

Chapter 9 - Polynomials (beginning with 9.4)

Factor each polynomial, making sure to factor out the GCF first

1. $4c^3 - 8c^2$ $4c^2(c - 2)$	2. $2k^3 + 6k^2 - 14k$	3. $x^2 - 36$ $(x+6)(x-6)$
4. $25y^2 - 81$	5. $x^2 + 12x - 45$ $(x+15)(x-3)$	6. $6x^2 + 19x - 7$
7. $2x^2 - 11x - 40$ $(2x+5)(x-8)$	8. $9x^2 + 30x + 25$	9. $2x^2 + 6x - 36$ $2(x^2 + 3x - 18)$ $2(x+6)(x-3)$
10. Which is a factor of $2x^2 + 5x - 3$? A. $(2x+1)$ B. $(x+3)$ C. $(2x+3)$ D. $(x+1)$	11. What is the greatest common factor of $6x^2 + 3xy$? A. $6x$ B. $3xy$ C. 3 D. \textcircled{D} $3x$	

Solve each equation by factoring:

12. $(x-5)(x+1) = 0$	13. $(x-13)(x-14) = 0$ $x-13=0$ $x-14=0$ $x=13$ $x=14$	14. $5w^2 - 10w = 0$
15. $6x^2 = -3x$ $6x^2 + 3x = 0$ $3x(2x+1) = 0$ $3x=0$ $2x+1=0$ $x=0$ $x = -\frac{1}{2}$	16. $x^2 - 10x + 9 = 0$	17. $x^2 - 16 = 0$ $(x+4)(x-4) = 0$ $x+4=0$ $x-4=0$ $x=-4$ $x=4$
18. $x^2 - 7x = 18$	19. $3x^2 - 10x + 8 = 0$ $(3x-4)(x-2) = 0$ $3x-4=0$ $x-2=0$ $x = \frac{4}{3}$ $x=2$	20. $5x^2 + 2x - 7 = 0$

Chapter 10 - Graphing & Solving Quadratic Equations

Find the vertex of the related parabola for each quadratic function.

21. $y = -2x^2 - 24x + 3$
 $x = \frac{24}{2(-2)} \quad y = 2(-6)^2 - 24(-6) + 3$
 $x = \frac{24}{-4} \quad y = 75$
 $x = -6$ (-6, 75)

22. $y = 3x^2 + 18x - 1$

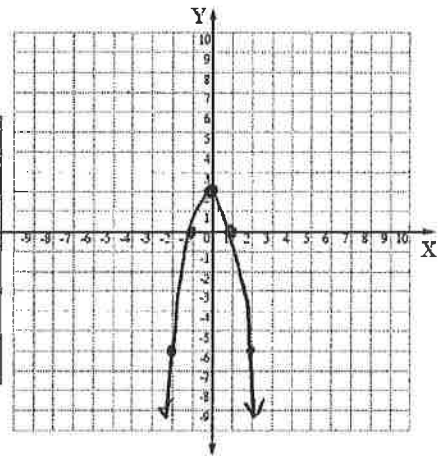
23. $y = -x^2 + 8x - 7$
 $x = \frac{-8}{2(-1)} \quad y = -(-4)^2 + 8(-4) - 7$
 $x = \frac{-8}{-2} \quad y = 9$
 $x = 4$ (4, 9)

24. Find the x-coordinate of the vertex for the quadratic function $y = 2x^2 + 12x - 7$?
 A. 12 B. -3 C. 3 D. -7

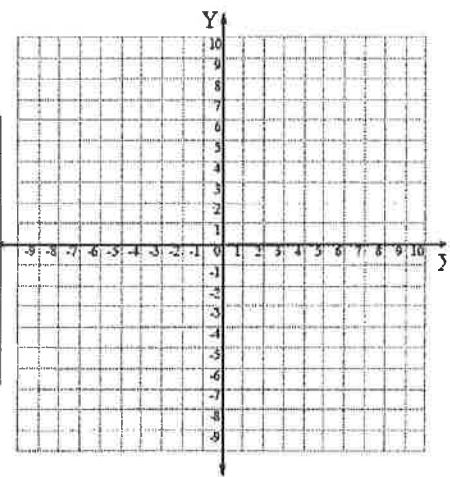
25. Graph $y = -2x^2 + 2 \rightarrow -2x^2 + 0x + 2$ 26. Graph $y = 3x^2 - 6x + 2$

