

Chapter 9 - Polynomials (beginning with 9.4)

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

1. $4c^3 - 8c^2$	2. $2k^3 + 6k^2 - 14k$ $2k(k^2 + 3k - 7)$	3. $x^2 - 36$
4. $25y^2 - 81$ $(5y + 9)(5y - 9)$	5. $x^2 + 12x - 45$	6. $6x^2 + 19x - 7$ $(2x + 7)(3x - 1)$
7. $2x^2 - 11x - 40$	8. $9x^2 + 30x + 25$ $(3x + 5)(3x + 5)$	9. $2x^2 + 6x - 36$

10. Which is a factor of $2x^2 + 5x - 3$?

$(2x - 1)(x + 3)$

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. $3x$

Solve each equation by factoring:

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

Chapter 10 - Graphing & Solving Quadratic Equations

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

21. $y = -2x^2 - 24x + 3$	22. $y = 3x^2 + 18x - 1$ $X = \frac{-18}{2(3)} = -3$ $Y = 3(-3)^2 + 18(-3) - 1 = -28$ $(-3, -28)$	23. $y = -x^2 + 8x - 7$
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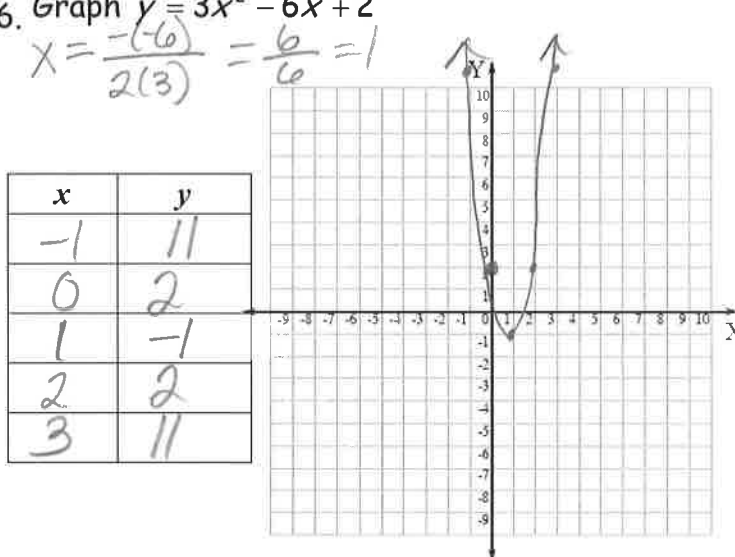
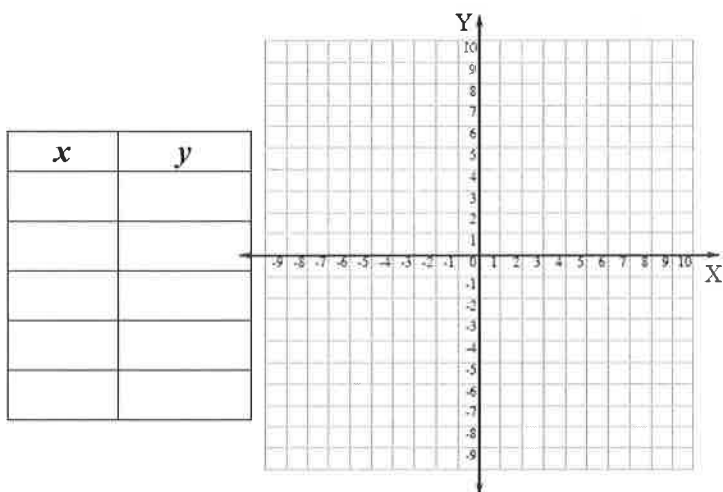
24. Find the x-coordinate of the vertex for the quadratic function $y = 2x^2 + 12x - 7$?

