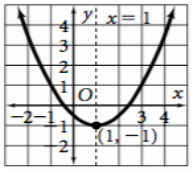

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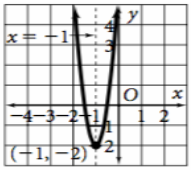

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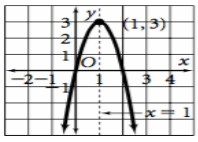

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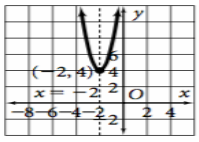

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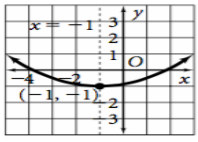

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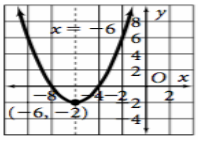

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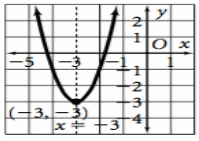

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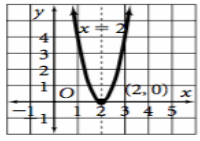
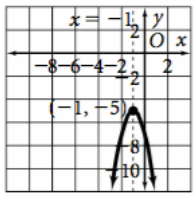


Practice 5-3

17.



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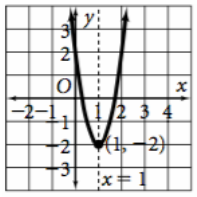


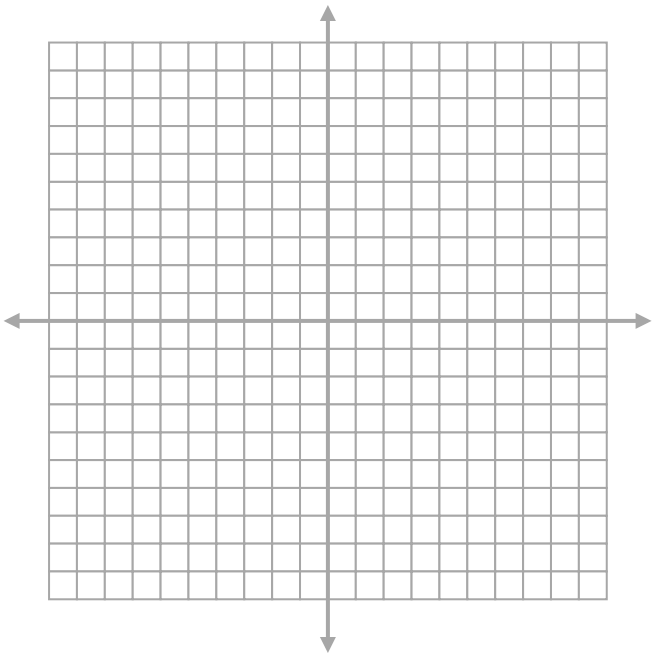
19. $y = (x + 2)^2 - 4$ **20.** $y = 2(x + 2)^2 - 5$
21. $y = -2(x + 2)^2 + 8$ **22.** $y = -(x - 2)^2 + 8$
23. $y = (x - 2)^2 - 8$ **24.** $y = \left(x + \frac{5}{2}\right)^2 - \frac{25}{4}$
25. $y = 2(x - 0)^2 - 6$ **26.** $y = -3\left(x + \frac{1}{6}\right)^2 - \frac{95}{12}$
27. $y = \left(x + \frac{7}{2}\right)^2 - \frac{45}{4}$ **28.** $y = (x + 4)^2 - 13$
29. $y = 2\left(x + \frac{3}{2}\right)^2 + \frac{11}{2}$ **30.** $y = (x + 2)^2 - 7$
31. $(2, -4); 8$ **32.** $(-6, 5); -7$ **33.** $(1, -1); 1$
34. $(-4, -3); \frac{23}{3}$ **35.** $(1, 2); 3$ **36.** $(2, 4); -8$ **37.** $(5, 1); 101$
38. $(-5, -3); -53$ **39.** $(-2, 5); -15$

CPA2 Unit 2-2 **Name _____ Pd _____**

LT 5. I can graph quadratic functions in standard form (using properties of quadratics).
LT 7. I can identify key characteristics of quadratic functions including axis of symmetry, vertex, min/max, y-intercept, x-intercepts, domain and range.
LT 10. I can write quadratic expressions/functions/equations given the roots/zeros/x-intercepts/solutions.
LT 11. I can write quadratic equations in vertex form by completing the square.

Write the following in vertex $f(x) = a(x-h)^2 + k$ form by completing the square. Verify your answer using –b/2a. Find the important information and sketch.

1. $f(x) = x^2 + 4x + 8$



vertex form: _____

vertex_____max or min?

x – int_____

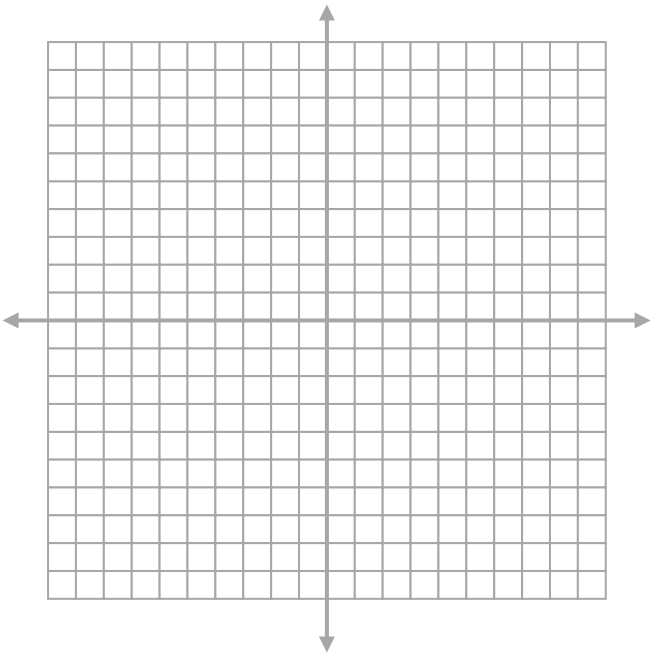
y – int_____

axis of sym_____

domain _____

range_____

2. $f(x) = 3x^2 - 18x + 15$



vertex form: _____

vertex_____max or min?

