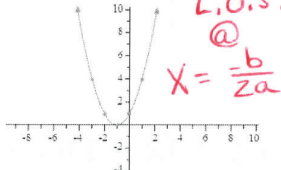
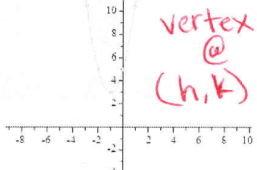
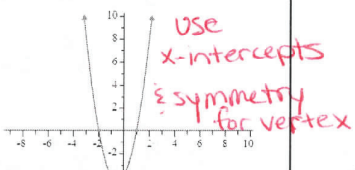


Answers

Graphing

Form	Example
Standard	$y = x^2 + 2x + 1$ 
Vertex	$y = 2(x + 1)^2 + 3$ 
Intercept	$y = -2(x - 1)(x + 2)$ 

Writing Equations

Form	How To
Standard $ax^2 + bx + c$	FOIL and combine like terms Example: $y = 3(x + 1)^2 + 2$ $= 3(x + 1)(x + 1) + 2$ $= 3(x^2 + 2x + 1) + 2$ $= 3x^2 + 6x + 3 + 2$ $= 3x^2 + 6x + 5$
Vertex	1. Use vertex and a point to solve for a . 2. Then put vertex and a into equation $y = a(x - h)^2 + k$
Intercept	1. Use intercepts and point to solve for a . 2. Then put intercepts and a into equation $y = a(x - p)(x - q)$

Quadratics

Solving

Factoring

- Factor out a monomial first, if possible
- Reverse FOIL – OR – Factor by Grouping
- Remember! These problems do NOT have an equals sign, and the answer should include parenthesis OR the acronym CBF

be "Prime" (cannot be factored).

Method	How To
Factor	1. Arrange so one side = 0 2. Factor other side. 3. Set each factor = 0 and solve.
Square Roots	1. Arrange into form $x^2 = 0$ or $(x - p)^2 = 0$ 2. Take the square root of both sides. 3. Simplify the radicals.
Complete the Square	1. Use the formula $c = \left(\frac{b}{2}\right)^2$ to get into form $\left(x - \frac{b}{2}\right)^2 = k + c$ 2. Use Square Roots Method from here.
Quadratic Formula	1. Use formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ to get into form 2. Simplify the radical and then any fractions.

Graph the Equations—Use Graph Paper at End of Packet—Show Your Work Here

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

L.O.S. @ $x = \frac{-b}{2a}$
 $= \frac{4}{2(2)} = 1$ vertex
 $2(1)^2 - 4(1) + 3 = 1$

if $x=0$, extra point
 $y=3$

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

Vertex $(0,4)$

if $x=2$, extra point
 $y=0$

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

Vertex $(1,2)$

if $x=0$, extra point
 $y=3$

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

Vertex $(1,0)$

if $x=0$, extra point
 $y=3$

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

$(-4,0)$ $(2,0)$

x-coord. of vertex

$\frac{-4+2}{2} = \frac{-2}{2} = -1$

y-coord

$-(-1+4)(-1-2) = 9$ vertex

6. $y = (x - 1)(x - 5)$

$(1,0)$ $(5,0)$

$\frac{1+5}{2} = \frac{6}{2} = 3$

$(3-1)(3-5) = -4$ vertex

Write a Quadratic Equation in Standard Form

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

$(x-1)(x-1) + 2$

$x^2 - x - x + 1 + 2$

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

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

$3(x-1)(x-1)$

$3(x^2 - 2x + 1)$

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

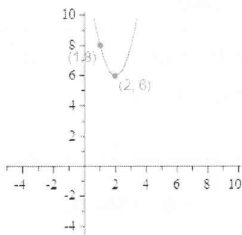
9. $y = (x - 1)(x - 5)$

$x^2 - 5x - x + 5$

$y = x^2 - 6x + 5$

Write a Quadratic Equation in Vertex Form

10.



