Honors Algebra 2 Name_____

WS: Factor GCFs, Trinomials, and Difference of Squares

1. $5a^2 - 15$ 2. $2y + 6xy$ 3. $36xy^2 - 48x^2y$ 4. $75b^2c^3 + 60bc^6$

5. $81r + 48rs$ 6. $10q - 25q^2$ 7. $82e^3 - 122ef$ 8. $6z^4 - 18z^3$

9. $l^2 - 9l$ 10. $20p^2 - 16p^2q^2$ 11. $9c^4d^3 - 6c^2d^4$

12. $6e^3f - 11ef$ 13. $34x^4y^3 - 17x^2y^5$ 14. $35m^3n + 105m^2n^3$

15. $x^2 + 7x + 12$ 16. $x^2 - 13x + 40$ 17. $a^2 + 11ab + 18b^2$

18. $y^2 - 7xy - 18x^2$ 19. $m^2 - mn - 90n^2$ 20. $c^2 - 19cd + 34d^2$

Hint: On these, you'll have to factor twice to completely factor.

21. $2x^2+4x-96$ 22. $-x^2-12x-36$ 23. $3x^3-69x^2+180x$

24. $-5x^8-40x^7-60x^6$ 25. $4x^2y+8xy-96y^2$ 26. $-x^2+23xy+50y^2$

Tip: Now use ac method or difference of squares. Always look for a GCF first!

27. $2x^2+x-6$ 28. $4g^2-81h^2$ 29. $3x^2-2x-1$ 30. $8n^2-72p^2$

31. $16c^4-81$ 32. $5x^2-24x+27$ 33. $3a^2+11ab+10b^2$ 34. $25v^5x-9v^3x$

35. $10x^3-25x^2+10x$ 36. $-6x^2y-8xy-2y$ 37. $9t^6m^4-196t^8m^4$

38. $3e^2+5ef-12f^2$ 39. $75x^2-147y^2$ 40. $-15x^2-14x+8$

Solve these polynomial equations by completely factoring.

41. $6x^2 + 21x = 0$

42. $9x^2 - 5x = 8x^2 + 3x$

43. $9x^2 - 25 = 0$

44. $x^2 + 4x - 60 = 0$

45. $7x^2 + 3 = 3x^2 + 39$

46. $x^2 + 4x + 5 = 23 - 3x$

47. $x^2 + 6x + 3 = 8x + 2$

48. $3x(2x - 7) + 14(2x - 7) = 0$

49. $25x^2 + 30 = 60x - 6$

50. $(x + 6)(x - 3) = 5x + 30$

51. $6x^2 + 75x + 11 = 20 + 4x - 2x^2$

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Worksheet: Simplify square roots & imaginary numbers

Simplify each expression. Use perfect square factors to help you. No decimals!

1. $\sqrt{76}$

2. $\sqrt{90}$

3. $\sqrt{48}$

4. $2\sqrt{75}$

5. $-5\sqrt{576}$

6. $\frac{4\sqrt{45}}{3}$

7. $-\frac{\sqrt{72}}{18}$

8. $\sqrt{3}\cdot\sqrt{12}$

9. $\frac{\sqrt{128}}{\sqrt{2}}$

10. $5\sqrt{42}\cdot 2\sqrt{3}$

11. $\frac{4\sqrt{294}}{\sqrt{3}}$

12. $\frac{\sqrt{90}}{\sqrt{40}}$

13. $\frac{6}{\sqrt{5}}$

14. $\sqrt{\frac{1}{7}}$

15. $\frac{\sqrt{13}}{4\sqrt{6}}$

16. $\frac{\sqrt{5}}{\sqrt{12}}$

17. $\frac{-3\sqrt{15}}{\sqrt{3}}$

18. $\frac{\sqrt{375}}{\sqrt{100}}$

19. $\sqrt{\frac{5}{2}}$

20. $\frac{2\sqrt{243}}{3\sqrt{200}}$

Simplify the following complex numbers.