x – int_____

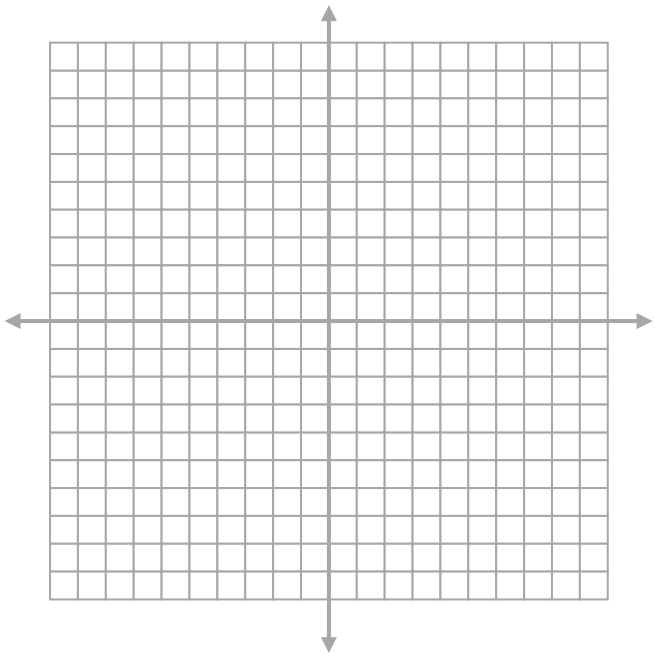
y – int_____

axis of sym_____

domain _____

range_____

3. $f(x) = 2x^2 + 10x + 12$



vertex form: _____

vertex_____max or min?

x – int_____

y – int_____

axis of sym_____

domain _____

range_____

Write the equation for the quadratic in $f(x) = a(x-h)^2 + k$ **form with the given vertex that passes through the given point.**

4. Vertex $(-6,8)$ **through point** $(-4,10)$

5. Vertex $(-2,7)$ **through point** $(3,-18)$

_____ _____

ANSWERS

1. $y = (x+2)^2 + 4$
min (–2, 4)
***x*-int none**
***y*-int (0, 8)**
sym *x* = –2
D $(-\infty,\infty)$ **R** $[4,\infty)$

2. $y = 3(x-3)^2 - 12$
min (3, –12)

***x*-int (5, 0) & (1, 0)**
***y*-int (0, 15)**

sym *x* = 3
D $(-\infty,\infty)$ **R** $[-12,\infty)$

3. $y = 2\left(x+\frac{5}{2}\right)^2 - \frac{1}{2}$
min $y = \left(\frac{-5}{2},\frac{-1}{2}\right)$
***x*-int (–2, 0) ,(–3, 0)**
***y*-int (0, 12)**
sym $x = \frac{-5}{2}$
D $(-\infty,\infty)$ **R** $\left[\frac{-1}{2},\infty\right)$

4. $y = \frac{1}{2}(x+6)^2 + 8$

5. $y = -1(x+2)^2 + 7$

CPA2 Unit 2-2 **Name _____ Pd _____**

LT 5. I can graph quadratic functions in standard form (using properties of quadratics).
LT 6. I can graph quadratic functions in vertex form (using basic transformations).
LT 7. I can identify key characteristics of quadratic functions including axis of symmetry, vertex, min/max, y-intercept, x-intercepts, domain and range.
LT 8. I can rewrite quadratic equations from standard to vertex and vice versa.
LT 9. I can write quadratic equations given a graph or given a vertex and a point (without a calculator).
LT 10. I can write quadratic expressions/functions/equations given the roots/zeros/x-intercepts/solutions.
LT 11. I can write quadratic equations in vertex form by completing the square.

LT 5. I can graph quadratic functions in standard form (using properties of quadratics).
LT 6. I can graph quadratic functions in vertex form (using basic transformations).
LT 9. I can write quadratic equations given a graph or given a vertex and a point (without a calculator).

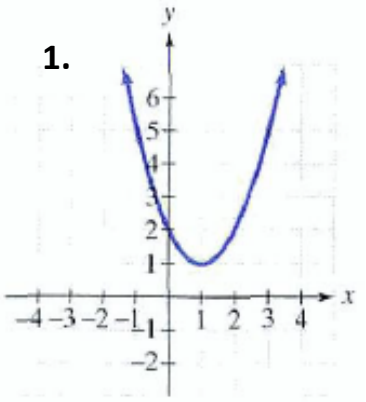
For problems 1 to 8, match each graph with its equation.

A. $a(x) = (x+1)^2 - 1$ **B.** $b(x) = -x^2 - 1$ **C.** $c(x) = (x-1)^2 + 1$

D. $d(x) = x^2 - 2x + 1$ **E.** $e(x) = x^2 + 2x + 1$ **F.** $f(x) = (x+1)^2 + 1$

G. $g(x) = (x-1)^2 - 1$ **H.** $h(x) = x^2 - 1$

1.



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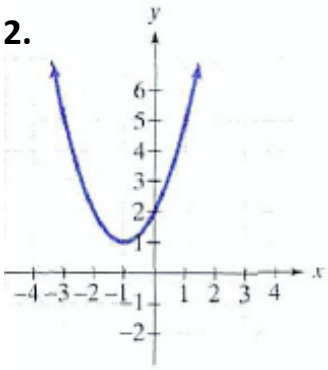
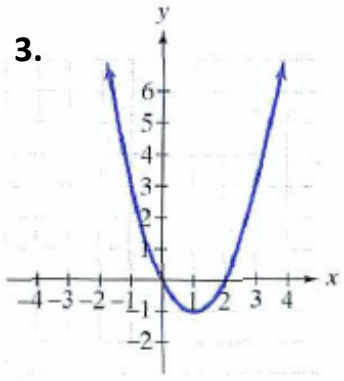


3.



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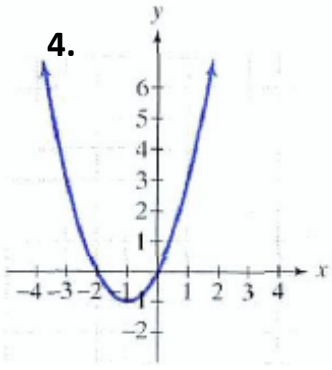

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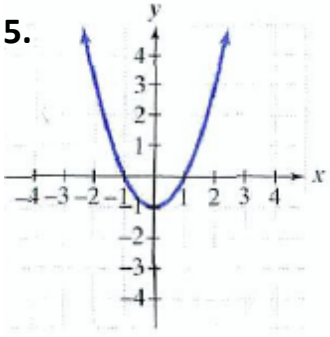

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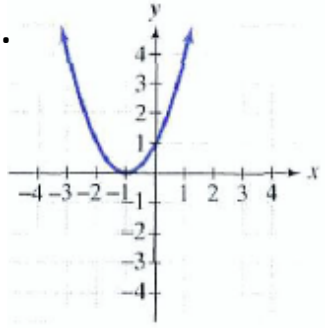

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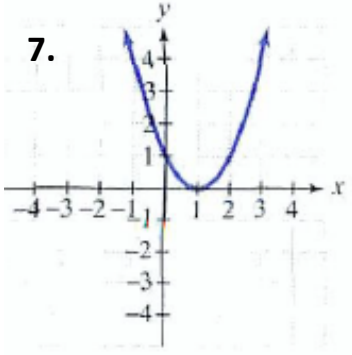

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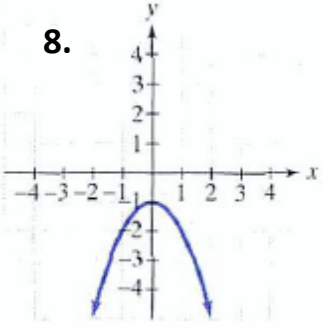


LT 7. I can identify key characteristics of quadratic functions including axis of symmetry, vertex, min/max, y-intercept, x-intercepts, domain and range.