$x = \frac{0}{2(-2)}$
 $x = 0$

x	y
-2	-6
-1	0
0	2
1	0
2	-6



x	y

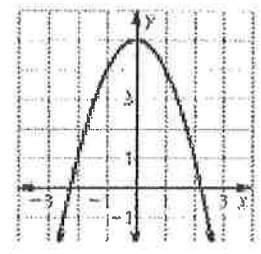


27. Does this function have a maximum or minimum: opens Up!
 $f(x) = 12x^2 - 3x + 6$? **Minimum!**

28. Does this function have maximum or minimum?
 $f(x) = -x^2 + 5x - 5$

29. Which equation best represents the parabola below?

- A. $y = 5x^2$ **(B.) $y = -x^2 + 5$**
 C. $y = -\frac{1}{5}x^2$ D. $y = -5x^2 + 2$



Match each equation with its graph.

30. $y = x^2 - 3$

31. $y = x^2 + 3$

32. $y = -x^2 - 3$

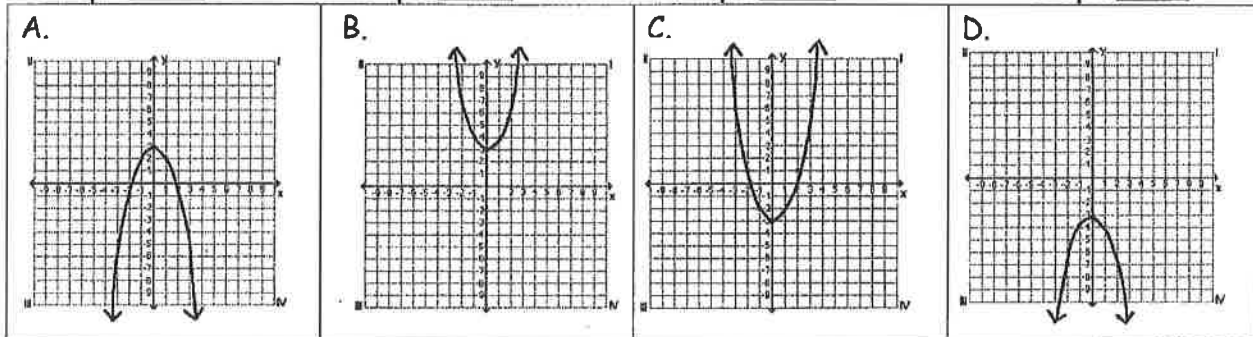
33. $y = -x^2 + 3$

Graph _____

Graph B

Graph _____

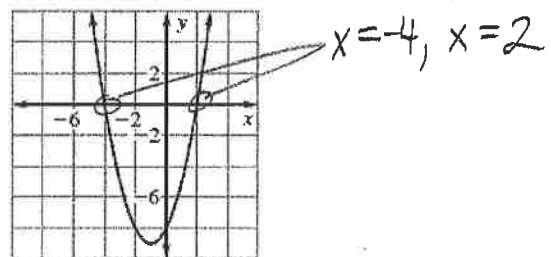
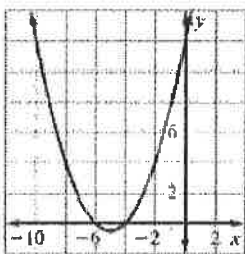
Graph A



Use the graph to find the solutions of the following equations:

34. $0 = x^2 + 10x + 24$

35. $x^2 + 2x = 8$



Solve the following quadratic equations using square roots.

<p>36. $2x^2 + 12 = -8$</p>	<p>37. $\frac{25x^2}{25} = \frac{49}{25}$</p> $\sqrt{x^2} = \sqrt{\frac{49}{25}}$ $x = \pm \frac{7}{5}$	<p>38. $3(x+1)^2 + 12 = 39$</p>
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Use the quadratic formula to solve the following quadratic equations. Find each answer in simplest radical form AND also round to the nearest hundredth (2 decimal places).

