Honors Math II
Graphing/ Quadratic Equations

Name Key
Period_____ Date_____

Factor the following quadratics.

1. $x^2 - 9$

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

2. $x^2 + 9$

$(x+3i)(x-3i)$

3. $x^2 - 5$

$(x+\sqrt{5})(x-\sqrt{5})$

4. $x^2 + 5$

$(x+\sqrt{5}\,i)(x-\sqrt{5}\,i)$

5. $x^2 + 20x + 64$

$(x+4)(x+16)$

6. $x^2 - 16x - 36$

$(x-18)(x+2)$

Solve for x by factoring.

7. $4x^2 + 8x = 0$

$4x(x+2)=0$

$4x=0$ or $x+2=0$

$x=0$ or $x=-2$

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

$-6x(x-1)=0$

$-6x=0$ or $x-1=0$

$x=0$ or $x=1$

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

$2x(x-3)=0$

$2x=0$ $x-3=0$

$x=0$ or $x=3$

10. $-2x^2 - 2x + 40 = 0$

$-2(x^2+x-20)=0$

$-2(x+5)(x-4)=0$

$x=-5$ or $x=4$

11. $-2x^2 + 17x - 21 = 0$

$-1(2x^2-17x+21)=0$

$-1(2x-3)(x-7)=0$

$2x-3=0$ or $x-7=0$

$x=3/2$ or $x=7$

12. $-3x^2 + 2x + 5 = 0$

$-1(3x^2-2x-5)=0$

$-1(3x-5)(x+1)=0$

$3x-5=0$ or $x+1=0$

$x=5/3$ or $x=-1$

Multiply the following binomials.

13. $-(2x+5)(x-7)$

$-(2x^2-14x+5x-35)$

$-2x^2+9x+35$

14. $-2(3x-4)(2x+1)$

$-2(6x^2+3x-8x-4)$

$-12x^2+10x+8$

15. $\frac{1}{2}(x-4)^2$

$\frac{1}{2}(x^2-8x+16)$

$\frac{1}{2}x^2-4x+8$

16. $3(x-5)(x+5)$

$3(x^2-25)$

$3x^2-75$

Solve for x by using the technique of taking the square root of both sides.

17. $6 = 2(x+1)^2 - 14$

$+14$ $+14$

$20 = 2(x+1)^2$

$10 = (x+1)^2$

$\pm\sqrt{10} = x+1$

$x = -1 \pm \sqrt{10}$

18. $0 = -3(x-2)^2 + 15$

-15 -15

$-15 = -3(x-2)^2$

$5 = (x-2)^2$

$\pm\sqrt{5} = x-2$

$2 \pm \sqrt{5} = x$

19. A quadratic equation has an axis of symmetry of $x = -4$. Name the x-intercepts if they are 4 units from the axis of symmetry.

(0,0) (-8,0)

20. A quadratic equation has an axis of symmetry of $x = -7$ and an x-intercept of (-2, 0). What is the other x-intercept? (-12,0)

21. A quadratic equation has an axis of symmetry of $x = 5$ and the x-intercepts are 4 units from the axis of symmetry.

A) Name the 2 possible points for a vertex given that the graph follows the standard rate of change. (5,16) (5,-16)

B) Name the 2 possible points for a vertex given that the graph has a vertical stretch by a factor of 2. (5,32) (5,-32)

For questions 22-23, write the quadratic equation that represents the given data in:

A) Vertex Form

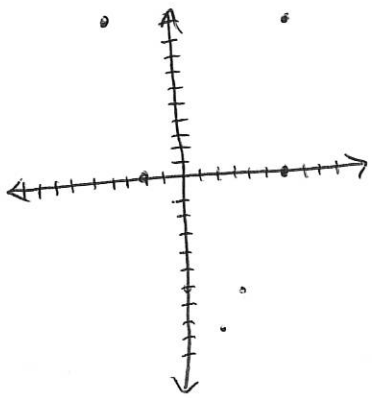
B) Intercept Form

C) Standard Form

22.