Find the coordinates of the vertex for the parabola defined by the given quadratic function.

9. $f(x) = 2(x-3)^2+1$

10. $f(x) = -2(x+1)^2+5$

Find the coordinates of the vertex for the parabola defined by the given quadratic function.

11. $f(x) = 2x^2 - 8x + 3$

12. $f(x) = -x^2 - 2x + 8$

LT 8. I can rewrite quadratic equations from standard to vertex and vice versa.
LT 11. I can write quadratic equations in vertex form by completing the square.
Look ahead to #13-19.
Rewrite the equations in standard form ($y = ax^2 + bx + c$) into vertex form ($y=a(x-h)^2 + k$) (Use completing the square for LT 11)

16) $f(x) = 2x^2 + 4x - 3$

17) $f(x) = 2x - x^2 - 2$

18) $f(x) = -4x^2 + 8x - 3$

19) $f(x) = 3x^2 - 12x - 1$

LT 8. I can rewrite quadratic equations from standard to vertex and vice versa.
LT 11. I can write quadratic equations in vertex form by completing the square.
Look ahead to #13-19.
Rewrite the equations in vertex form ($y=a(x-h)^2 + k$) into standard form ($y=ax^2 + bx + c$).

13) $f(x) = (x-4)^2 - 1$

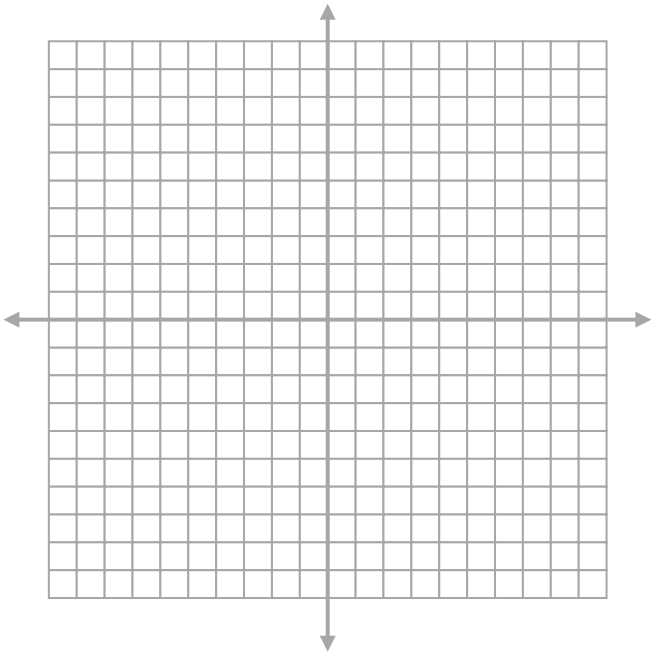
14) $f(x) = (x-1)^2 + 2$

15) $f(x) = x^2 + 6x + 3$

LT 6. I can graph quadratic functions in vertex form (using basic transformations).
LT 7. I can identify key characteristics of quadratic functions including axis of symmetry, vertex, min/max, y-intercept, x-intercepts, domain and range.

Find the important information about the following graphs and sketch. Describe the transformation of graph from $y=x^2$

13. $f(x) = (x-4)^2 - 1$



Transformation _____

vertex_____max or min?

x – int_____

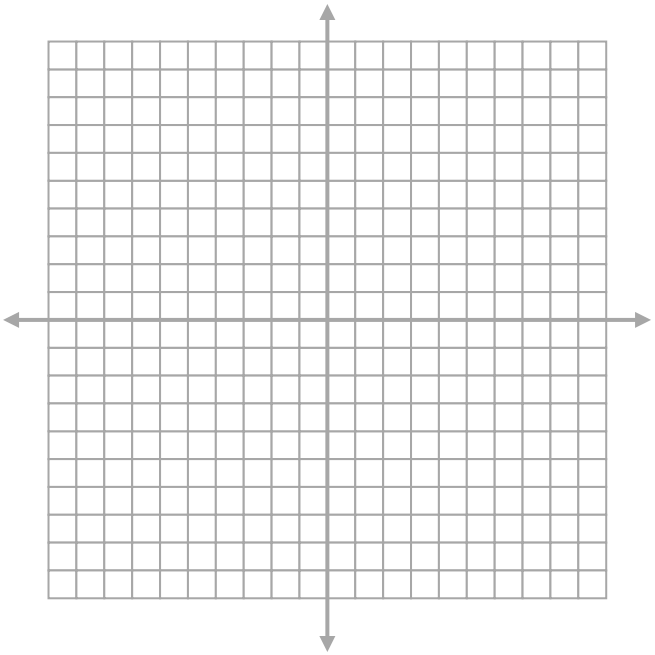
y – int_____

axis of sym_____

domain _____

range_____

14. $f(x) = (x-1)^2 + 2$



Transformation _____

vertex_____max or min?

x – int_____

y – int_____

axis of sym_____

domain _____

range_____

LT 5. I can graph quadratic functions in standard form (using properties of quadratics).
LT 7. I can identify key characteristics of quadratic functions including axis of symmetry, vertex, min/max, y-intercept, x-intercepts, domain and range.

15. $f(x) = x^2 + 6x + 3$

vertex_____max or min?

