

Name: Key Period: \_\_\_\_\_

8-49 through 8-53

8-49. Factor each polynomial.

a.  $x^2 - 64$

$$(x-8)(x+8)$$

b.  $y^2 - 6y + 9$

$$(y-3)^2$$

c.  $4x^2 + 4x + 1$

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

d.  $5x^2 - 45 = 5(x^2 - 9)$

$$5(x-3)(x+3)$$

8-50. Simplify each expression below. Your answer should contain no parentheses and no negative exponents.

a.  $(-\frac{2}{3}x^5y^{1/3})^0 = \boxed{1}$

b.  $(25^{1/2}x^5)(4x^{-6}) = (\sqrt{25}x^5)(4x^{-6})$   
 $= (5x^5)(4x^{-6})$   
 $= \boxed{\frac{20}{x}}$

c.  $5t^{-3} = \boxed{\frac{5}{t^3}}$

d.  $(\frac{x^7y^3}{x})^{1/3} = \frac{x^{7/3}y}{x^{1/3}}$   
 $= \boxed{x^2y}$

8-51. Solve the following systems of equations algebraically.

$$2x + y = 9$$

$$y = -x + 4$$

$$2x + (-x + 4) = 9$$

$$x + 4 = 9$$
  
$$\begin{array}{r} -4 \\ -4 \end{array}$$

$$\boxed{x = 5}$$

$$y = -(5) + 4$$

$$y = -5 + 4$$

$$\boxed{y = -1}$$

$$\boxed{(5, -1)}$$

8-52. Consider the sequence 4, 8, ...

a. If the sequence is arithmetic, write the first 4 terms and an equation for  $t(n)$ .

$$t(1) = 4$$

$$t(2) = 8$$

$$t(3) = 12$$

$$t(4) = 16$$

$$t(n) = 4n$$

b. If the sequence is geometric, write the first 4 terms and an equation for  $t(n)$ .

$$t(1) = 4$$

$$t(2) = 8$$

$$t(3) = 16$$

$$t(4) = 32$$

$$t(n) = 2(2)^n$$

8-53. Solve the following equations for  $x$ .