$a = \frac{1}{2}$

x	y	
-4	10	
-2	0	x-intercept
0	-6	
2	-8	vertex
4	-6	
6	0	x-intercept
8	10	



a) $y = \frac{1}{2}(x-2)^2 - 8$

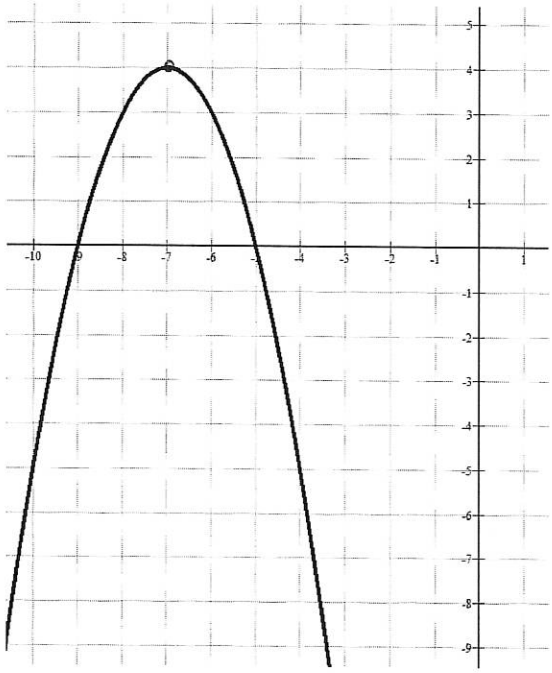
b) $y = \frac{1}{2}(x+2)(x-6)$

c) $y = \frac{1}{2}(x^2 - 6x + 2x - 12)$

$y = \frac{1}{2}(x^2 - 4x - 12)$

$y = \frac{1}{2}x^2 - 2x - 6$

23.



$a = -1$

a) $y = -(x+7)^2 + 4$

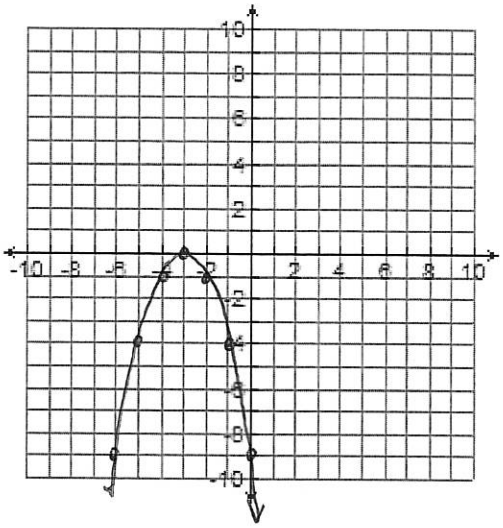
b) $y = -(x+9)(x+5)$

c) $y = -(x^2 + 5x + 9x + 45)$

$y = -x^2 - 14x - 45$

Questions 24-28: Graph the given quadratic equations and write the equation in Vertex form, Intercept form, and Standard form.

