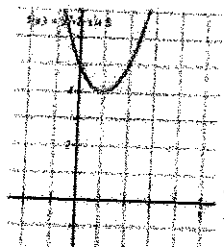


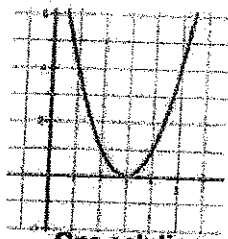
Algebra I Unit 3C

Solving Quadratics

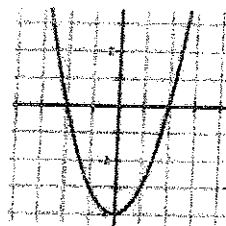
Name: _____



No solutions



One solution

 $x = 3$ 

Two solutions

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

Objective 1: I can use the discriminant to determine the number of solutions.

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

So $b^2 - 4ac$ is used to find the **number of solutions**.

If $b^2 - 4ac$ 0 then the equation has solutions.

If $b^2 - 4ac$ 0 then the equation has solution.

If $b^2 - 4ac$ 0 then the equation has .

REMEMBER! The number of solutions is equal to the number of x-intercepts of that equation.

EXAMPLES: Use the discriminant to tell if each equation has two solutions, one solution, or no real solutions

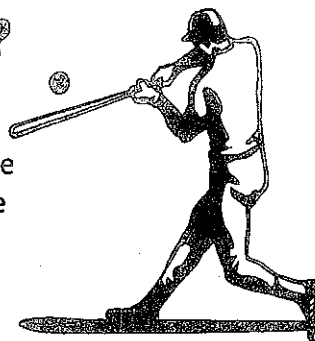
a) $x^2 - 2x + 4 = 0$

b) $-3x^2 + 5x - 1 = 0$

c) $-x^2 - 10x - 25 = 0$

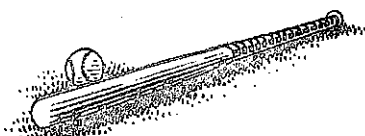
What do you call a \$1000.00 homerun?

Calculate the discriminant for each quadratic equation, and use the result to determine the number of possible solutions. You will then use the letter that corresponds to the number of solutions to complete the answer at the bottom of the page.

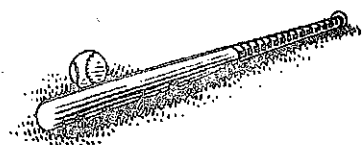


Quadratic Equation	Discriminant ($b^2 - 4ac$)	One solution	Two solutions	No solutions
1. $x^2 - 4x + 3 = 0$		P	A	Y
2. $4x^2 + 25 = 0$		O	I	G
3. $9x^2 - 24x + 16 = 0$		S	L	R
4. $x^2 + 4x + 12 = 0$		K	O	A
5. $4x^2 - 4x - 3 = 0$		P	D	C
6. $5x^2 - 6x + 2 = 0$		L	E	M
7. $36x^2 + 60x + 25 = 0$		R	U	P
8. $x^2 - 17x + 30 = 0$		F	L	K
9. $x^2 + 6x - 16 = 0$		O	N	R
10. $x^2 - 10x + 25 = 0$		A	T	U

10	2	7	4	9	5	3	8	1	6	



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Objective 2: Solving Quadratics by the Quadratic Formula.

So far, we have learned to solve quadratic equations by factoring, completing the square, and by extracting square roots. Now we will learn a final method that consistently works to solve any quadratic equations, with the quadratic formula.

QUADRATIC FORMULA: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ (when equation is $ax^2 + bx + c = 0$ and $a \neq 0$)

EXAMPLES: Solve the following equations.

A) $3x^2 + 5x - 7 = 0$

B) $2x^2 + 3 = 2x$

C) $2x^2 + 4x - 5$

D) $4x^2 - 3x + 15$

So now we know 4 ways to solve quadratic equations.

METHOD	CAN BE USED	WHEN TO USE
FACTORING	Sometimes	If $c = 0$ or factors are easy to find.
SQUARE ROOT PROPERTY	Sometimes	When equation is a perfect square.
COMPLETING THE SQUARE	Always	When b is an even number.
QUADRATIC FORMULA	Always	When other methods fail or are too tedious.

Algebra 2 Worksheet

Name: _____

A11.4b – The Quadratic Formula and Discriminant

The Discriminant:

- 1) What is the formula for the discriminant?
- 2) What does the discriminant tell us about an equation?
- 3) Based on the given discriminants, what do you know about the equation related to it?
 - a. 8
 - b. -10
 - c. 9
 - d. 1
 - e. 0
 - f. -4

Quadratic Formula:

- 4) What is the quadratic formula?
- 5) Why do we use the quadratic formula? What are the benefits of solving a quadratic equation by the quadratic formula over the other methods we have?