21. $\sqrt{-196}$

22. $\sqrt{-15}$

23. $\sqrt{-52}$

24. $\sqrt{\frac{-1}{3}}$

25. $\sqrt{\frac{-5}{121}}$

26. $2\sqrt{3}\cdot 5\sqrt{-3}$

27. $-11i(8i)$

28. $10\sqrt{-9}\cdot 2\sqrt{-7}$

29. $\frac{1}{\sqrt{-4}}$

30. $\frac{10}{5i}$

31. $\frac{8\pm\sqrt{-36}}{4}$

32. $\frac{-7\pm\sqrt{-42}}{14}$

33. $\frac{15\pm\sqrt{-2}}{5}$

34. $\frac{-10\pm\sqrt{-27}}{21}$

35. $\frac{28\pm\sqrt{-320}}{12}$

Honors Algebra 2 Name_____

Worksheet: More on Complex Numbers and Solve Quadratic Equations by taking square roots & with the quadratic formula

Simplify the following complex numbers.

1. $10(-8-2i)-4(-9+i)$ 2. $(3-5i)(9+11i)$ 3. $\left(2+5\sqrt{7i}\right)^2$

4. $\dfrac{5}{1-\sqrt{-9}}$ 5. $\dfrac{6i}{2+4i}$

Solve the following equations by taking square roots. Use fractions and radicals in your answers. No decimals.

6. $x^2=144$ 7. $x^2-8=0$ 8. $x^2+12=0$ 9. $3x^2=30$

10. $x^2+18=30$ 11. $2x^2+5=37$ 12. $5x^2+13=14$ 13. $3x^2-12=-20$

14. $(x-7)^2=81$ 15. $(x+6)^2=3$ 16. $3(x-4)^2-7=68$ 17. $\frac{1}{4}(x+1)^2+5=7$

18. $2(x-1)^2-11=-8$ 19. $\frac{1}{3}(x+4)^2+21=17$ 20. $3\left(\frac{1}{2}x-4\right)^2-17=58$

Solve the following equations with the quadratic formula.

21. $2x^2-6x-5=0$

22. $30x^2-24x+40=10x^2+36x-1$

23. $18x^2-96x+129=0$

24. $10x^2-20=x^2+30x-45$

25. $x^2 + 2x - 1 = -6x - 20$

26. $\frac{-2}{9}x^2 + 4x = 1$

27. A cannon ball is fired from a platform 10 feet above the ground with an initial velocity of 40 ft/sec. The equation that gives the height of the ball t seconds after it is fired is $h = -16t^2 + 40t + 10$. When will the ball hit the ground? Round your answer to 2 decimal places.

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Worksheet: Solve Quadratic Equations by completing the square & quadratic formula

Square each binomial to get a perfect square trinomial.

$(px+q)^2$	ax^2+bx+c	$(px+q)^2$	ax^2+bx+c	$(px+q)^2$	ax^2+bx+c
$(x+9)^2$		$(x-15)^2$		$(5x+2)^2$	
$(x-11)^2$		$(2x+7)^2$		$(8x-3)^2$	
$(x+6)^2$		$(3x-1)^2$		$5(x+4)^2$	

Rewrite each perfect square trinomial as the square of a binomial.

ax^2+bx+c	$(px+q)^2$	ax^2+bx+c	$(px+q)^2$	ax^2+bx+c	$(px+q)^2$
x^2+4x+4		$x^2-26x+169$		$4x^2+12x+9$	
$x^2-10x+25$		x^2+6x+9		$9x^2-6x+1$	
$x^2+14x+49$		x^2-2x+1		$64x^2+80x+25$	

Complete the square by adding a number in the first blank to form a perfect square trinomial. Finish by writing it as a squared binomial.

1. x^2+16x+ ____ = _____

2. x^2-20x+ ____ = _____

3. x^2-12x+ ____ = _____

4. x^2+50x+ ____ = _____

5. x^2+3x+ ____ = _____

6. x^2-5x+ ____ = _____

7. x^2-11x+ ____ = _____

8. $2(x^2+6x+$ ____$)$ = _____

9. $3(x^2-14x+$ ____$)$ = _____

10. $-(x^2+24x+$ ____$)$ = _____

Solve the equations by completing the square.

11. $x^2-14x=-45$

12. $x^2+6x=2$

13. $x^2-10x-2=0$

14. $4x^2 + 8x = -1$

15. $3x^2 - 10x + 129 = 2x^2 + 12x$

16. $3x^2 + 50x + 140 = 8x - 6$

17. $8x^2 - 4x + 17 = 7x^2 + 4$

18. $-x^2 - 12x = 31$

19. $\frac{1}{4}x^2 + 2x = -2$

20. $2x^2 - 12x + 13 = 1$

21. $3x^2 + 24x + 52 = 1$

22. $12x^2 + 3x = 11x^2 - 4x - 6$

Solve with the quadratic formula.