A. 12 **B. -3** C. 3 D. -7

$X = \frac{-12}{2(2)} = -3$

25. Graph $y = -2x^2 + 2$

26. Graph $y = 3x^2 - 6x + 2$

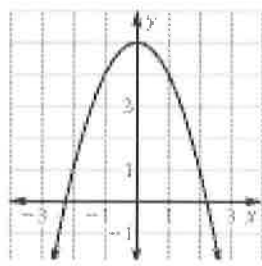


27. Does this function have a maximum or minimum:
 $f(x) = 12x^2 - 3x + 6$?

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

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. $y = -x^2 - 3$

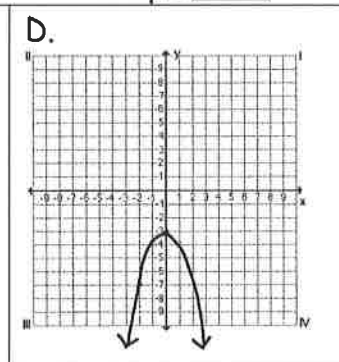
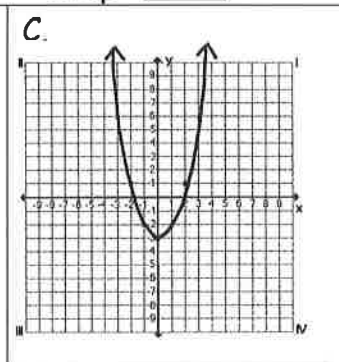
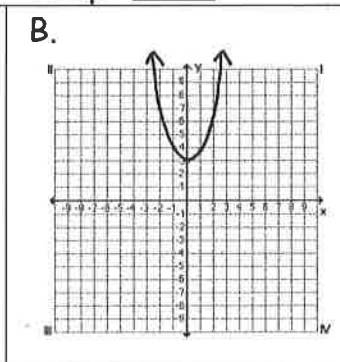
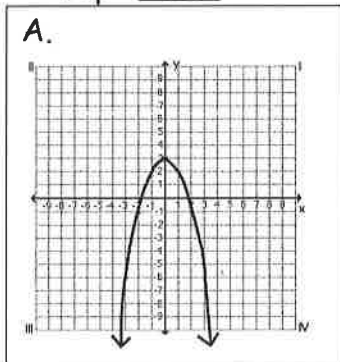
33. $y = -x^2 + 3$

Graph C

Graph _____

Graph D

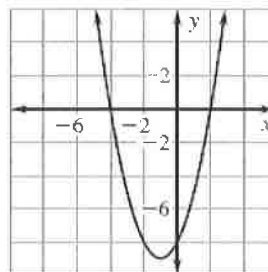
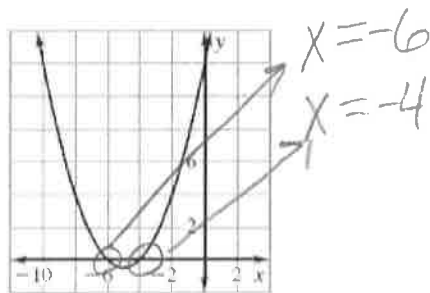
Graph _____



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

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

35. $x^2 + 2x - 8 = 0$



Solve the following quadratic equations using square roots.

36. $2x^2 + 12 = -8$
 $2x^2 = -20$
 $\sqrt{x^2} = \sqrt{-10}$
 No Real Solution

37. $25x^2 = 49$

38. ~~$3(x+1)^2 + 12 = 39$~~

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).

39. $2x + 3x^2 = 10$

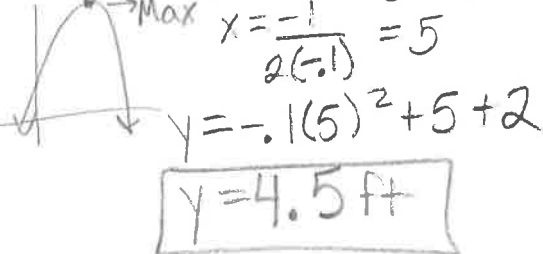
40. $2x^2 + 7x = 9$
 $2x^2 + 7x - 9 = 0$
 $x = \frac{-7 \pm \sqrt{(7)^2 - 4(2)(-9)}}{2(2)}$
 $x = \frac{-7 \pm \sqrt{121}}{4}$
 $x = \frac{-7+11}{4} = 1$
 $x = \frac{-7-11}{4} = \frac{-18}{4} = \frac{-9}{2}$

41. $x^2 + 3x + 1 = 0$

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

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?



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?

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?

- a. 2026 b. 1993 c. 1970 **d. 1976**

$$15,000 = 26t^2 + 168t + 4208$$

$$0 = 26t^2 + 168t - 10792$$

$$0 = 13t^2 + 84t - 5396$$

$$x = \frac{-84 \pm \sqrt{84^2 - 4(13)(-5396)}}{2(13)}$$

$$x = \frac{-84 + 536.33}{26} = 17.4 \text{ yrs after 1958}$$

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?

Chapter 11 - Simplifying Radicals & Solving Radical Equations

Simplify each radical expression.

<p>46. $4\sqrt{25}$</p> <p>$4 \cdot 5 = 20$</p>	<p>47. $\sqrt{16x^2y^2}$</p>	<p>48. $\sqrt{75n^3}$</p> <p>$5n\sqrt{3n}$</p>	<p>49. $\sqrt{300xy^4}$</p>
<p>50. $\sqrt{27} \cdot \sqrt{3}$</p> <p>$3\sqrt{3} \cdot \sqrt{3}$</p> <p>$3\sqrt{9}$</p> <p>9</p>	<p>51. $\sqrt{7x^5} \cdot \sqrt{14x^3}$</p>	<p>52. $2\sqrt{5} \cdot 7\sqrt{35}$</p> <p>$2\sqrt{5} \cdot 7\sqrt{35}$</p> <p>$14\sqrt{175}$</p> <p>$14 \cdot 5\sqrt{7}$</p> <p>$70\sqrt{7}$</p>	<p>53. $\sqrt{18b^5} \cdot 3\sqrt{2ab}$</p>