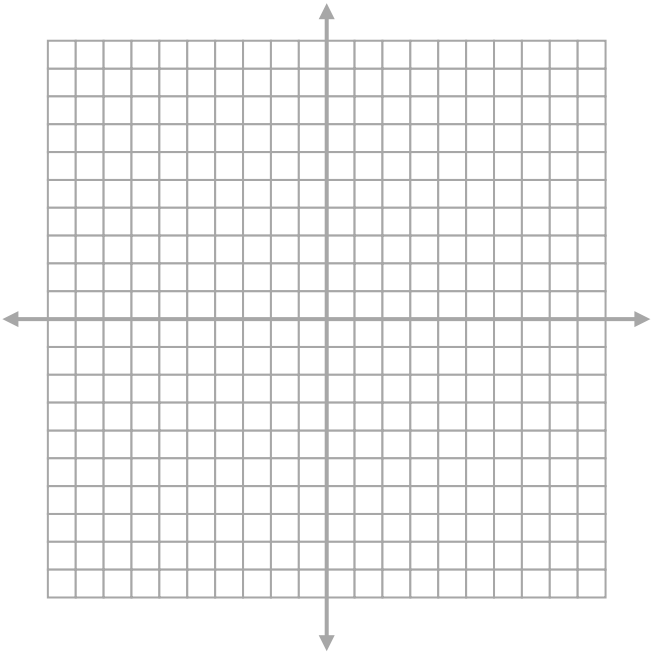
x – int_____

y – int_____

axis of sym_____

domain _____

range_____



16. $f(x) = 2x^2 + 4x - 3$

vertex_____max or min?

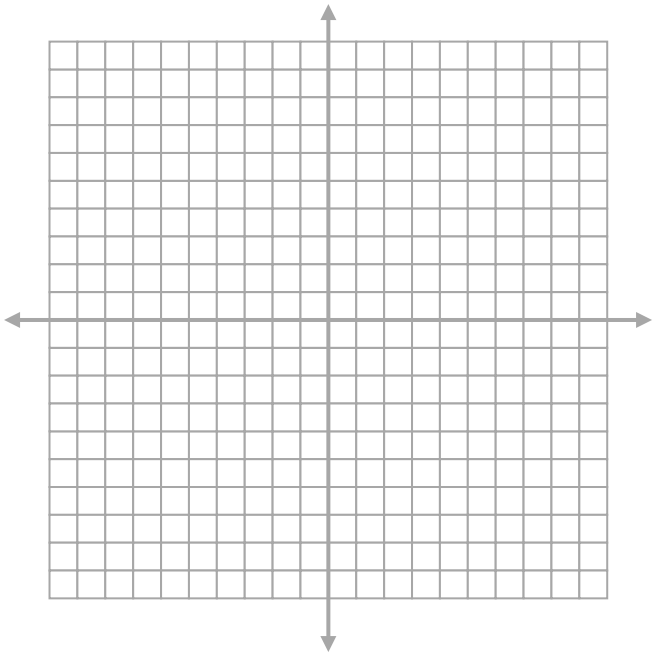
x – int_____

y – int_____

axis of sym_____

domain _____

range_____



17. $f(x) = 2x - x^2 - 2$

vertex_____max or min?

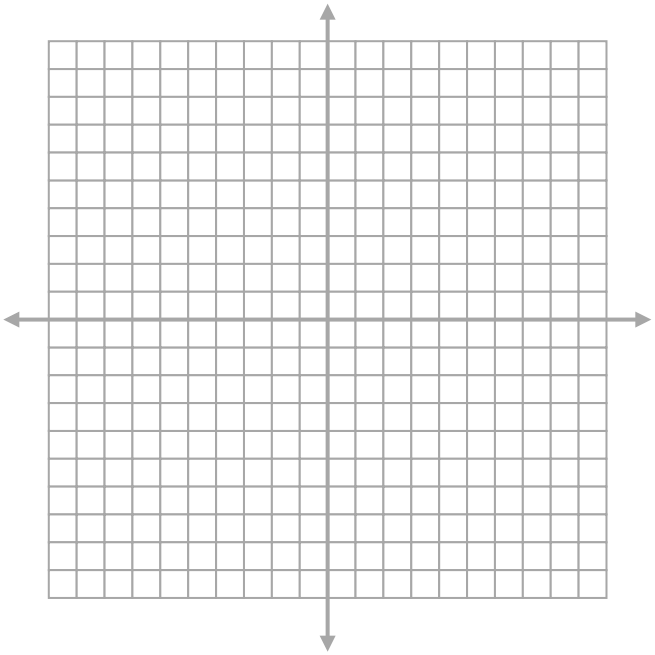
x – int_____

y – int_____

axis of sym_____

domain _____

range_____



18. $f(x) = -4x^2 + 8x - 3$

vertex_____max or min?

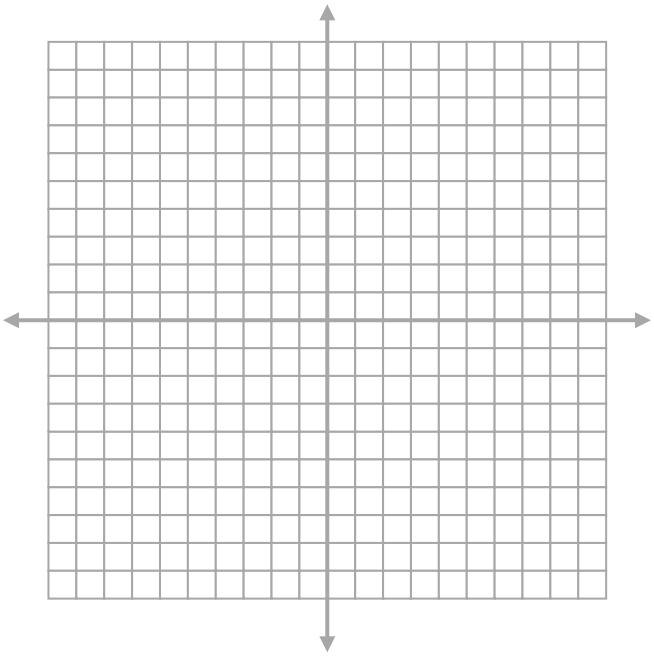
x – int_____

y – int_____

axis of sym_____

domain _____

range_____



19. $f(x) = 3x^2 - 12x - 1$

vertex_____max or min?

