Aim: How can we rewrite quadratic expressions given in standard form $ax^2 + bx + c$ (a=1) in the equivalent completed square form, $a(x-h)^2 + k$ (This lesson is combined with topic #11 – see Syllabus)

Do Now:

Use the information provided to write the vertex form equation of each parabola.

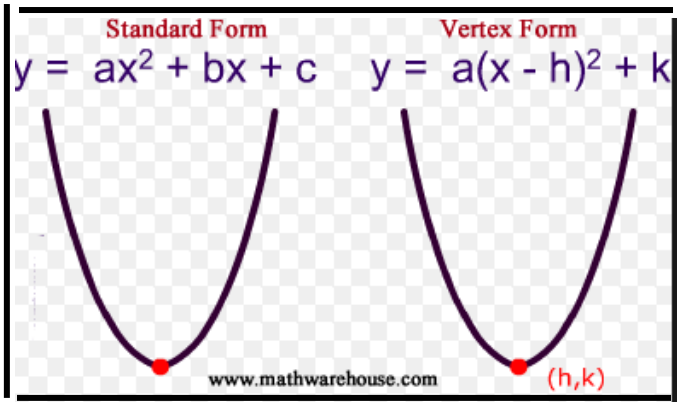
1) $y = x^2 + 16x + 71$

2) $y = x^2 - 2x - 5$

I – Vertex Form

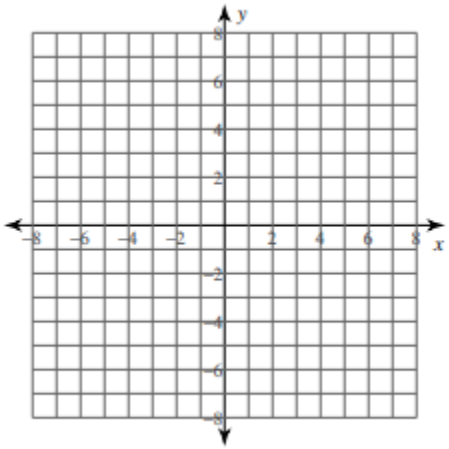
1) Vertex Form: $y = a(x - h)^2 + k$

2) You can change an equation from Standard form into Vertex Form



3) Use the Calculator to sketch the following parabola: a) $f(x) = -3(x-2)^2 - 4$

Find the axis of symmetry and its vertex



Aim: How can we rewrite quadratic expressions given in standard form $ax^2 + bx + c$ (a=1) in the equivalent completed square form, $a(x-h)^2 + k$ (This lesson is combined with topic #11 – see Syllabus)

b) $f(x) = -\frac{1}{4}(x-1)^2 + 4$

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

II – How to transform a quadratic equation in Standard Form into a Vertex Form? (Completing Square and Axis of Symmetry Method)

1)

Standard Form	Vertex Form
$y = ax^2 + bx + c$	$y = a(x - h)^2 + k$

2) Write the quadratic equation whose vertex is Vertex = (4 , - 9) ?

3) Write the quadratic equation whose vertex is Vertex = (- 1 , - 1)?

4) Transform into Vertex Form: $y = -x^2 - 14x - 59$

5) Transform into Vertex Form: $y = 2x^2 + 36x + 170$

6) Transform into Vertex Form: $y = x^2 - 12x + 46$

Aim: How can we rewrite quadratic expressions given in standard form $ax^2 + bx + c$ (a=1) in the equivalent completed square form, $a(x-h)^2 + k$ (This lesson is combined with topic #11 – see Syllabus)

Homework # 8

Name _____

Worksheet Graphing Quadratics from Vertex Form

Find the vertex, axis of symmetry, x-intercepts, y-intercept, value of the max/min, domain, and range of the following quadratics and then graph the parabola.