For each equation below A) find the discriminant and determine the type of solutions and B) solving each equation using the quadratic formula.

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

11. $-10x^2 = 45x$

7. $3x^2 - 3x + 12 = 0$

12. $2 = -10x + 25x^2 + 20$

8. $8x^2 - 4 = 0$

13. $3x^2 = -4x + 10$

9. $-4x^2 - 4x + 15 = 0$

14. $1 = -10x + 7x^2$

10. $12x = -18x - 2x^2$

15. $3x^2 - 10x + 22 = 0$

Factoring

- 1) Set the problem equal to **ZERO**
- 2) Factor
- 3) **SOLVE**

EX: $2x^2 - 16x = -30$

$6x^2 - 5x - 4 = 0$

Square Roots

- 1) Get x^2 by itself
- 2) Take the _____ of each side
- 3) _____ in the answer

EX: $5x^2 - 10 = 170$

Quadratic Formula

- 1) Set the problem equal to **ZERO**
- 2) Plug #'s (a, b, c) into **Quadratic formula**
- 3) Simplify & write answer

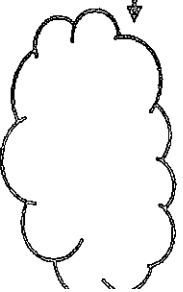
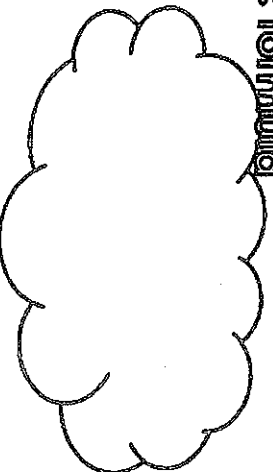
EX: $2x^2 - 10x = -4$

Solving Quadratics

Completing the

- 1) Move constants to the right side of =
- 2) Complete the ☐
- 3) **Factor** the left/ **Simplify** the right
- 4) Take the _____ of both sides
- 5) **SOLVE** for x

EX: $x^2 + 6x + 1 = 92$



Unit 3B Test Review

Date _____ Period _____

Factor the common factor out of each expression.

1) $5r^4 - 50r^3 - 50r^2$

2) $-28b^6 - 20b^4 - 16b^3$

Solve each equation by factoring.

3) $r^2 + 2r - 3 = 0$

4) $n^2 + 4n = 0$

5) $x^2 + 4x - 26 = -5$

6) $r^2 - 3r = -2$

7) $7a^2 + 22a + 3 = 0$

8) $2x^2 - 5x - 3 = 0$

Solve each equation by taking square roots.

9) $9v^2 = 81$

10) $v^2 + 1 = 101$

$$11) 8x^2 + 4 = 84$$

$$12) 5n^2 + 1 = 96$$

$$13) 81b^2 + 1 = 2$$

$$14) 10b^2 - 4 = 476$$

Solve each equation by completing the square.

$$15) m^2 - 8m - 84 = 0$$

$$16) n^2 - 6n - 24 = 0$$

$$17) r^2 - 20r + 89 = -10$$

$$18) x^2 - 8x - 87 = -7$$

$$19) a^2 - 20a + 59 = 8$$

$$20) b^2 - 4b - 53 = -4$$

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Using the Quadratic Formula

Solve each equation with the quadratic formula.

1) $m^2 - 5m - 14 = 0$

2) $b^2 - 4b + 4 = 0$

3) $2m^2 + 2m - 12 = 0$

4) $2x^2 - 3x - 5 = 0$

5) $x^2 + 4x + 3 = 0$

6) $2x^2 + 3x - 20 = 0$

7) $4b^2 + 8b + 7 = 4$

8) $2m^2 - 7m - 13 = -10$

Solving Quadratic Equations

Choose the best method to solve the following:

(3 have no solution)

1. $c^2 + 3c + 1 = 0$	2. $(x - 1)^2 = 9$	3. $x^2 - 7x = 0$
4. $2m^2 + m - 1 = 0$	5. $9x^2 + 24x = -16$	6. $4p^2 - p + 3 = 0$
7. $x^2 - 9x = -20$	8. $q^2 + 4q + 11 = -10$	9. $k(k + 5) = 0$
10. $y^2 - 7y + 4 = 0$	11. $3x^2 - 48 = 0$	12. $3n^2 - 5n - 9 = 0$
13. $m^2 - 4m = -4$	14. $4r^2 = 100$	15. $3r^2 + 12 = 0$
16. $2t^2 + 7t = -6$	17. $5x^2 + 13x - 1 = 0$	18. $a^2 = 8a$