23. $2x^2 + 18x = 3x^2 + 8x + 17$

24. $600x^2 - 240x = 24x^2 - 25$

25. $\frac{1}{4}x^2 + \frac{1}{4}x + \frac{13}{8} = 0$

26. $28x^2 - 19x - 11 = 4x^2 + 19x$

27. Suppose you stand at the top of the bleachers 64 feet high and toss an egg upward at a rate of 20 ft/sec. The equation which models the height of the egg after t seconds has passed is $h = -16t^2 + 20t + 64$. When will the egg splat on the ground? Round your answer to 2 decimal places.

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Honors Algebra 2 Name_____

Worksheet: Graph quadratic functions in standard form

Directions: Do work on your own notebook paper and/or graph paper.

Find the vertex of the parabola. Then build a 3-point t-chart. Plot 5 points on the parabola using symmetry. Sketch the parabola. Remember to shade the inequalities.

1. $y = -x^2 + 9$
2. $y = x^2 - 2x + 1$
3. $y > -x^2 - 2x + 8$
4. $y \geq 3x^2 + 6x - 2$
5. $y < -2x^2 + 20x - 49$
6. $y = 2x^2 - 2x + 3$

Find the vertex of the parabola. Name the a-value. Use the vertex and a-value to sketch the parabola. Remember to shade the inequalities.

7. $y \leq -x^2 + 6x - 9$
8. $y = 2x^2 + 12x + 19$
9. $y = -3x^2 + 6x + 3$
10. $y < \frac{1}{2}x^2 - 5$
11. $y = -\frac{1}{3}x^2 + 4x - 9$
12. $y > \frac{1}{5}x^2 - 4x + 20$

Word problems!

13. A golfer attempts to hit a ball out of a 2-foot-deep sand trap at a rate of 30 ft/sec. What is the maximum height the ball reaches?

14. A football player kicked a 41-yard punt. The path of the ball was modeled by the equation $y = -0.035x^2 + 1.4x + 1$, where x represents the ball's horizontal distance from the football player and y represents the ball's vertical distance above the ground, both x and y measured in yards.
    a) What is the maximum height of the ball?
    b) The player kicked the football toward midfield from the 18-yard line. Over which yard line was the ball when it was at its max height?

15. From 1980 through 1995, the annual sales, S (in thousands of dollars), of a photography studio can be modeled by $S = \frac{-1}{8}t^2 + 3t + 42$, where $t = 0$ represents 1980. During what year were annual sales maximized?

16. You are running a little business selling appliques for water bottles. Your cost, C, to produce x appliques is given by the equation $C = 2.5x^2 - 625x + 39214$. How many appliques should you produce to minimize your cost? What is the minimum cost?

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Worksheet: Graph quadratic functions in vertex and factored forms

Directions: Do work on your own notebook paper and/or graph paper.

Name the vertex of the parabola. Then build a 3-point t-chart. Plot 5 points on the parabola using symmetry. Sketch the parabola. Remember to shade the inequalities.

1. $y = 2x^2 + 1$
2. $y = (x-4)^2 - 1$
3. $y > -(x+2)^2 + 8$
4. $y \geq 3(x+1)^2 - 2$
5. $y < -2(x-7)^2$
6. $y = \frac{1}{3}(x-6)^2 - 2$

Name the vertex of the parabola. Name the a-value. Use the vertex and a-value to sketch the parabola. Remember to shade the inequalities.

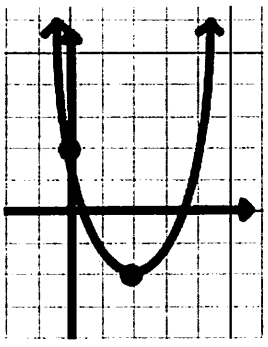
7. $y \leq -(x-1)^2 + 6$
8. $y = 2(x+5)^2 - 4$
9. $y = -3x^2 + 10$
10. $y < \frac{1}{4}x^2 - 3$
11. $y = -\frac{1}{3}(x+9)^2$
12. $y > \frac{1}{5}(x-10)^2 - 1$

Name the x-intercepts of the parabola. Then find the vertex. Use the vertex and roots to sketch the parabola. Remember to shade the inequalities.