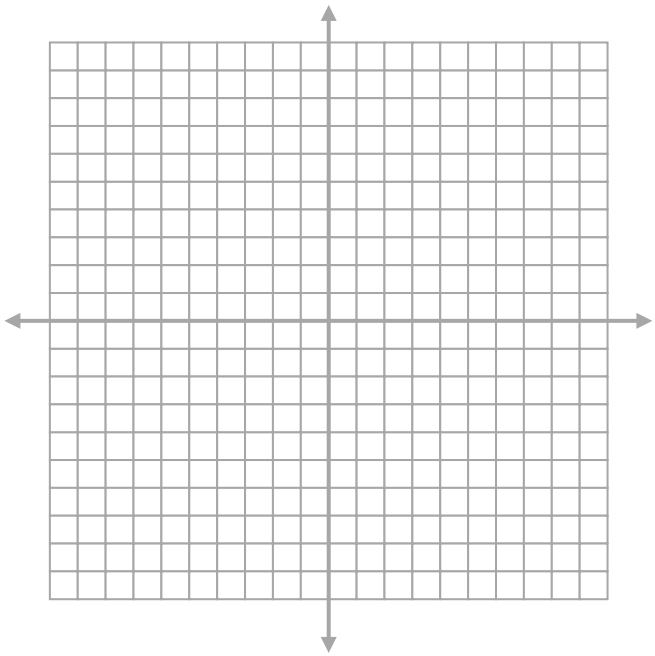
x – int_____

y – int_____

axis of sym_____

domain _____

range_____



answers

1. C 2. F 3. G 4. A **5. H 6. E 7. D 8. B** **9. (3, 1)** **10. (–1, 5)** **11. (2, –5)** **12. (–1, 9)** **13. min (4, –1)** ***x*-int (5, 0) & (3, 0)** ***y*-int (0, 15)** **sym *x* = 4** **D** $(-\infty,\infty)$ **R** $[-1,\infty)$ **14. min (1, 2)** ***x*-int none** ***y*-int (0, 3)** **sym *x* = 1** **D** $(-\infty,\infty)$ **R** $[2,\infty)$	**15. min (–3, –6)** ***x*-int** $\left(-3\pm\sqrt{6},0\right)$ ***y*-int (0, 3)** **sym *x* = –3** **D** $(-\infty,\infty)$ **R** $[-6,\infty)$ **16. min (–1, –5)** ***x*-int** $\left(-1\pm\frac{\sqrt{10}}{2},0\right)$ ***y*-int (0, –3)** **sym *x* = –1** **D** $(-\infty,\infty)$ **R** $[-5,\infty)$ **17. max (1, –1)** ***x*-int none** ***y*-int (0, –2)** **sym *x* = 1** **D** $(-\infty,\infty)$ **R** $(-\infty,-1]$	**18. max (1, 1)** ***x*-int** $\left(\frac{1}{2},0\right)$, $\left(\frac{3}{2},0\right)$ ***y*-int (0, –3)** **sym *x* = 1** **D** $(-\infty,\infty)$ **R** $(-\infty,1]$ **19. min (2, –13)** ***x*-int** $\left(2\pm\frac{\sqrt{39}}{3},0\right)$ ***y*-int (0, –1)** **sym *x* = 2** **D** $(-\infty,\infty)$ **R** $[-13,\infty)$

CP Algebra 2 Unit 2-2 LT 1 to 12 Name_____

LT 1. I can identify a function as quadratic given a table, equation, or graph.
LT 3. I can identify the minimum or maximum and zeros of a function with a calculator.
LT 4. I can apply quadratic functions to model real-life situations, including quadratic regression models from data.

1. Use your calculator to find a linear and a quadratic model for the following data.

Money Spent in the U.S. on Personal Technology

Year (0 = 1970)	0	10	20	22	24	26
Billions of $	8.8	17.6	53.8	61.2	78.5	89.7

linear model: _____ quadratic model: _____

Which one is a better fit? _____ How do you know? _____

2. Find the quadratic model containing the following points: (–2, 24), (–1, 13), (3, 9).

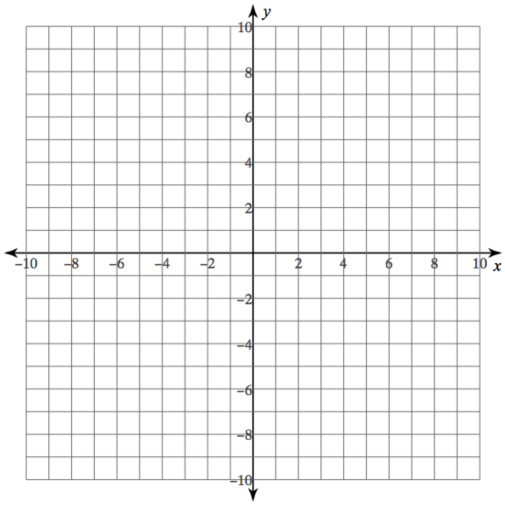
Y=_____ What is the min/max? _____ Where is it? _____

LT 5. I can graph quadratic functions in standard form (using properties of quadratics).
LT 7. I can identify key characteristics of quadratic functions including axis of symmetry, vertex, min/max, y-intercept, x-intercepts, domain and range

3. Do not use a calculator. Graph the following, showing the axis of symmetry and at least 5 plotted points. Fill in all requested information.

x	y

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



Equation of axis of symmetry: _____

vertex: _____

Max /Min of _____ at _____

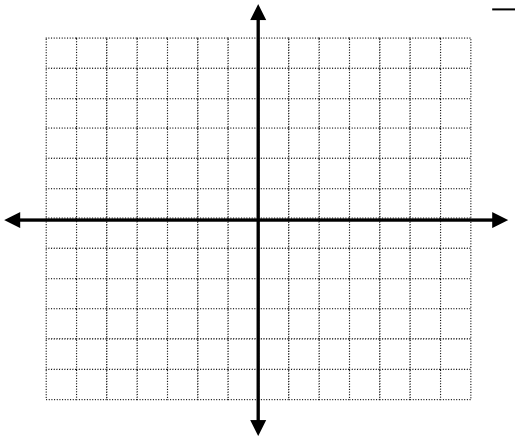
y-intercept _____

Domain_____ Range_____ x-int _____

LT 6. I can graph quadratic functions in vertex form (using basic transformations).

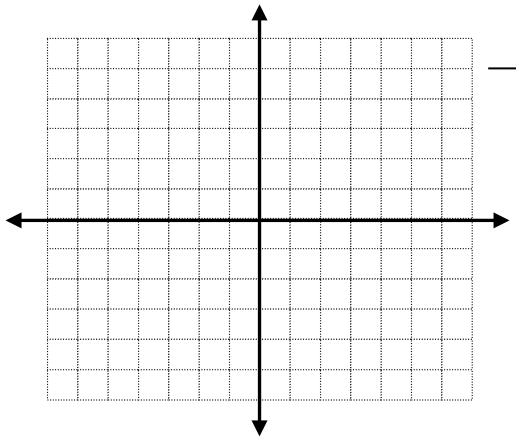
4. Do not use a calculator. Graph the following. Describe the transformations. You must plot and state the 5 "key" points, wherever they end up after transformation.