a.  $4x - 6y = 20$

$$+6y \quad +6y$$

$$\frac{4x}{4} = \frac{20}{4} + \frac{6y}{4}$$

$$x = 5 + \frac{3}{2}y$$

b.  $\frac{1}{2}(x-6) = 9$

$$\frac{1}{2}x - 3 = 9$$
$$+3 \quad +3$$

$$\frac{1}{2}x = 12$$

$$x = 24$$

c.  $\frac{4}{5} + \frac{18}{x} = 8$

$$-\frac{4}{5} \quad -\frac{4}{5}$$

$$\frac{18}{x} = \frac{36}{5}$$

$$36x = 90$$

$$x = 2.5$$

d.  $2 + |2x - 3| = 5$

$$-2 \quad -2$$

$$|2x - 3| = 3$$

$$2x - 3 = 3$$

$$+3 \quad +3$$

$$\frac{2x}{2} = \frac{6}{2}$$

$$x = 3$$

$$2x - 3 = -3$$

$$+3 \quad +3$$

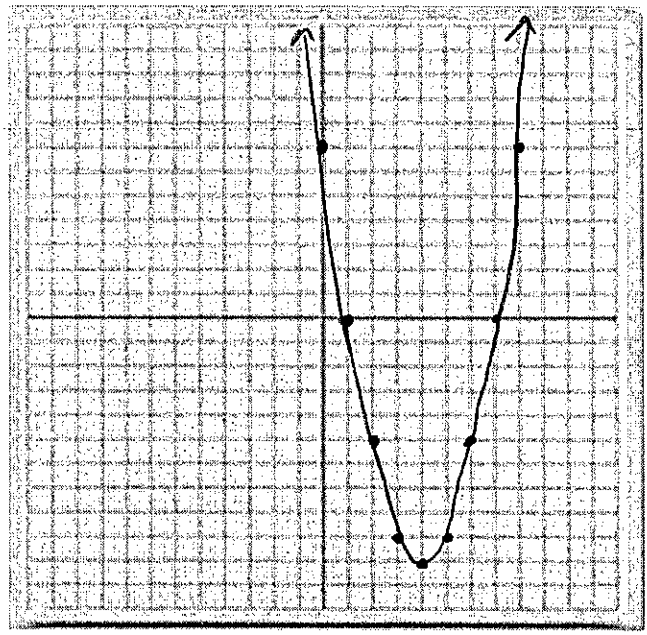
$$\frac{2x}{2} = \frac{0}{2}$$

$$x = 0$$

Name: Key Period: \_\_\_\_\_

8-58 through 8-63  
Skip 8-61

8-58. Graph  $y = x^2 - 8x + 7$  and label its vertex, x-intercepts, and y-intercepts.



x	y
-1	16
0	7
1	0
2	-5
3	-8
4	-9
5	-8
6	-5
7	0

x-int: (1,0) (7,0)  
y-int: (0,7)

8-59. What is special about the number zero? Think about this as you answer the questions below.

a. Find each sum:

$0 + 3 = 3$     $-7 + 0 = -7$     $0 + 6 = 6$     $0 + (-2) = -2$

b. What is special about adding zero? Write a sentence that begins, "When you add zero to a number, ..."  
It does not change the value of that number.

c. Julia is thinking of two numbers  $a$  and  $b$ . When she adds them together, she gets a sum of  $b$ . Does that tell you anything about either of Julia's numbers?  
It tells us that  $a = 0$ .

d. Find each product:

$3 \cdot 0 = 0$     $(-7) \cdot 0 = 0$     $0 \cdot 6 = 0$     $0 \cdot (-2) = 0$

e. What is special about multiplying by zero? Write a sentence that begins, "When you multiply a number by zero, ..."  
The result is always zero.

8-60. Based on the tables below, say as much as you can about the  $x$ - and  $y$ -intercepts of the corresponding graphs.

a.

$x$	$y$
2	0
0	18
-4	0
-1	-8
6	22
3	0

$x$ -int:  $(2,0)(-4,0)(3,0)$   
 $y$ -int:  $(0,18)$

b.

$x$	$y$
7	-4
3	0
10	8
0	-3
8	0
-7	-1

$x$ -int:  $(3,0)(8,0)$   
 $y$ -int:  $(0,-3)$

c.

$x$	$y$
0	-4
-5	11
3	-2
1	0
13	27
-6	14

$x$ -int:  $(1,0)$   
 $y$ -int:  $(0,-4)$

8-62. Solve the following systems of equations using any method. Check your solution if possible.

a.  $6x - 2y = 10$   
 $-2(3x - y = 2)$

$$\begin{array}{r} -6x + 2y = -4 \\ + \quad 6x - 2y = 10 \\ \hline \end{array}$$

$$0 = 6$$

**No solution**

b.  $x - 3y = 1$   
 $y = 16 - 2x$

$$\begin{aligned} x - 3(16 - 2x) &= 1 \\ x - 48 + 6x &= 1 \\ 7x - 48 &= 1 \\ +48 \quad +48 & \end{aligned}$$

$$7x = 49$$

$$\boxed{x = 7}$$

$$y = 16 - 2(7)$$

$$y = 16 - 14$$

$$\boxed{y = 2}$$

$$\boxed{(7, 2)}$$

8-63. The " $\leq$ " symbol represents "less than or equal to," while the " $<$ " symbol represents "less than."

a. How can you write an expression that states that 5 is greater than 3?

$$5 > 3$$

b. Write another expression that states that  $x$  is less than or equal to 9.

$$x \leq 9$$

c. Translate the expression  $-2 < 7$  into words.

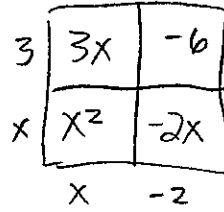
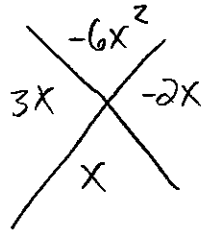
$-2$  is less than  $7$ .