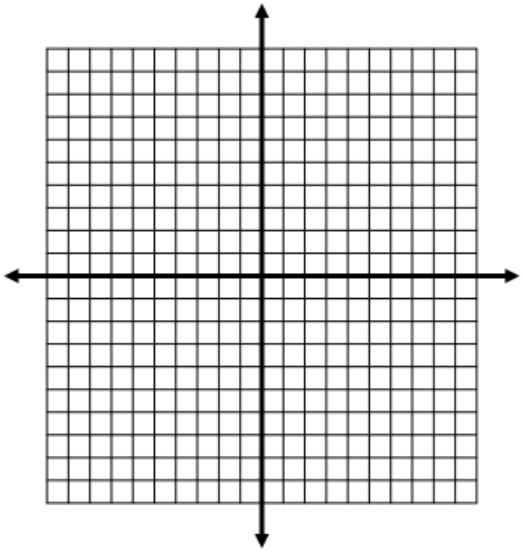
1. $f(x) = (x-4)^2 - 1$

vertex _____ axis _____

x-int _____ y-int _____

max/min _____

domain _____ range _____



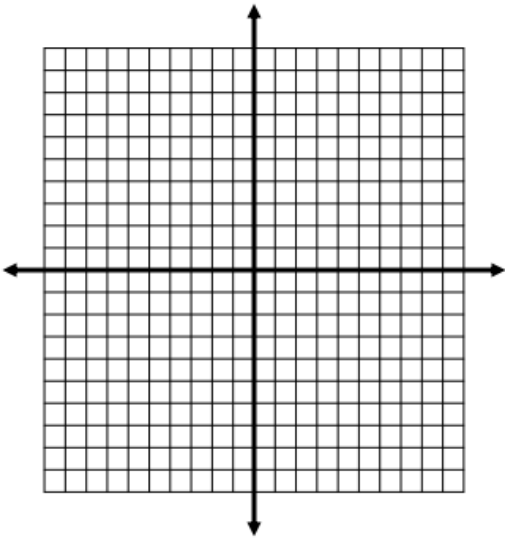
2. $f(x) = (x+2)^2 + 3$

vertex _____ axis _____

x-int _____ y-int _____

max/min _____

domain _____ range _____



Aim: How can we rewrite quadratic expressions given in standard form $ax^2 + bx + c$ (a=1) in the equivalent completed square form, $a(x-h)^2 + k$ (This lesson is combined with topic #11 – see Syllabus)