a. $f(x) = -(x+1)^2 + 4$



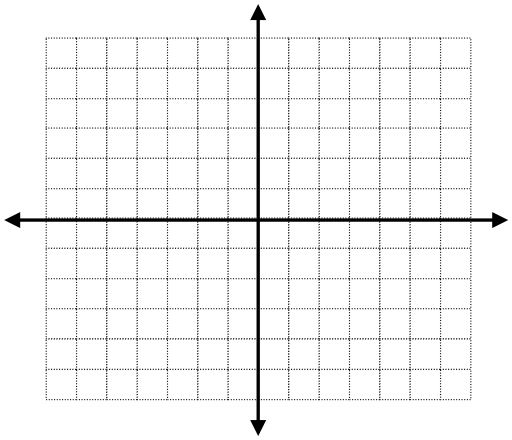
x	y

b. $f(x) = (x-3)^2$

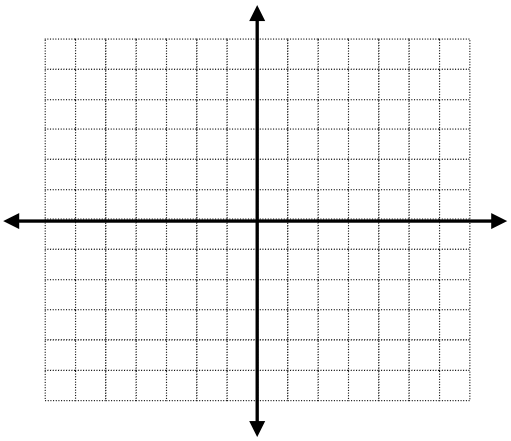


x	y

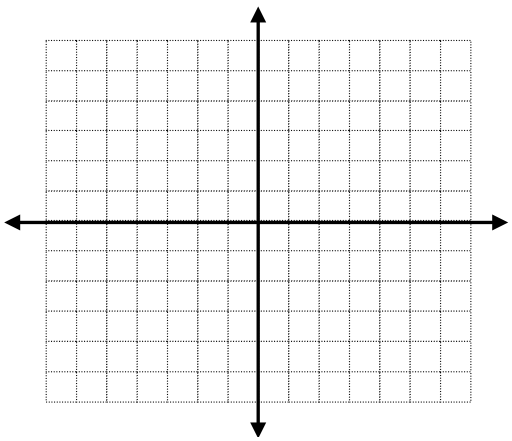
c. $f(x) = -(x+4)^2 - 2$



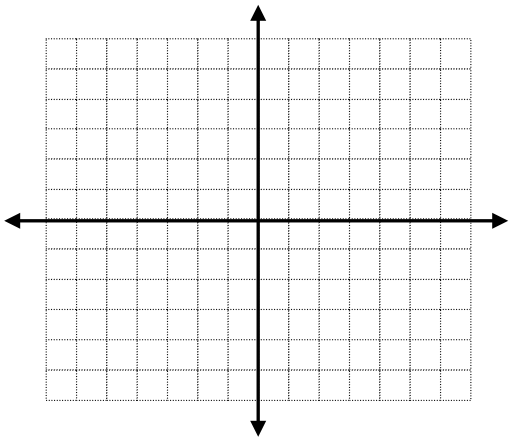
d. $f(x) = 2x^2 - 5$



e. $f(x) = \frac{1}{2}(x-2)^2$



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



LT 2 I can determine the appropriate domain and range of a quadratic equation or event.
LT 3 I can identify the minimum or maximum and zeros of a function with a calculator.
LT 4 I can apply quadratic functions to model real-life situations, including quadratic regression models from data.

5. The cross section of a hill can be modeled by $h(x) = -0.0025x^2 + 1.25x$ where h(x) is the height and *x* is the distance in feet. Graph the function on your calculator. What can give you a clue about the window settings? (*the x-intercepts , y-intercept and the vertex!*)

x-min: _____ to x-max: _____ y-min:_____ to y-max:_____

How wide is the hill? (from the start, over the peak, and down the other side) _____

What is the maximum height of the hill? _____

6. The number of dolls a toy company sells can be modeled by $-4p + 80$, where p is the price of a doll. What price will maximize revenue? What is the maximum revenue?

R(x) = _____

Max of _____ at _____

7. The equation $h = 40t - 16t^2$ describes the height h, in feet, of a ball that is thrown straight up as a function of the time t, in seconds, that the ball has been in the air.

At what time does the ball reach its maximum height?

What is the maximum height?

8. Find the minimum value of the function $f(x) = x^2 + 6x - 1$.

LT 8. I can rewrite quadratic equations from standard to vertex and vice versa.

9. Write the following quadratics in standard form.

a. $y = (x+3)^2 + 2$ b. $y = -(2x-1)^2 + 5$

LT 8. I can rewrite quadratic equations from standard to vertex and vice versa.
LT 11. I can write quadratic equations in vertex form by completing the square.

10. Write the following quadratics in vertex form. (Use completing the square for LT 11)

a. $y = x^2 + 2x + 10$ b. $y = -3x^2 + 12x - 5$

LT 9. I can write quadratic equations given a graph or given a vertex and a point (without a calculator).

11. Find the equation of the parabola in vertex form having a vertex of (2, 4) and a y-intercept of (0, 2).

LT 10. I can write quadratic expressions/functions/equations given the roots/zeros/x-intercepts/solutions.

12. Write an equation in standard form that has the given zeros:

a) 5, -1/2 b) $\mathbf{4\sqrt{3}, -4\sqrt{3}}$ c) 2i, -2i

13. Write an equation in vertex form that has the given zeros:

a) 7, 3/2 b) $\mathbf{5\sqrt{2}, -5\sqrt{2}}$ c) 6i, -6i

Unit 2-2 CP Algebra 2 Name _____ Pd _____

LT 1,2,3,4,7,8,9,11*12 (if no calc)

LT 1 I can identify a function as quadratic given a table, equation, or graph.
LT 2 I can determine the appropriate domain and range of a quadratic equation or event.
LT 3 I can identify the minimum or maximum and zeros of a function with a calculator.
LT 4 I can apply quadratic functions to model real-life situations, including quadratic regression models from data.
LT 4R. I can apply quadratics functions to real life situations without using the graphing calculator.

---

1. A parabola contains the points (10, 66), (3, 24), (-1, 44).

Find the equation with the regression capabilities of your calculator.

The equation is y = _____

Estimate the of the function at x = 8.

Estimate the value of x when the function equals 50.

2. The income from ticket sales for a concert is modeled by the function $I(p) = -70p^2 + 3500p$ here *p* is the price of a ticket.
First, do part a and b without the graphing capabilities of your calculator.

a. Calculate the maximum value of the function. (In other words, how high does the income go?)

b. What price should be charged in order to attain the maximum income?