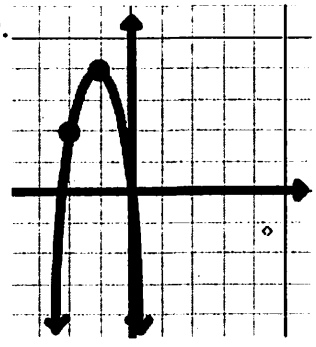
13. $y = (x+5)(x-7)$
14. $y = 2(x+6)(x+2)$
15. $y = -(x-3)(x-11)$
16. $y = -3(x+1)(x-3)$
17. $y = \frac{2}{5}(x-10)(x+8)$
18. $y = (2x-5)(2x+3)$

Set up the equation for each parabola in vertex form. Put your final answer in standard form.

19.



20.



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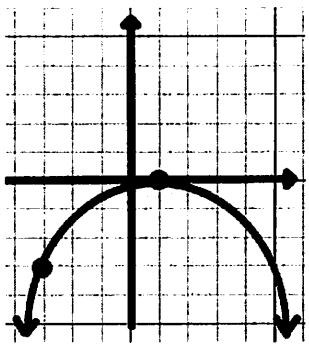


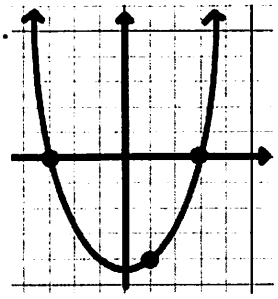
Sketch the parabola first. Then set up the equation for each parabola in vertex form.

22. vertex: $(2,-1)$
point: $(4,3)$

23. vertex: $(-1,-6)$
point: $(1,-8)$

Set up the equation for each parabola in factored form. Put your final answer in standard form.

24.



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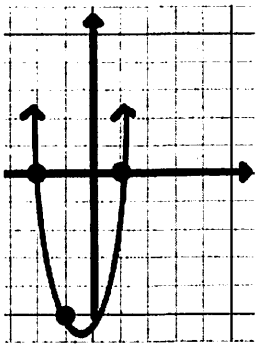

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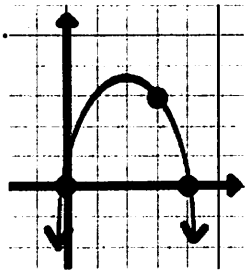

Sketch the parabola first. Then set up the equation for each parabola in factored form.

27. x-intercepts: 1, 4
point: (3,2)

28. x-intercepts: -5, 0
point: (-3,18)

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Worksheet: Review graphing quadratic functions, Find intercepts

$y = 2x^2 - 16x + 20$	Form of Equation	Up or Down	1

Vertex

x-intercepts

sketch

y-intercept

$y = -x^2 + 6x - 4$	Form of Equation	Up or Down	2

Vertex

x-intercepts

sketch

y-intercept

$y = 2(x + 1)(x - 7)$	Form of Equation	Up or Down	3

Vertex

x-intercepts

sketch

y-intercept

$y = -(x + 4)(x - 2)$	Form of Equation	Up or Down	4

Vertex

x-intercepts

sketch

y-intercept

$y = -5(x+6)^2 + 1$	Form of Equation	Up or Down	5

Vertex

x-intercepts

sketch

y-intercept

$y = \frac{1}{2}(x-8)^2 - 2$	Form of Equation	Up or Down	6

Vertex

x-intercepts

sketch

y-intercept

$y = \frac{2}{3}(x+6)^2 + 1$	Form of Equation	Up or Down	7

Vertex	x-intercepts
y-intercept	sketch

8. Find the y-intercepts of the quadratic functions. Do work on NB paper.

a) $y = -\frac{2}{3}x^2 + 6x - 9$ b) $y = 4(x-5)^2 + 11$ c) $y = \frac{1}{2}(x+6)(2x-1)$

9. Find the x-intercepts of the quadratic functions. Do work on NB paper.

a) $y = -x^2 + 9$ b) $y = x^2 - 2x + 1$ c) $y = -x^2 - 2x + 8$

d) $y \geq 3x^2 + 6x - 2$ e) $y = 5(3x+2)(x-9)$ f) $y = -2(x+6)^2$

g) $y = 2x^2 - 6$ h) $y = \frac{1}{3}(x-12)^2 - 2$ i) $y = 4(x-5)^2 + 11$

j) $y = -3(x-2)^2 + 8$ k) $y = -\frac{1}{2}(x+3)^2 - 1$