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8-69 through 8-75

8-69. Use a similar process as you did in problems 8-65 and 8-67 to sketch the parabola for  $y = x^2 + x - 6$  by using its intercepts.

y-int:  $(0, -6)$



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

$$x+3=0 \quad x-2=0$$

$$-3 \quad -3 \quad +2 \quad +2$$

$$x=-3 \quad x=2$$

$(-3, 0)$        $(2, 0)$

8-70. Compare the two equations below.

$(x+2)(x-1) = 0$  and  $(x+2) + (x-1) = 0$

a. How are the equations different?

One is a product, the other is a sum.

b. Solve both equations.

Product:  $x+2=0$      $x-1=0$   
 $-2 \quad -2$      $+1 \quad +1$   
 $x=-2$      $x=1$

Sum:  $(x+2) + (x-1) = 0$   
 $2x+1=0$   
 $-1 \quad -1$   
 $2x=-1$   
 $\frac{2}{2} \quad \frac{-1}{2}$   
 $x = -\frac{1}{2}$

8-71. For each equation below, solve for x.

a.  $(3x-9)(x-1) = 0$

$$3x-9=0 \quad x-1=0$$

$$+9 \quad +9 \quad +1 \quad +1$$

$$\frac{3x}{3} = \frac{9}{3} \quad x=1$$

$$x=3$$

b.  $(x-7)^2 = 0$

$$x-7=0$$

$$+7 \quad +7$$

$$x=7$$

8-72. Examine the system of equations below.

$$5x-2y=4$$

$$x=0$$

$$5(0)-2y=4$$

$$-2y=4$$

$$\frac{-2y}{-2} = \frac{4}{-2}$$

$$y=-2$$

$$(0, -2)$$

8-73. The (x-intercepts) of the graph of  $y = 2x^2 - 16x + 30$  are (3, 0) and (5, 0).

a. What is the x-coordinate of the vertex? How do you know?

The vertex is the line of symmetry, so it is halfway between the x-intercepts, so the x-coordinate is 4.

b. Use your answer to part (a) above to find the y-coordinate of the vertex. Then write the vertex as a point (x, y).

$$x = 4$$

$$\begin{aligned} y &= 2(4)^2 - 16(4) + 30 \\ &= 2(16) - 64 + 30 \\ &= 32 - 64 + 30 \\ &= -2 \end{aligned}$$

$$(4, -2)$$

8-74. Factor each quadratic below completely.

a.  $2x^2 - 2x - 4 \rightarrow 2(x^2 - x - 2)$

$$\begin{array}{r} -2x^2 \\ -2x \quad 1x \\ -1x \end{array}$$

-2	-2x	-2
x	x <sup>2</sup>	1x
	x	1

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

b.  $4x^2 - 24x + 36 \rightarrow 4(x^2 - 6x + 9)$

$$\begin{array}{r} 9x^2 \\ -3x \quad -3x \\ -6x \end{array}$$

-3	-3x	9
x	x <sup>2</sup>	-3x
	x	-3

$$4(x-3)^2$$

8-75. Rewrite the following expressions using fractional exponents.

a.  $(\sqrt{3x})^3 = (3x)^{3/2}$

b.  $(\sqrt[4]{81}) = 81^{1/4}$

c.  $(\sqrt[3]{17})^x = 17^{x/3}$

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8-83 through 8-88  
Skip 8-85

8-83. Use the Zero Product Property to find the roots of the polynomials below.