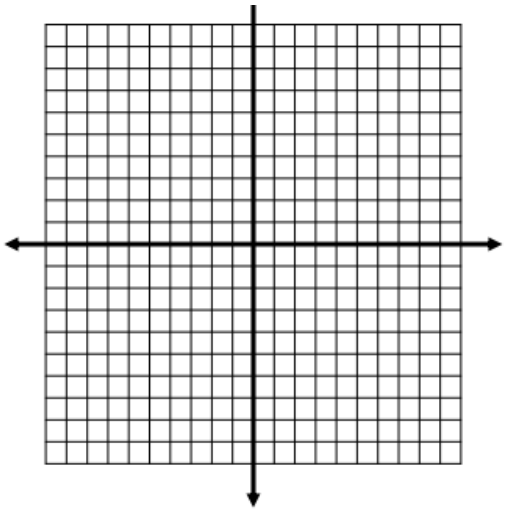
3. $f(x) = -2(x-1)^2 + 3$

vertex _____ axis _____

x-int _____ y-int _____

max/min _____ value _____

domain _____ range _____



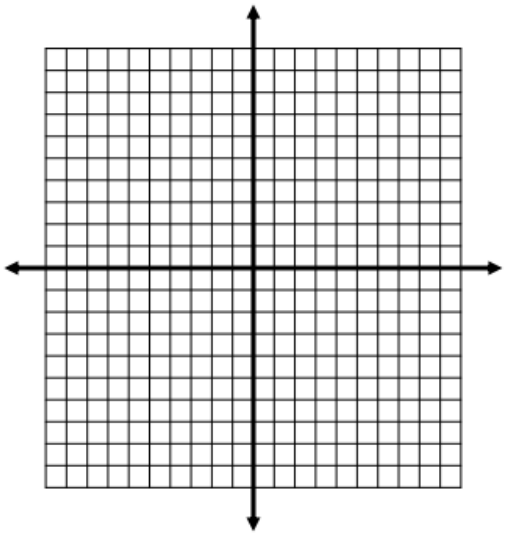
4. $f(x) = \frac{1}{2}(x+3)^2 - 2$

vertex _____ axis _____

x-int _____ y-int _____

max/min _____

domain _____ range _____



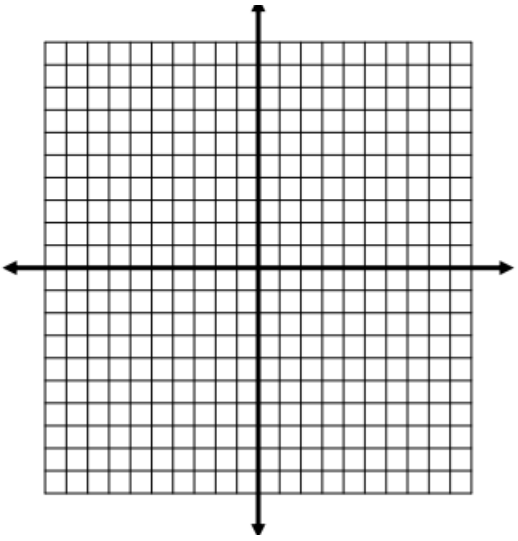
5. $f(x) = x^2 + 3$

vertex _____ axis _____

x-int _____ y-int _____

max/min _____

domain _____ range _____



Aim: How can we rewrite quadratic expressions given in standard form $ax^2 + bx + c$ (a=1) in the equivalent completed square form, $a(x-h)^2 + k$ (This lesson is combined with topic #11 – see Syllabus)

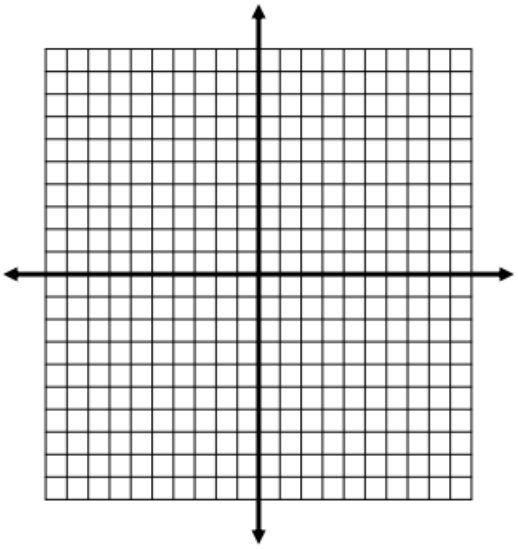
6. $y - 1 = (x - 3)^2$

vertex _____ axis _____

x-int _____ y-int _____

max/min _____

domain _____ range _____



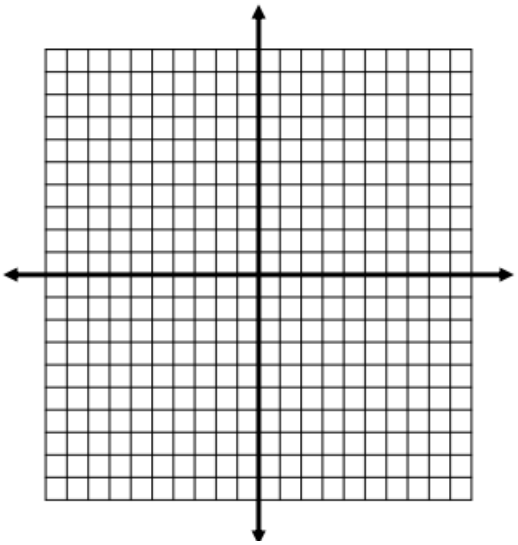
7. $f(x) = x^2 - 9$

vertex _____ axis _____

x-int _____ y-int _____

max/min _____

domain _____ range _____



Aim: How can we rewrite quadratic expressions given in standard form $ax^2 + bx + c$ (a=1) in the equivalent completed square form, $a(x-h)^2 + k$ (This lesson is combined with topic #11 – see Syllabus)

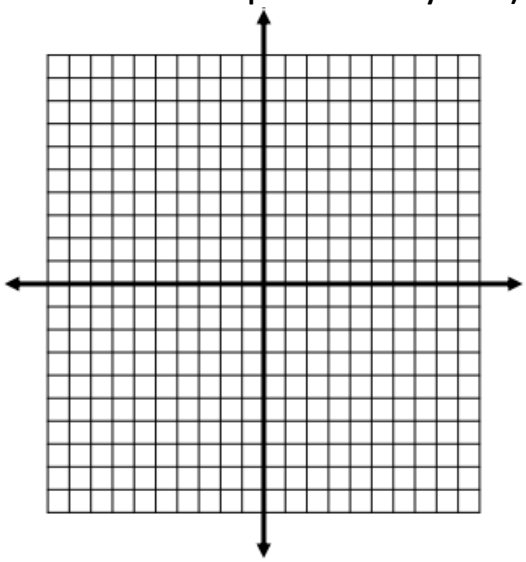
8. $y - 3 = -(x-2)^2$

vertex _____ axis _____

x-int _____ y-int _____

max/min _____

domain _____ range _____



Put the following quadratic equations in vertex form

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

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

11. $f(x) = x^2 - 8x - 20$

12. $f(x) = 4x^2 - 4x + 21$

13. $f(x) = 2x^2 + 16x + 29$

14. $f(x) = -3x^2 + 6x - 5$

Aim: How can we rewrite quadratic expressions given in standard form $ax^2 + bx + c$ (a=1) in the equivalent completed square form, $a(x-h)^2 + k$ (This lesson is combined with topic #11 – see Syllabus)