$y = a(x-h)^2 + k$

$8 = a(1-2)^2 + 6$

$2 = +1a$

$a = +2$

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

11. Vertex: $(4, 1)$

Point: $(1, -2)$

$y = a(x-h)^2 + k$

$-2 = a(1-4)^2 + 1$

$-3 = +9a$

$a = -1$

$y = -(x-4)^2 + 1$

12. Vertex: $(-3, -8)$

Point: $(2, 2)$

$y = a(x-h)^2 + k$

$2 = a(2+3)^2 - 8$

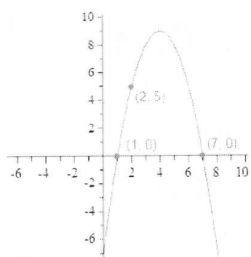
$+8$

$10 = 25a$ $a = \frac{2}{5}$

$y = \frac{2}{5}(x+3)^2 - 8$

Write a Quadratic Equation in Intercept/Factored Form

13.



$$y = a(x-p)(x-q)$$

$$5 = a(2-1)(2-7)$$

$$= a(1)(-5)$$

$$= -5a \quad a = -1$$

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

14.

Intercept: $(-6, 0)$

Intercept: $(-2, 0)$

Point: $(0, 8)$

$$y = a(x-p)(x-q)$$

$$8 = a(0+6)(0+2)$$

$$8 = 12a \quad a = \frac{2}{3}$$

$$y = \frac{2}{3}(x+6)(x+2)$$

15.

Intercept: $(-2, 0)$

Intercept: $(4, 0)$

Point: $(1, -9)$

$$y = a(x-p)(x-q)$$

$$-9 = a(1+2)(1-4)$$

$$= a(3)(-3)$$

$$= a(-9) \quad a = 1$$

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

Factor Completely

16. $x^2 + x - 6$

$$(x-2)(x+3)$$

17. $x^2 - 10x + 24$

$$(x-4)(x-6)$$

18. $3x^2 - 6x - 72$

$$3(x^2 - 2x - 24)$$

$$3(x-6)(x+4)$$

19. $3x^2 + 17x + 10$

$$a \cdot c = 30$$

$$15 \cdot 2 = 30 \text{ and } 15+2=17$$

$$\frac{3x^2+15x}{3x} + \frac{2x+10}{2}$$

$$3x(x+5) + 2(x+5)$$

$$(x+5)(3x+2)$$

20. $6x^2 + 17x + 5$ $a \cdot c = 30$ again:

$$\frac{6x^2+15x}{3x} + \frac{2x+5}{1}$$

$$3x(2x+5) + 1(2x+5)$$

$$(2x+5)(3x+1)$$

21. $40x^2 + 36x + 8$

$$4(10x^2 + 9x + 2)$$

$$a \cdot c = 20$$

$$4 \cdot 5 = 20 \text{ and } 4+5=9$$

$$\frac{10x^2+4x}{2x} + \frac{5x+2}{1}$$

$$2x(5x+2) + 1(5x+2)$$

$$4(5x+2)(2x+1)$$

Solve By Factoring

22. $x^2 + 10x + 24 = 0$

$(x+6)(x+4) = 0$

$x = -6, -4$

23. $3x^2 + 6x - 24 = 0$

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

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

$x = 4, -2$

24. $x^2 + 3x = 10$

$x^2 + 3x - 10 = 0$

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

$x = 2, -5$

25. $x^2 + 9x + 3 = -3x^2 + x$

$4x^2 + 8x + 3 = 0$

$\frac{4x^2 + 6x}{2x} + \frac{2x + 3}{1} = 0$

$2x(2x+3) + 1(2x+3) = 0$

$(2x+3)(2x+1) = 0$

$x = -\frac{3}{2}, -\frac{1}{2}$

$a \cdot c = 12$

$6 \cdot 2 = 12 \quad 6+2=8$

Solve with Square Roots

26. $x^2 = 50$ $\sqrt{25 \cdot 2}$

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

27. $x^2 + 49 = 0$ $\sqrt{x^2 = -49}$

$x = \pm 7i$

or

No Real Solutions

28. $3(x+1)^2 = 27$

$\sqrt{(x+1)^2 = 9}$

$x+1 = \pm 3$

$3-1, -3-1$

$x = 2, -4$

29. $-\frac{2}{3}(x-2)^2 = 10$

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

$x = 2 \pm \sqrt{15}i$

or

No Real Solutions

Solve by Completing the Square

$$30. x^2 + 6x = 40 \quad \left(\frac{b}{2}\right)^2 = \left(\frac{6}{2}\right)^2 = 9$$

