Name: _____

Workbook for Solving Quadratic Equations

Unit Outline:

a. Solving from Vertex Form
b. Solving by Factoring
c. Solving using the Quadratic Formula
d. Word Problems
e. Review

Math 10D Name_____

Solving By Factoring

Date_____

Solve each equation by factoring.

1) $n^2 - 6n - 7 = 0$

2) $8v^2 - 36v + 16 = 0$

3) $3b^2 + 13b + 4 = 0$

4) $8x^2 - 32x + 22 = -2$

5) $3n^2 - 8n - 27 = 8$

6) $a^2 + 12a = -36$

7) $5k^2 = 4 + k$

8) $5x^2 - 61x + 168 = 5x - x^2$

9) $7x^2 = 105 - 14x$

10) $4p^2 - 12p - 10 = -p^2 - 1$

11) $28n^2 + 4n - 38 = -6 + 8n^2 - 8n$

12) $14n^2 + 6n = 2 - 2n + 4n^2$

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Solving From Vertex Form

Date_____

Solve each question for the zeros. For #13-16, solve for the x-value that gives the included y-value, then state the coordinates.

1) $y = (x + 8)^2 - 4$

2) $y = \frac{1}{3}(x - 6)^2 + 8$

3) $y = -5(x + 8)^2 + 3$

4) $y = -6(x + 2)^2 + 3$

5) $y = 2(x - 9)^2 - 10$

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

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

8) $y = 2(x + 1)^2 + 8$

9) $y = -\frac{3}{4}(x+7)^2 + 3$

10) $y = -\frac{1}{18}(x+4)^2 + 3$

11) $y = x^2 - 5$

12) $y = 2(x+3)^2 - 8$

13) $9 = 2(x + 7)^2 + 1$

14) $26 = -3(x - 10)^2 + 8$

15) $10 = -4(x - 7)^2 + 9$

16) $-14 = -\frac{4}{5}(x + 2)^2 - 6$

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Solving Using The Quadratic Formula

Solve each equation with the quadratic formula.

1) $6n^2 + 7n - 55 = 0$

2) $12k^2 - 11k - 24 = 0$

3) $3p^2 + 5 = 8$

4) $8p^2 + 5p + 2 = -9$

5) $9m^2 - 7m = -2$

6) $8n^2 + 6n = 24$

7) $-3x^2 + 5x - 39 = -6x^2 + 11$

8) $15n^2 - 3n - 7 = -6n + 11n^2$

Find the vertex by using the Quadratic Formula to find the x-intercepts. Then determine the AoS.

9) $y = 2x^2 + 8x - 64$

10) $y = 3x^2 - 11x - 17$

11) $y = -5x^2 + 17x + 12$

12) $y = 0.34x^2 - 201x - 3172$

Quadratics: Word Problems

1. The length of a rectangle is three more than twice the width. Determine the dimensions that will give a total area of $27m^2$.

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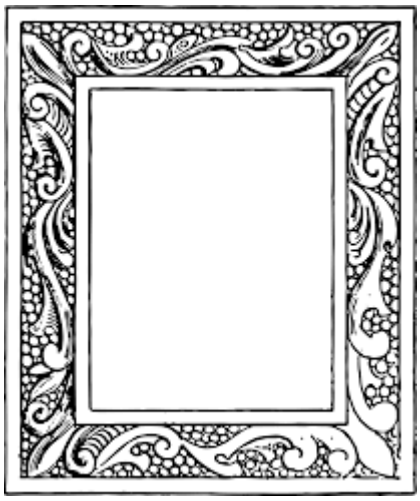
2. An artist has created a painting that is 4m by 3m in size. She wants a uniform border that surrounds the painting that is has an area of $2m^2$. How wide should the border be? *Round your answer to the nearest tenth.*



3. A company earns a weekly profit of *P* dollars by selling items x, according to the equation

$P = -0.5x^2 + 40x - 300.$

How much profit would they make if they sold 50 items?

How many items does the company have to sell each week to maximize the profit?

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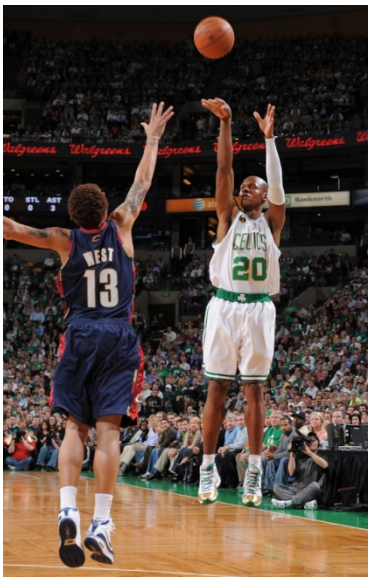
4. While playing basketball this weekend Frank shoots an air-ball. The height in feet of the ball is given by $h = -16t^2 + 32t + 8$.



From what height did Frank release the ball?

How long will it take the ball to strike the ground?

What is the maximum height of the ball?

5. An object is thrown upward off the top of a building. The height of the object, (measured in feet) *t* seconds after the throw is, $h = -16t^2 + 160t + 1200$.
a) How tall is the building?

b) Where is the object 3 seconds after we threw it?

c) How long does it take for the object to hit the ground?

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6. Your factory produces lemon-scented candles. You know that each unit is cheaper, the more you produce. But you also know that costs will eventually go up if you make too many candles, due to the costs of storage of the overstock. The guy in accounting says that your cost for producing x thousands of units a day can be approximated by the formula, $C = 0.04x^2 - 8.504x + 25302$. Find the daily production level that will minimize your costs.

7. The length of a rectangular flower garden is 5 feet more than its width. If the area of the garden is 104 square feet, find the dimensions of the flower garden.

8. The equation $P = -6x^2 + 36x - 48$ is used to determine the profit a company makes by selling a certain product, where *P* is the profit in **thousands of dollars** (meaning P=1 is \$1000, P=2 is \$2000) and x is the number of products sold in **hundreds** (meaning x=5 is 500 products sold).

a) If the company sold nothing, what is their Profit? (*Please note that Profit is Revenue by selling the products minus the Cost incurred to manufacture the products.)*

b) How many products does the company need to sell to break even?

c) How many products need to be sold to maximize the profit? What is the max profit?

d) The sale of how many products would result in the company making a profit of at least \$4,000?