<p>39. $2x + 3x^2 = 10$</p> $3x^2 + 2x - 10 = 0$ $x = \frac{-2 \pm \sqrt{2^2 - 4(3)(-10)}}{2(3)}$ $x = \frac{-2 \pm \sqrt{124}}{6}$ $x = \frac{-2 \pm 2\sqrt{31}}{6} \quad x = \frac{-1 \pm \sqrt{31}}{3}$	<p>40. $2x^2 + 7x = 9$</p>	<p>41. $x^2 + 3x + 1 = 0$</p> $x = \frac{-3 \pm \sqrt{3^2 - 4(1)(1)}}{2(1)}$ $x = \frac{-3 \pm \sqrt{9 - 4}}{2}$ $x = \frac{-3 \pm \sqrt{5}}{2}$
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$x = 1.52, x = -2.19$

$x = .38, x = -2.62$

In 42-45, round to the nearest hundredth (.01), as needed.

<p>42. You toss a ball that travels on the path $y = -0.1x^2 + x + 2$ where x and y are measured in meters. Sketch the path of the ball. What is the maximum height of the ball?</p>	<p>43. The equation $h = -16t^2 + 40t + 5$ gives the height h, in feet, of a baseball as a function of time t, in seconds, after it is hit. What is the maximum height the baseball reaches?</p> <p>$h = -16(1.25)^2 + 40(1.25) + 5$</p> <p>$x = \frac{-40}{(2(-16))} \quad h = 30$</p> <p>$x = 1.25 \quad \boxed{30 \text{ feet}}$</p>
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<p>44. The number of new cars purchased in a city can be modeled by the equation $C = 26t^2 + 168t + 4208$, where C is the number of new cars and t is the number of years since 1958. In what year will the number of new cars reach 15,000?</p> <p>a. 2026 b. 1993 c. 1970 d. 1976</p>	<p>45. A football that is kicked at a height of 2.5 feet above the ground with an initial velocity of 45ft/second follows the equation $h = -16t^2 + 45t + 2.5$, where h is height and t is time in seconds. The ball is later caught at a height of 5.5 feet. How long was the ball in the air?</p> <p>$5.5 = -16t^2 + 45t + 2.5$</p> <p>$0 = -16t^2 + 45t - 3$</p> <p>$x = \frac{-45 \pm \sqrt{(45)^2 - 4(-16)(-3)}}{2(-16)}$</p> <p>$x = \frac{-45 \pm \sqrt{1833}}{-32} \quad x = \frac{-45 \pm 42.81}{-32}$</p> <p>$x = 0.07 \quad \boxed{x = 2.7 \text{ seconds}}$</p>
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Chapter 11 - Simplifying Radicals & Solving Radical Equations

Simplify each radical expression.

<p>46. $4\sqrt{25}$</p>	<p>47. $\sqrt{16x^2y^2}$</p> <p>$\boxed{4xy}$</p>	<p>48. $\sqrt{75n^3}$</p>	<p>49. $\sqrt{300xy^4}$</p> <p>$\sqrt{100 \cdot 3xy^4}$</p> <p>$\boxed{10y^2\sqrt{3x}}$</p>
<p>50. $\sqrt{27} \cdot \sqrt{3}$</p>	<p>51. $\sqrt{7x^5} \cdot \sqrt{14x^3}$</p> <p>$\sqrt{98x^8} = \sqrt{49 \cdot 2x^8}$</p> <p>$\boxed{7x^4\sqrt{2}}$</p>	<p>52. $2\sqrt{5} \cdot 7\sqrt{35}$</p>	<p>53. $\sqrt{18b^5} \cdot 3\sqrt{2ab}$</p> <p>$3\sqrt{36ab^6}$</p> <p>$3 \cdot 6b^3\sqrt{a}$</p> <p>$\boxed{18b^3\sqrt{a}}$</p>

54. $\frac{14}{\sqrt{2}}$	55. $\frac{8}{\sqrt{20}} = \frac{8}{2\sqrt{5}}$ $= \frac{4}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$ $= \frac{4\sqrt{5}}{5}$	56. $\frac{5\sqrt{3}}{\sqrt{10}}$	57. $\frac{\sqrt{3x^3}}{\sqrt{18x}} = \sqrt{\frac{x^2}{6}}$ $= \frac{\sqrt{x^2}}{\sqrt{6}} = \frac{x}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}}$ $= \frac{x\sqrt{6}}{6}$
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58. $7\sqrt{x} - 15\sqrt{x}$	59. $5\sqrt{8} + 9\sqrt{200} + \sqrt{32}$ $5 \cdot 2\sqrt{2} + 9 \cdot 10\sqrt{2} + 4\sqrt{2}$ $10\sqrt{2} + 90\sqrt{2} + 4\sqrt{2}$ $104\sqrt{2}$	60. $\sqrt{63} - \sqrt{28}$
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61. Which expression is equivalent to $\sqrt{24} + 5\sqrt{6}$?