$$x^2 + 6x + 9 = 49$$

$$\sqrt{(x+3)^2} = \sqrt{49}$$

$$x+3 = \pm 7$$

$$\boxed{x = 4, -10}$$

$$32. x^2 + 3x = \frac{7}{4} \quad \left(\frac{b}{2}\right)^2 = \left(\frac{3}{2}\right)^2 = \frac{9}{4}$$

$$x^2 + 3x + \frac{9}{4} = \frac{16}{4}$$

$$\sqrt{\left(x + \frac{3}{2}\right)^2} = \sqrt{4}$$

$$x + \frac{3}{2} = \pm 2 \quad (\sqrt{4})$$

$$\boxed{x = \frac{1}{2}, -\frac{7}{2}}$$

$$31. x^2 + 1.4x = .32 \quad \left(\frac{b}{2}\right)^2 = 0.49$$

$$x^2 + 1.4x + 0.49 = 0.81$$

$$+.32$$

$$\sqrt{(x+0.7)^2} = \sqrt{0.81}$$

$$x+0.7 = \pm 0.9$$

$$\boxed{x = 0.2, -1.6}$$

$$33. x^2 + 10x = 25 \quad \left(\frac{b}{2}\right)^2 = 25$$

$$x^2 + 10x + 25 = 50$$

$$\sqrt{(x+5)^2} = \sqrt{50} \quad \sqrt{25 \cdot 2}$$

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

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

Solve with Quadratic Formula

$$a=1 \quad b=4 \quad c=13$$

$$34. x^2 + 4x + 13 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-4 \pm \sqrt{16 - 4(1)(13)}}{2(1)} \quad \frac{\sqrt{-36}}{6i}$$

$$= \boxed{-2 \pm 3i}$$

or

$$\boxed{\text{No Real Solutions}}$$

$$35. x^2 + 4 = 5x \quad x^2 - 5x + 4 = 0$$

$$x = \frac{5 \pm \sqrt{25 - 4(1)(4)}}{2(1)} \quad \sqrt{9}$$

$$\frac{5+3}{2}, \frac{5-3}{2}$$

$$\boxed{4, 1}$$

$$36. 2x^2 + 9x - 5 = 0$$

$$x = \frac{-9 \pm \sqrt{81 - 4(2)(-5)}}{2(2)}$$

$$= \frac{-9 \pm \sqrt{121}}{4}$$

$$\frac{-9+11}{4}, \frac{-9-11}{4}$$

$$\frac{2}{4}, \frac{-20}{4}$$

$$\boxed{\frac{1}{2}, -5}$$

$$37. x^2 + 4x = -7 \quad x^2 + 4x + 7 = 0$$

$$x = \frac{-4 \pm \sqrt{16 - 4(1)(7)}}{2(1)} \quad \sqrt{-12} \quad \sqrt{-4 \cdot 3}$$

$$= \boxed{-2 \pm 2\sqrt{3}}$$

or

$$\boxed{\text{No Real Solutions}}$$

Answer the Question

38. The Smiths just got a dog and need to fence in a kennel area in their big yard. The length of the kennel will be triple its width, and the total area is 432 square feet. What are the dimensions of the kennel area?



$$3x \cdot x = 432$$

$$3x^2 = 432$$

$$x^2 = 144$$

$$x = 12$$

12 feet
by
36 feet

39. The roof of the Empire State Building is 1250 feet above the ground. During a field trip, if you dump a truckload of water balloons from the roof, how long until they drench your classmates on the ground? Assume you miss but the splash from hitting the ground is spectacular, and round to the nearest hundredth of a second.