<p>54. $\frac{14}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$</p> $\frac{14\sqrt{2}}{2} = 7\sqrt{2}$	<p>55. $\frac{8}{\sqrt{20}}$</p>	<p>56. $\frac{5\sqrt{3}}{\sqrt{10}} \cdot \frac{\sqrt{10}}{\sqrt{10}}$</p> $= \frac{5\sqrt{30}}{10}$ $= \frac{\sqrt{30}}{2}$	<p>57. $\sqrt{\frac{3x^3}{18x}}$</p>
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<p>58. $7\sqrt{x} - 15\sqrt{x}$</p> $-8\sqrt{x}$	<p>59. $5\sqrt{8} + 9\sqrt{200} + \sqrt{32}$</p>	<p>60. $\sqrt{63} - \sqrt{28}$</p> $3\sqrt{7} - 2\sqrt{7}$ $1\sqrt{7}$
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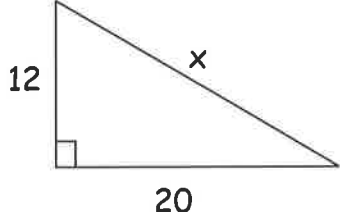
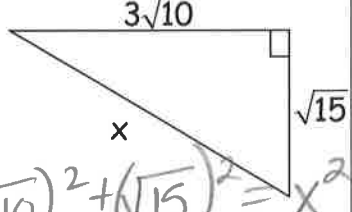
61. Which expression is equivalent to $\sqrt{24} + 5\sqrt{6}$?

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

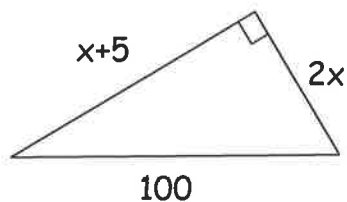
62. Which expression is equivalent to $\sqrt{25x^5y^2}$? $5x^2y\sqrt{x}$

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

<p>63.</p> 	<p>64.</p>  <p> $(3\sqrt{10})^2 + (\sqrt{15})^2 = x^2$ $(3\sqrt{10})(3\sqrt{10}) + (\sqrt{15})(\sqrt{15}) = x^2$ $9 \cdot 10 + 15 = x^2$ $90 + 15 = x^2$ $105 = x^2$ $x = \sqrt{105}$ </p>
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65.



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

3, $\sqrt{34}$, 5

$$3^2 + 5^2 \stackrel{?}{=} (\sqrt{34})^2$$

$$9 + 25 = 34?$$

$$34 = 34 \checkmark$$

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

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

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

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

$$D = \sqrt{(-6-9)^2 + (4+4)^2}$$

$$D = \sqrt{(-15)^2 + 8^2}$$

$$D = \sqrt{289}$$

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	$\frac{1}{3}$

\downarrow \downarrow \downarrow \downarrow
 $\times \frac{1}{3}$ $\times \frac{1}{3}$ $\times \frac{1}{3}$ $\times \frac{1}{3} \rightarrow b$

$$y = 3 \cdot \left(\frac{1}{3}\right)^x$$

71.

x	-2	-1	0	1	2
y	$\frac{5}{2}$	5	10	20	60 40

In 72-77, state whether each set of data is linear, exponential, or quadratic. If exponential, write the function.

72.

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

\downarrow \downarrow \downarrow \downarrow
 $\times 7$ $\times 7$ $\times 7$ $\times 7$

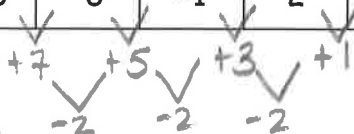
$$y = \frac{1}{3} \cdot 7^x$$

73.

x	-2	-1	0	1	2
y	1	7	13	19	25

74.

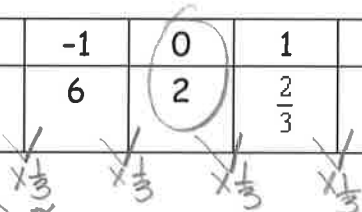
x	-2	-1	0	1	2
y	-13	-6	-1	2	5



Quadratic

76.

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



$$y = 2 \cdot \left(\frac{1}{3}\right)^x$$

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

$$y = 130(1 + 0.05)^t$$

y = current price

t = time in years

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.

$$y = 1815(1 - 0.035)^6$$

$$y = 1,465.68$$

75.

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

77.

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

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

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?

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, 2, 17, 26, 27, 14, 4, 12, 26, 26, 6

Mean: 16

Median: $\frac{14+17}{2} = 15.5$

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.

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?

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.

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?

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.

$$\underline{9} \cdot \underline{9} \cdot \underline{9} \cdot \underline{9} = \underline{26} \cdot \underline{26}$$

$$4,435,236$$

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.

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

~~8, 6, 6, 14, 7, 8, 5, 6, 6, 6, 9, 8, 6, 6, 5~~

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

$$8 - 6 = 2$$

$$2(1.5) = 3$$

$$6 + 3 = 9 \rightarrow 14 \text{ is an outlier!}$$

$$6 - 3 = 3$$

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.