Write the vertex form of the equation of the parabola that has the indicated vertex and whose graph passes through the given point

15. Vertex: $(-2, 5)$; point: $(0, 9)$

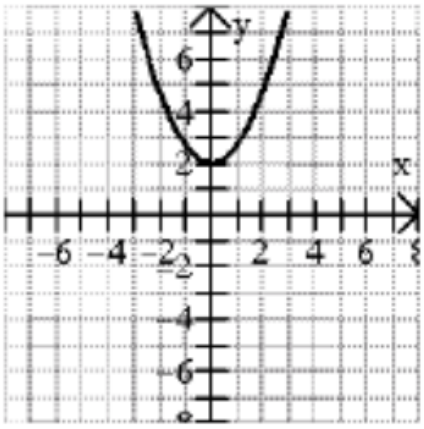
16. Vertex: $(4, -1)$; point: $(2, 3)$

17. Vertex: $(3, 4)$; point: $(1, 2)$

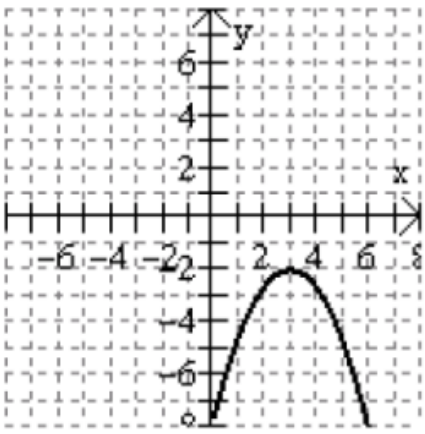
18. Vertex: $(-2, -2)$; point: $(-1, 0)$

Write the equation of the quadratic in vertex form from the graph below

19. _____



20. _____



Aim: How can we rewrite quadratic expressions given in standard form $ax^2 + bx + c$ (a=1) in the equivalent completed square form, $a(x-h)^2 + k$ (This lesson is combined with topic #11 – see Syllabus)

Answers to Homework # 8

Please select the correct answers number for each question. There are more answers than questions. Answers may be repeated.

1) $Y= 4 (x-0.5)^2 + 20$

2) $Y=- (x-3)^2 – 2$

3) $Y= (x+1)^2$

4) Vertex (-2,3), x-int none, min, all real numbers, axis x=-2, y-int 7, range $y \geq 3$

5) Vertex (2,3), x-int 0.26 and 3.73, max, all real numbers, axis x=2, y-int -1, range $y \leq 3$

6) $Y = -3 (x-1)^2 – 2$

7) $Y = (x – 0.5)^2 + 1$

8) $Y = x^2 + 2$

9) $Y = (x + 2)^2 + 5$

10) $Y= 2 (x+2)^2 – 2$

11) $Y = (x-4)^2 – 36$

12) $Y = 2 (x+4)^2 – 3$

13) Vertex (0,-9), x-int -3 and 3, min, all real numbers, axis x = 0, y-int -9, range $y \geq -9$

14) Vertex (1,3), x-int -0.22 and 2.22, max, all real numbers, axis x = 1, y-int 1, range $y \leq 3$

15) Vertex (4,-1), x-int 3 and 5, min, all real numbers, axis x=4, y-int 15, range $y \geq -1$

16) Vertex (3,1), x-int none, min, all real numbers, axis x=3, y-int 10, range $y \geq 1$

17) $Y= -1/2 (x-3)^2 + 4$

18) Vertex (0,3), x-int none, min, all real numbers, axis x = 0, y-int 3, range $y \geq 3$

19) $Y = (x-4)^2 – 1$

20) $Y = (x-4)^2$

21) Vertex (-3,-2), x-int -5 and -1 , min, all real numbers, axis x =-3, y-int 2.5, range $y \geq -2$