$$0 = -16x^2 + 1250$$

$$16x^2 = 1250$$

$$x^2 = 78.125$$

$$x = 8.84 \text{ seconds}$$

40. Literal Equations Challenge:

Convert both $y = a(x - h)^2 + k$ and $y = a(x - p)(x - q)$ into standard form.

$$y = a(x - h)(x - h) + k$$
$$= a(x^2 - 2hx + h^2) + k$$

$$y = ax^2 - 2ahx + (ah^2 + k)$$

ok with or
without
parentheses

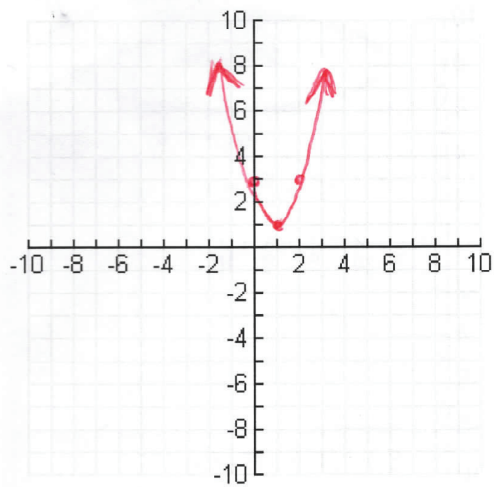
$$y = a(x^2 - qx - px + pq)$$

$$= ax^2 - aqx - apx + apq$$

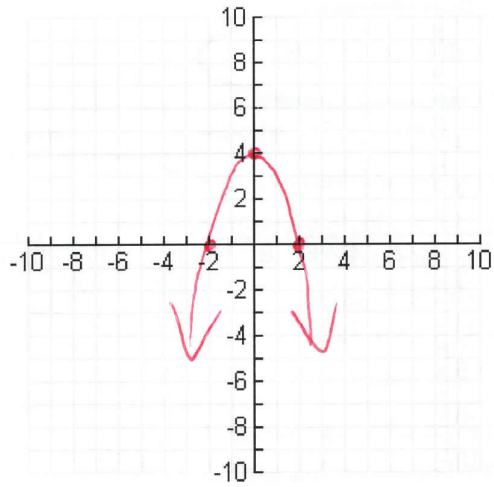
OR

$$ax^2 - (q + p)ax + apq$$

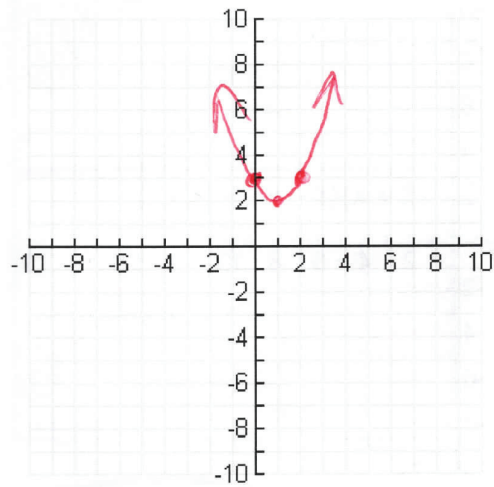
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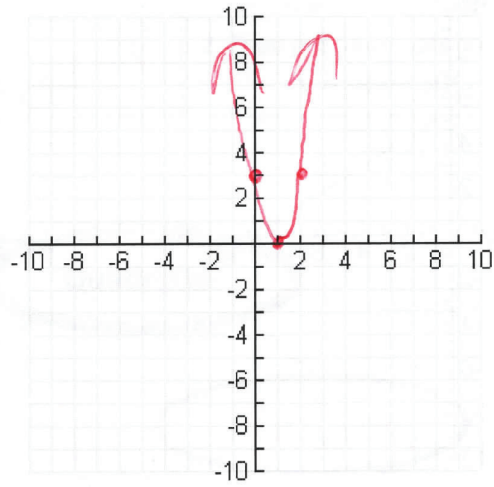
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3



4



5