24. $f(x) = -x^2 - 6x - 9$



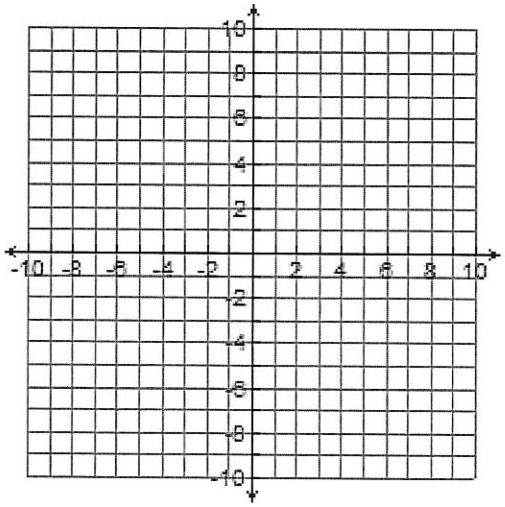
$y = -1(x^2 + 6x + 9)$

$y = -1(x+3)(x+3)$ intercept form

$y = -1(x+3)^2$ vertex form

$y = -x^2 - 6x - 9$ standard form

25. $f(x) = 2(x+1)^2 - 18$



$f(x) = 2(x+1)^2 - 18$ vertex form

$y = 2(x+1)(x+1) - 18$

$y = 2(x^2 + 2x + 1) - 18$

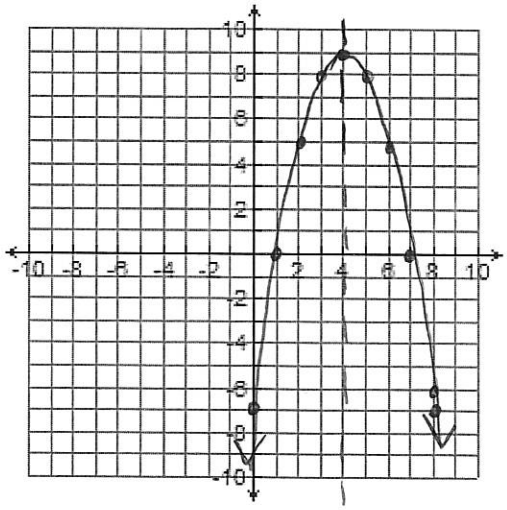
$y = 2x^2 + 4x + 2 - 18$

$y = 2x^2 + 4x - 16$ standard form

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

$y = 2(x+4)(x-2)$ intercept form

26. $f(x) = -(x-1)(x-7)$



$y = -(x-1)(x-7)$ intercept form

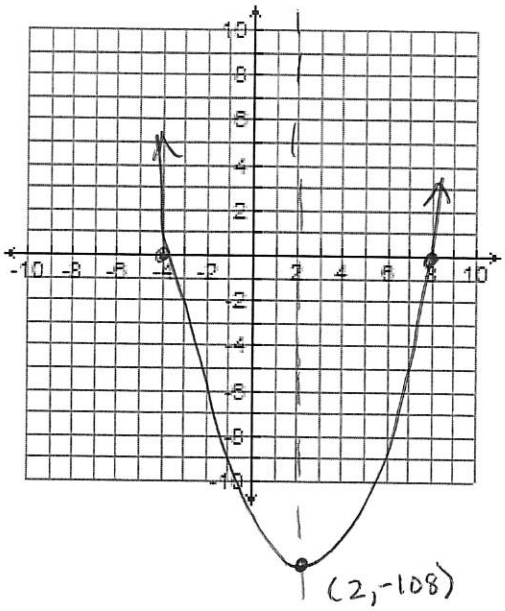
$y = -(x^2 - 8x + 7)$

$y = -x^2 + 8x - 7$ standard form

v: $(4, 9)$

$y = -(x-4)^2 + 9$ vertex form

27. $f(x) = 3(x-2)^2 - 108$



$f(x) = 3(x-2)^2 - 108$ vertex form

$y = 3(x-2)(x-2) - 108$

$y = 3(x^2 - 4x + 4) - 108$

$y = 3x^2 - 12x + 12 - 108$

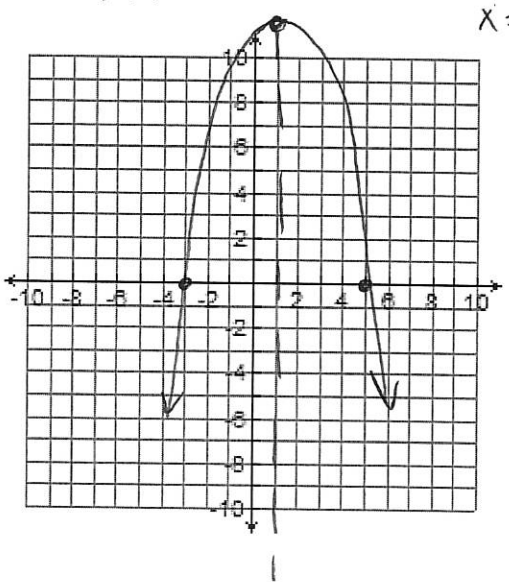
$y = 3x^2 - 12x - 96$ standard form

$y = 3(x^2 - 4x - 32)$

$y = 3(x-8)(x+4)$ intercept form

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

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



$f(x) = -x^2 + 2x + 15$ standard form

V: $(1, 16)$

$f(x) = -(x-1)^2 + 16$ vertex form

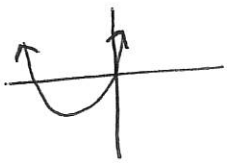
$y = -x^2 + 2x + 15$

$y = -1(x^2 - 2x - 15)$

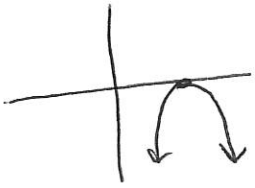
$y = -1(x-5)(x+3)$ intercept form

29. What are the possible number of zeros that a quadratic equation could have? Make a sketch of each scenario.

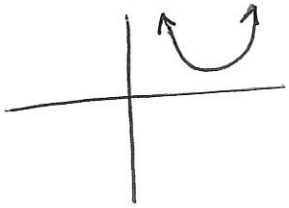
2 zeros



1 zero



0 zeros



30. Explain why the axis of symmetry is useful when writing and graphing quadratic equations.

axis of symmetry is the x-value of the vertex

You can use this to find the y-value of the vertex