a.  $3x^2 - 7x + 4$

$$\begin{array}{r} 12x^2 \\ -4x \quad -3x \\ -7x \end{array}$$

-4	-4x	4
3x	3x <sup>2</sup>	-3x
x		-1

$$(3x-4)(x-1) = 0$$

$$3x-4=0 \quad \text{and} \quad x-1=0$$

$$\left(\frac{4}{3}, 0\right)$$

$$(1, 0)$$

b.  $x^2 + 6x$

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

$$x=0 \quad x+6=0$$

$$x = -6$$

$$(0, 0) \quad (-6, 0)$$

c.  $(x+5)(-2x+3)$

$$x+5=0 \quad -2x+3=0$$

$$x = -5$$

$$x = \frac{3}{2}$$

$$(-5, 0)$$

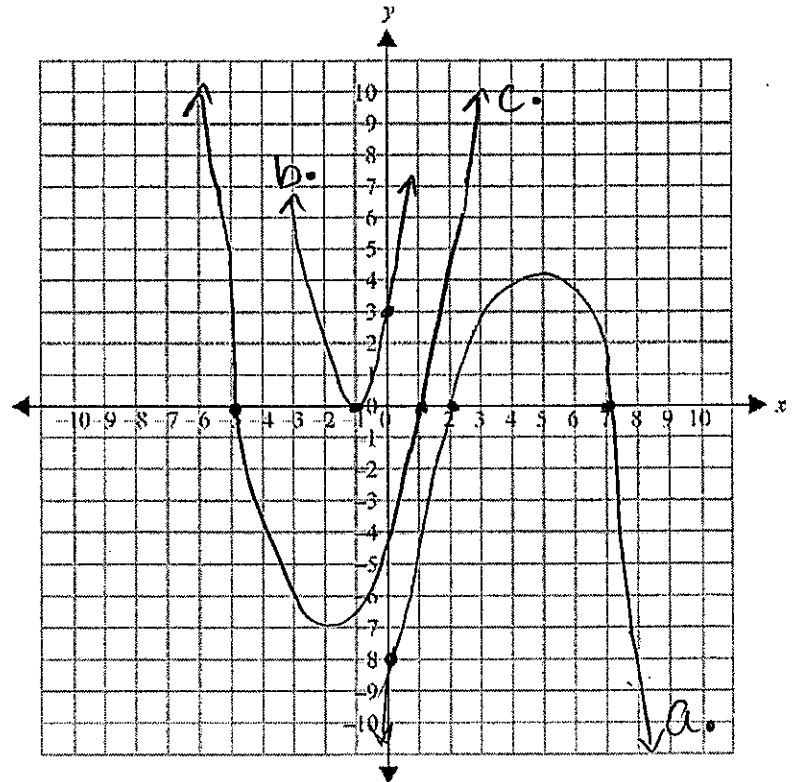
$$\left(\frac{3}{2}, 0\right)$$

8-84. Jamie was given the problem, "Find the result when the factors of  $65x^2 + 212x - 133$  are multiplied together." Before she could answer, her sister, Lauren, said, "I know the answer without factoring or multiplying!" What was Lauren's answer and how did she know?

The result must be the original expression because multiplying and factoring are opposite processes.

8-86. Sketch each parabola below with the given information on the same set of axes.

- A parabola with x-intercepts (2, 0) and (7, 0) and y-intercept (0, -8).
- A parabola with exactly one x-intercept at (-1, 0) and y-intercept (0, 3).
- The parabola represented by the equation  $y = (x + 5)(x - 1)$ .



8-87. Review the meanings of the inequality symbols in the box at right. Then decide if the statements below are true or false.

<	less than
≤	less than or equal to
>	greater than
≥	greater than or equal to

a.  $5 < 7$  true

b.  $-2 \geq 9$  false

c.  $0 \leq 0$  true

d.  $-5 > -10$  true

e.  $16 \leq -16$  false

f.  $1 > 1$  false

8-88. Calculate the value of each expression below using a calculator.

a.

$$\frac{-10 + \sqrt{25}}{5} = \boxed{-1}$$

b.

$$\frac{8 + \sqrt{40}}{3.3} = \boxed{1.6}$$

c.

$$\frac{8 + \sqrt{3^2 + 2 \cdot 3 + 1}}{-4} = \boxed{-3}$$

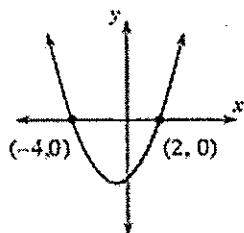


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8-92 through 8-97

8-92. Lots O'Dough, a wealthy customer, would like to order a variety of parabolas. However, he is feeling pressed for time and said that he will pay you *lots* of extra money if you complete his order for him. Of course you agreed! He sent you sketches of each parabola that he would like to receive. Determine a possible equation for each parabola so that you can pass this information on to the Manufacturing Department.

a.