Confirm your answers to a and b by using the graph in your calculator, along with a CALC menu option. What are your window settings?

x-min: _____ to x-max: _____ y-min:_____ to y-max:_____

3. A pair of numbers has a sum of 24. Find their maximum product.

4. **A rectangle has a perimeter of 60 inches. What dimensions would maximize the area?**

5. **A rectangle has the dimensions** (w) and $(170-2w)$ **in feet. What width will maximize the area? What is the maximum area?**

6. **A company knows that –2*p* +1500 models the number of wheelbarrows it sells per month, where *p* is the price of a wheelbarrow. Revenue from sales is the _____ times the _____.**
   What price will maximize revenue? What is the maximum revenue?

7. **The cross section of a hill can be modeled by** $h(x) = -0.0018x^2 + 1.44x$ **where h(x) is the height and x is the distance in feet. Graph the function on your calculator. What can give you a clue about the window settings? (*the y-intercept and the vertex!*)**

   x-min: _____ to x-max: _____ y-min:_____ to y-max:_____

   How wide is the hill? _____ How high is the hill? _____

8. From the Practice 5-2 worksheet:

19. The path of a baseball after it has been hit is modeled by the function $h = -0.0032d^2 + d + 3$, where h is the height in feet of the baseball and d is the distance in feet the baseball is from home plate. What is the maximum height reached by the baseball? How far is the baseball from home plate when it reaches its maximum height?

a. Do this problem without the graph in your calculator, and show each step in the process.

b. Now do the problem with the graph in your calculator. Include your window settings, and briefly explain what to do in the calculator to find your answers.

x-min: _____ to x-max: _____ y-min:_____ to y-max:_____

c. Also, using the graph, how far is the baseball from home plate when it lands on the ground, to the nearest tenth? What CALC menu option must you use?

LT 9. I can write quadratic equations given a graph or given a vertex and a point (without a calculator).

9. Find the equation of the parabola in vertex form having a vertex of (3, 4) and a point (–1,–4). Do this algebraically – show your work.

LT 7. I can identify key characteristics of quadratic functions including axis of symmetry, vertex, min/max, y-intercept, x-intercepts, domain and range.

10. Fill in the table:

	$y = \frac{1}{3}x^2 + 2x + 3$	$y = -2(x+5)^2 + 30$
Axis of symmetry		
Vertex		
Min/max value		
y-intercept		

LT 8. I can rewrite quadratic equations from standard to vertex and vice versa.
LT 11. I can write quadratic equations in vertex form by completing the square.

---

11. Convert equation to vertex form or standard form as appropriate. (use completing the square for LT11)

4b. $y=3x^2 = 12x + 17$

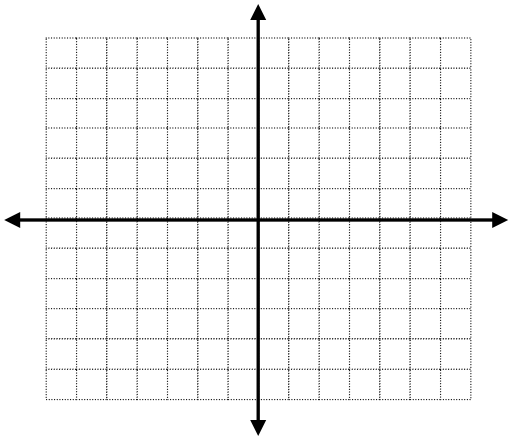
5a. $y = -\frac{1}{2}(x-4)^2 + 10$

Review for Unit 2-2 **Name**_____
LT 2,3,4,5,6,7,8,11

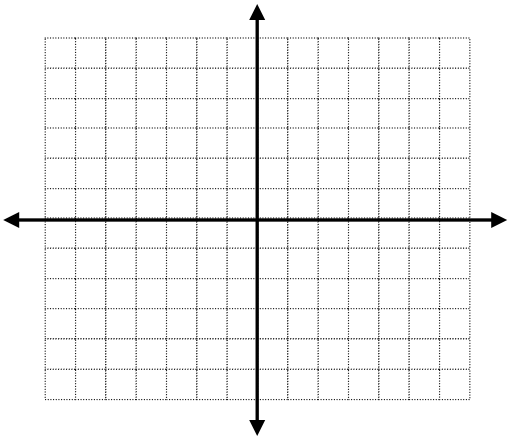
LT 6. I can graph quadratic functions in vertex form (using basic transformations).

1. Graph the following. Show 5 plotted points.

a. $y = -2x^2 + 3$



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



LT 7. I can identify key characteristics of quadratic functions including axis of symmetry, vertex, min/max, y-intercept, x-intercepts, domain and range.

2. Given $f(x) = -2x^2 - 8x - 5$**, find:**

the axis of symmetry: _____

the vertex: _____

the maximum value of the function: _____

the y-intercept: _____

domain: _____ **range** _____

x-intercepts:_____

LT 8. I can rewrite quadratic equations from standard to vertex and vice versa.

3. What is the standard form for a quadratic equation? $y =$ _____

4. What is the vertex form of a quadratic equation? $y =$ _____

LT 11. I can write quadratic equations in vertex form by completing the square.

Use completing the square to rewrite the function into vertex form

5) $f(x) = -2x^2 + 12x - 11$ **6)** $2x^2 + 10x - 3 = y$

Rewrite the function in vertex form by completing the square. Show all of the steps. Verify that your answer is correct by graphing your answer together with the original equation – do you get the same graph?

7. $f(x) = x^2 + 6x - 22$ **8 .** $f(x) = 5x^2 + 60x - 8$

LT 2 I can determine the appropriate domain and range of a quadratic equation or event.
LT 3 I can identify the minimum or maximum and zeros of a function with a calculator.
LT 4 I can apply quadratic functions to model real-life situations, including quadratic regression models from data.

9. Find the approximate real roots (or real zeros) of the following quadratic equation, rounded to the nearest hundredth.

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

a) no real roots **b) -1.75, 1.15** **c) 1.08, -1.85** **d) 1.12, -1.79**

10. Find the zeros using the graphing calculator. (Round to 2 decimal places) $2x^2 - 3x - 1 = y$

x = _____

11. A ball is thrown from the top of a building and follows the path given by $h(d) = -0.05d^2 + 1.25d + 36.1875$ **where *d* is the distance on the ground in yards and *h(d)* is the height in yards.**

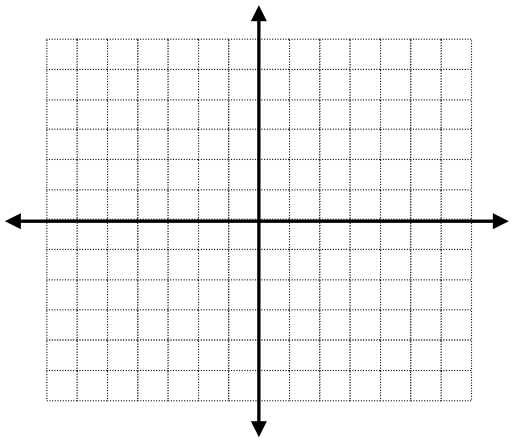
a. Does the ball will ever reach a height of 60 yards? If so, at what distance?

b. Using any method of your choice, find the maximum height of the ball.

c. Using any method of your choice, find the distance (to the nearest whole yard) the ball is thrown when it hits the ground.