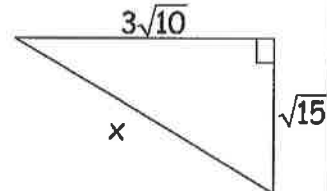
A. $5\sqrt{30}$ B. $7\sqrt{6}$ C. $11 + \sqrt{24}$ D. $10\sqrt{6}$

$2\sqrt{6} + 5\sqrt{6}$

62. Which expression is equivalent to $\sqrt{25x^5y^2}$?

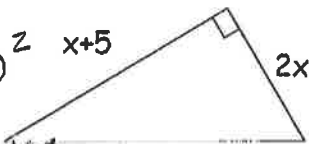
A. $5x^2y\sqrt{x}$ B. $5x^4y\sqrt{x}$ C. $x^2y\sqrt{5}$ D. $x^4y\sqrt{5x}$

For #63-65, find the value of the variable in simplest radical form

63. $12^2 + 20^2 = x^2$ $144 + 400 = x^2$ $\sqrt{544} = \sqrt{x^2}$ $x = 4\sqrt{34}$	64. 
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65.

$$(2x)^2 + (x+5)^2 = 10^2 \quad x+5$$



$$(2x)(2x) + (x+5)(x+5) = 100$$

$$4x^2 + x^2 + 10x + 25 = 100$$

$$5x^2 + 10x - 75 = 0$$

$$5(x^2 + 2x - 15) = 0$$

$$5(x+5)(x-3) = 0$$

10

$$x \neq -5$$

$$\boxed{x = 3}$$

66. If a triangle has the given side lengths, is it a right triangle?

3, $\sqrt{34}$, 5

Find the distance between each pair of points as a simplified radical.

67. $(-4, -5); (8, -1)$

$$d = \sqrt{(-4-8)^2 + (-5+1)^2}$$

$$d = \sqrt{(-12)^2 + (-4)^2}$$

$$d = \sqrt{144 + 16}$$

$$d = \sqrt{160}$$

$$\boxed{d = 4\sqrt{10}}$$

68. $(9, -4); (-6, 4)$

69. $(-3, -2); (5, -4)$

$$d = \sqrt{(-3-5)^2 + (-2+4)^2}$$

$$d = \sqrt{(-8)^2 + (2)^2}$$

$$d = \sqrt{64 + 4}$$

$$d = \sqrt{68}$$

$$\boxed{d = 2\sqrt{17}}$$

Exponential Functions Mini-Unit

Write a rule (function) for each table of coordinates:

70.

x	-2	-1	0	1	2
y	27	9	3	1	$\frac{1}{3}$

71.

x	-2	-1	0	1	2
y	$\frac{5}{2}$	5	10	20	6040

$\times 2$ $\times 2$ $\times 2$ $\times 2$

$$y = 10(2)^x$$

72.

x	-2	-1	0	1	2
y	$\frac{1}{147}$	$\frac{1}{21}$	$\frac{1}{3}$	$\frac{7}{3}$	$\frac{49}{3}$

73.

x	-2	-1	0	1	2
y	24	12	6	3	$\frac{3}{2}$

$\times \frac{1}{2}$ $\times \frac{1}{2}$ $\times \frac{1}{2}$ $\times \frac{1}{2}$

$$y = 6\left(\frac{1}{2}\right)^x$$

74.

x	-2	-1	0	1	2
y	-13	-6	-1	2	5

75.

x	-2	-1	0	1	2
y	24	12	6	3	$\frac{3}{2}$

Exponential

$y = 6 \cdot \left(\frac{1}{2}\right)^x$

Handwritten notes: $x \cdot \frac{1}{2}$, $x \cdot \frac{1}{2}$, $x \cdot \frac{1}{2}$, $x \cdot \frac{1}{2}$

76.

x	-2	-1	0	1	2
y	18	6	2	$\frac{2}{3}$	$\frac{2}{9}$

77.

x	-2	-1	0	1	2
y	16	5	0	1	8

Quadratic

Handwritten notes: -11 , -5 , $+1$, $+7$, $+6$, $+6$, $+6$

78. Write an exponential function to model the situation: A price of \$130 increases 5% each year. Tell what each variable represents.

