

# Survival Guide: Quadratics

BASIC PARABOLA – \_\_\_\_\_

\_\_\_\_\_ – a set of ordered pairs

\_\_\_\_\_ – a relation in which each  $x$  value has only 1  $y$ -value, passes vertical line test, and equations don't have an even exponent on the  $y$

\_\_\_\_\_ – the set of all  $x$ -values of the ordered pairs of a relation, shadow of graph on the  $x$  axis

\_\_\_\_\_ – the set of all  $y$ -values of the ordered pairs of a relation, shadow of graph on the  $y$  axis

\_\_\_\_\_ – a way of representing the  $y$ -coordinate of an ordered pair, written as  $f(x)$

QUADRATIC FUNCTIONS		QUADRATIC EQUATIONS
	VS	

The QUADRATIC FORMULA is \_\_\_\_\_. It is used to find \_\_\_\_\_ when factoring does not work in equations of the form \_\_\_\_\_.

The DISCRIMINANT is \_\_\_\_\_. It is used to determine the number of roots that a quadratic has if it is given in \_\_\_\_\_ form.

- when  $b^2 - 4ac > 0$ , there are \_\_\_\_\_
- when  $b^2 - 4ac = 0$ , there is \_\_\_\_\_
- when  $b^2 - 4ac < 0$ , there are \_\_\_\_\_

If the equation is given in vertex form in equations of the form \_\_\_\_\_, there is another way to tell the number of zeros

- no zeros if \_\_\_\_\_
- one zero if \_\_\_\_\_
- two zeros if \_\_\_\_\_



FACTORING METHODS		COMPLETE THE SQUARE
COMMON FACTORING $f(x) = 5x^2 + 25xy$	SIMPLE TRINOMIAL $f(x) = x^2 + 5x - 14$	$f(x) = 2x^2 - 12x + 1$
COMPLEX TRINOMIAL $f(x) = 4x^2 - 12x + 9$	COMPLEX TRINOMIAL $f(x) = 3x^2 - 8x + 4$	
DIFFERENCE OF SQUARES $f(x) = 9x^2 - 100$		

Find an equation with zeros 3 and 6 and passes through the y-intercept at -4.	<b>PUTTING INFO INTO FUNCTION FORM:</b>	Find an equation with vertex (-3, 1) and passes through the point (-1, -1)
	1. Decide which form will work best. [Factored form if given the zeros and vertex form if given the vertex.]	
	2. Sub given info (zeros or vertex) into chosen form.	
	3. Sub in additional point.	
	4. Solve for $a$ .	
	5. State final function.	

## HINTS FOR SOLVING WORD PROBLEMS

<i>If a question asks for . . .</i>	<i>You must find . . .</i>
<ul style="list-style-type: none"> <li>Find the max/min</li> </ul>	
<ul style="list-style-type: none"> <li>Find the value that produces the max/min</li> </ul>	
<ul style="list-style-type: none"> <li>no reference to max/min (asking for the value of the independent variable – ex. break-even points, etc.)</li> </ul>	
<ul style="list-style-type: none"> <li>find the dependent variable given an independent variable (ex. find height given time; remember initial time is always 0)</li> </ul>	
<ul style="list-style-type: none"> <li>find the independent variable given a dependent variable (ex. find time given height)</li> </ul>	

1. A company selling CDs models its profits with the equation  $P(x) = -3x^2 + 36x - 18$ , where  $x$  and  $P(x)$  are both in thousands. Use factoring methods to answer the following questions. How many CDs should the company produce to make the maximum possible profit? What is the max profit?

2. The community garden club has a vegetable garden that measures 15 m by 30 m. One of the members has donated a new piece of land for a larger garden. Because of the dimension of the new land, both dimensions of the original garden must increase by the same amount. The total garden is of size 700 m<sup>2</sup>. Determine the dimensions of the new garden.