LT 5. I can graph quadratic functions in standard form (using properties of quadratics).
LT 7. I can identify key characteristics of quadratic functions including axis of symmetry, vertex, min/max, y-intercept, x-intercepts, domain and range.

12. Graph the parabola $y = x^2 - 4x - 5$



Opens?

Vertex _____

Min/max of _____ at _____

Equation of AOS _____

Domain:_____

Range: _____

x-intercept(s) _____ y-intercept _____

CPA2 Unit 2-2 **Name _____ Pd _____**

LT 4R. I can apply quadratics functions to real life situations without using the graphing calculator.

1. Among all pairs of numbers whose difference is 16, find a pair whose product is as small as possible. What the numbers and what is the minimum product?

2. You have 600 feet of fencing to enclose a rectangular plot that borders on a river. If you do not fence the side along the river, find the length and width of the plot that will maximize the area. What is the largest area that can be enclosed?

Answers:

1. 8 and –8, –64

2. 150ft by 300ft, 45000 sqft

Unit 2-1 LT 12. I can use the discriminant to determine the number and type of solutions.

CP Algebra 2 Discriminant Name _____

Fill in the chart:

Equation	Standard Form	Discriminant	Number and type of Solutions/Roots
1. $6x^2 + 3x + 4 = 0$			
2. $x^2 = -6x - 9$			
3. $3x^2 – 6 = -5x$			
4. $2x^2 – x = -4$			

PRACTICE 5-8

Evaluate the discriminant of each equation. Tell how many solutions each equation has and whether the solutions are real or imaginary.

1 $y = x^2 + 10x - 25$

2. $y = x^2 + 10x + 10$

3. $y = 9x^2 - 24x$

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

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

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

7. $y = x^2 + 3x + 4$

8. $y = x^2 + 7x - 3$

9. $y = -2x^2 + 3x - 5$

10. $y = x^2 - 5x + 4$

11. $y = x^2 + 12x + 36$

12. $y = x^2 + 2x + 3$

13. $y = 2x^2 - 13x - 7$

14. $y = -5x^2 + 6x - 4$

15. $y = -4x^2 - 4x - 1$

ANSWERS:

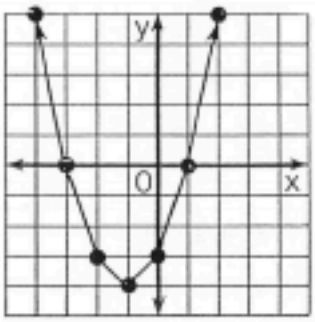
Practice 5-8

1. 200; 2 real **2.** 60; 2 real **3.** 576; 2 real **4.** 0; 1 real
5. 9; 2 real **6.** −7; 2 imaginary **7.** −7; 2 imaginary
8. 61; 2 real **9.** −31; 2 imaginary **10.** 9; 2 real **11.** 0; 1 real
12. −8; 2 imaginary **13.** 225; 2 real **14.** −44; 2 imaginary

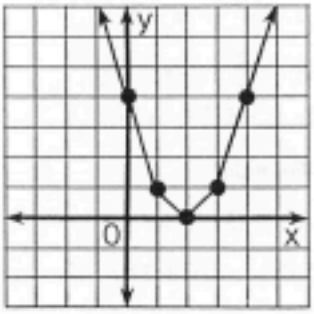
Unit 2-1 LT 12 - D55 Discriminant and Number of Solutions “Soil Erosion”

How Can You Help Control Soil Erosion?

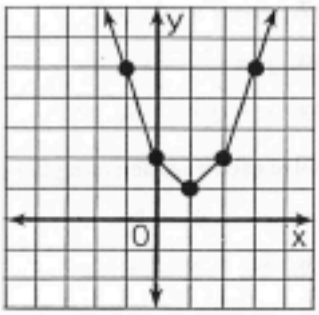
Use the related graph or the discriminant of each equation to determine how many real number solutions it has. Circle the letter of the correct choice and write this letter in the box containing the exercise number.



(1) $x^2 + 2x - 3 = 0$
(D) two solutions
(E) one solution
(M) no solutions



(2) $x^2 - 4x + 4 = 0$
(C) two solutions
(A) one solution
(W) no solutions



(3) $x^2 - 2x + 2 = 0$
(H) two solutions
(D) one solution
(O) no solutions

	two solutions	one solution	no solutions
(4) $x^2 + 5x + 4 = 0$	K	B	G
(5) $x^2 - 3x = 2$	U	O	A
(6) $y^2 + 10y + 25 = 0$	V	A	I
(7) $2x^2 = 4x - 3$	F	C	H
(8) $4x^2 + 9 = 12x$	S	P	N
(9) $-3n^2 + 5n - 2 = 0$	N	R	S
(10) $\frac{1}{2}x^2 + 3x + 8 = 0$	R	P	L
(11) $\frac{1}{3}t^2 + 3 = 2t$	Y	B	T

7	3	10	1	5	8	2	11	6	9	4

OBJECTIVE 4–f: To use the related graph or the discriminant of a quadratic equation to determine how many real-number solutions it has.

D–55

CPA2 Name_____ ID: 1

Practice Assignment Date_____ Period____

LT 12: I can use the discriminant to determine the number and type of solutions.

1) $3k^2 + 8k - 5 = -10$

2) $-6n^2 + 5n + 4 = 5$

3) $7r^2 - 3r - 5 = -9$

4) $6r^2 + 10r = 4$

5) $-x^2 - 2x - 8 = -7$

6) $8r^2 - 8r + 10 = 8$

7) $-6m^2 + 3m + 3 = 9$

8) $-3m^2 - m - 6 = -10$

9) $5n^2 + n - 4 = -6$

10) $-6n^2 + 9n - 14 = -5n$

11) $7x^2 + 3x - 2 = 9x^2$

12) $16v^2 + 10 = 6 + 12v^2 - 8v$

13) $4k^2 - 14 = -14 + 10k$

14) $4x^2 - 7 = -12 - 4x$

15) $3n^2 - 2n - 8 = -3$

16) $-6v^2 - 16v - 5 = -13v$