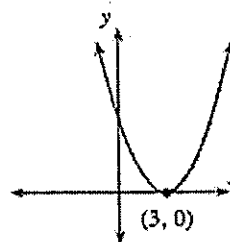


$$y = (x+4)(x-2)$$

$$y = x^2 - 2x + 4x - 8$$

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

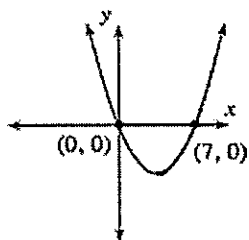
b.



$$y = (x-3)^2$$

$$y = x^2 - 6x + 9$$

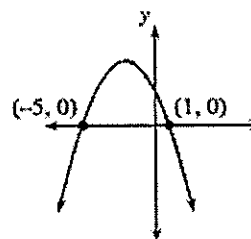
c.



$$y = (x-0)(x-7)$$

$$y = x^2 - 7x$$

d.



$$y = -(x+5)(x-1)$$

$$y = -(x^2 - 1x + 5x - 5)$$

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

$$y = -x^2 - 4x + 5$$

8-93. Find the slope and y-intercept of the line  $6y - 3x = 24$ .

$$+3x + 3x$$

$$\frac{6y}{6} = \frac{3x}{6} + \frac{24}{6}$$

$$y = \frac{1}{2}x + 4$$

$$m = \frac{1}{2}$$

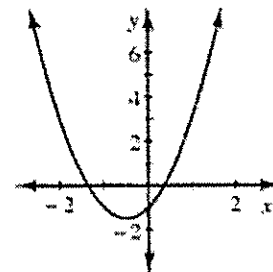
$$y\text{-int: } (0, 4)$$

8-94. Examine the graph of  $y = 2x^2 + 2x - 1$  at right.

a. Estimate the zeros from the graph.

$$(-1.4, 0) \text{ and } (0.4, 0)$$

b. What happens if you try to use the Zero Product Property to find the roots of  $2x^2 + 2x - 1 = 0$ ?



~~$$-2x^2$$

$$2x$$~~

The quadratic is not factorable.

8-95. Solve the equations below for x. Check your solutions.

a.  $x^2 + 6x - 40 = 0$

~~$$\begin{array}{r} -40x^2 \\ 10x \quad -4x \\ \hline 6x \end{array}$$~~

10	10x	-40
x	x <sup>2</sup>	-4x
	x	-4

$$(x+10)(x-4) = 0$$

$$x+10=0 \quad x-4=0$$

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

b.  $2x^2 + 13x - 24 = 0$

~~$$\begin{array}{r} -48x^2 \\ 16x \quad -3x \\ \hline 13x \end{array}$$~~

8	16x	-24
x	2x <sup>2</sup>	-3x
	2x	-3

$$(2x-3)(x+8) = 0$$

$$2x-3=0 \quad x+8=0$$

$$\boxed{x=\frac{3}{2}} \quad \boxed{x=-8}$$

8-96. Calculate the expressions below. Then compare your answers to problem 8-95. What do you notice?

a.

$$\frac{-6 + \sqrt{6^2 - (4)(1)(-40)}}{2 \cdot 1} = \boxed{4}$$

b.

$$\frac{-6 - \sqrt{6^2 - (4)(1)(-40)}}{2 \cdot 1} = \boxed{-10}$$

c.

$$\frac{-13 - \sqrt{13^2 - (4)(2)(-24)}}{2 \cdot 2} = \boxed{-8}$$

8-97. Use any method to solve the systems of equations below.

$$\begin{array}{r} 2x - 3y = 5 \\ 3(4x + y = 3) \\ \hline 12x + 3y = 9 \\ + \quad 2x - 3y = 5 \\ \hline 14x = 14 \end{array}$$

$$\frac{14x}{14} = \frac{14}{14}$$

$$\boxed{x=1}$$

$$4(1) + y = 3$$

$$\begin{array}{r} 4 + y = 3 \\ -4 \quad -4 \end{array}$$

$$\boxed{y=-1}$$

$$\boxed{(1, -1)}$$