79. Write an exponential function to model the situation: A population of 470 animals decreases at an annual rate of 12%.

$$y = 470(1 - .12)^t$$

80. The enrollment at Beta-Gamma School District has been declining 3.5% each year from 1986 to 1992. If the enrollment in 1986 was 1815, find the 1992 enrollment.

81. How much money must be deposited now in an account paying 7% annual interest, compounded yearly, to have a balance of \$1000 after 6 years?

$$1000 = a \cdot (1 + .07)^6$$

$$1000 = a \cdot 1.50$$

$$a = \$666.67$$

Chapter 13: Data and Probability

82. What are the mean, median, and mode(s) of the data? 2, 4, 6, 12, 14, 17, 26, 26, 26, 27

Handwritten notes: 2, 11, 26, 21, 14, 11, 12, 26, 26, 6

Mean: 16

Median: 22.5

Mode: 26

83. So far in geography class, a student's quiz scores are 86%, 84%, 76%, and 72%. What score does the student need on the fifth quiz to have a mean quiz score of 81%? All the quizzes have equal weights.

$$81 = \frac{86 + 84 + 76 + 72 + x}{5}$$

$$x = 87$$

84. Suppose you want to find out how many Jerome students take the bus to school, determine which sampling method is being used if you ask 6 freshmen, 6 sophomores, 6 juniors, and 6 seniors chosen at random. Stratified random

Data and Probability Cont'd

Determine each of the following:

85. Of those who participated in a soft drink survey, 48 said they preferred the new soft drink, 112 preferred the old soft drink, and 40 could not tell any difference. What is the probability that a person in this survey, chosen at random, preferred the new soft drink?

$$\frac{48}{200} = \frac{6}{25}$$

86. A number cube is rolled 120 times. Six is rolled 23 times.

a. What is the theoretical probability of rolling a six?

$$\frac{1}{6}$$

b. What is the experimental probability of rolling a six?

$$\frac{23}{120}$$

87. The probability of an event is 5:12. Find the odds against the event occurring.

$$\frac{7}{5}$$

88. Tomorrow has a 20% chance of thunderstorms. What are the odds of a thunderstorm tomorrow?

$$\frac{20}{80} = \frac{1}{4}$$

Determine whether it is best to use Counting Principle, Permutations, or Combinations on each of the following. Then, solve:

89. Eight people are entered in a race. If there are no ties, in how many ways can the first two places come out?

$$\frac{8 \times 7}{1} = 56$$

or

$$8P_2 = 56$$

90. Suppose you are choosing a 6-digit personal access code. This code is made up of 4 digits chosen from 1 to 9, followed by 2 letters chosen from A to Z. Any of these digits or letters can be repeated. Find the total number of personal access codes that can be formed.

$$9 \cdot 9 \cdot 9 \cdot 9 \cdot 26 \cdot 26$$

$$4,435,236$$

91. The Pioneer High track coach has a group of nine runners from which to choose a 4-person relay team. How many different 4-person teams can be formed from this group of runners.

$$9C_4 = 126$$

92. Fifteen mothers were asked how many months old their babies were when they got their first tooth. The results are shown below.

~~8, 8, 8, 14, 9, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8~~

Find the range and the outlier(s), if any, of the data set. 5, 5, 6, 6, 6, 6, 6, 6, 7, 8, 8, 9, 9, 14

Range: $14 - 5 = 9$

$$8 - 6 = 2$$

$$2 \times 1.5 = 3$$

$$8 + 3 = 11$$

$$6 - 3 = 3$$

Outlier: 14

93. Only one of the box-and-whisker plots correctly displays data about the ages of team members on a company baseball team. Which is it?

- The youngest member is 20 years old.
- About 75% of the members are between 25 and 34 years old.
- No one is older than 34 years old.
- About 50% of the members are at least 29 years old.

