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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.) 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. $5x^2 + 2x - 7 = 0$

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Chapter 10 – Graphing & Solving Quadratic Equations

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

21. $y = -2x^2 - 24x + 3$

$x = \frac{24}{2(-2)}$ $y = -2(-6)^2 - 24(-6) + 3$

$x = \frac{24}{-4}$ $y = 75$

$x = -6$ $(-6, 75)$

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

23. $y = -x^2 + 8x - 7$

$x = \frac{-8}{2(-1)}$ $y = -(4)^2 + 8(4) - 7$

$x = \frac{-8}{-2}$ $y = 9$

$x = 4$ $(4, 9)$

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

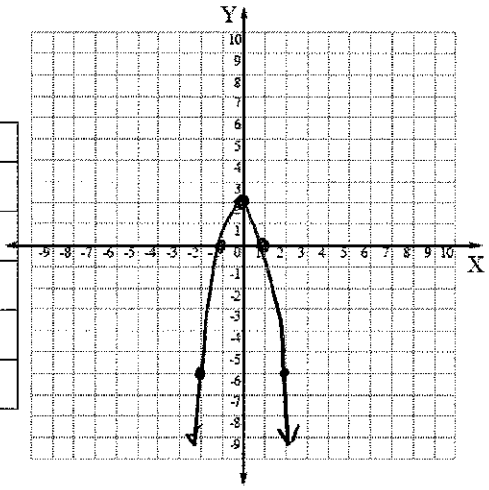
A. 12 B. -3 C. 3 D. -7

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

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

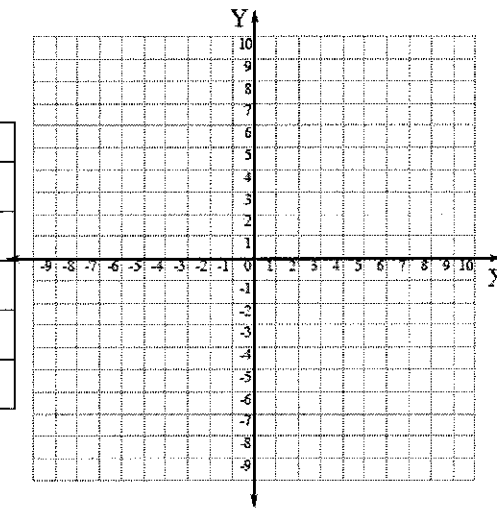
$x = 0$

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



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

x	y



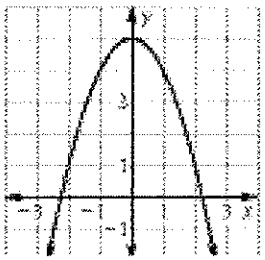
27. Does this function have a maximum or minimum: opens up!
$f(x) = 12x^2 - 3x + 6$? Minimum!

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



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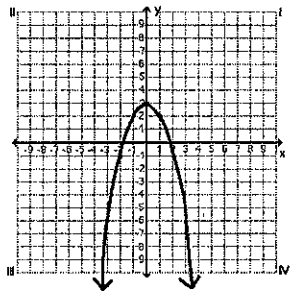
Match each equation with its graph.

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

A.



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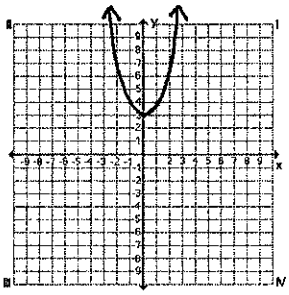
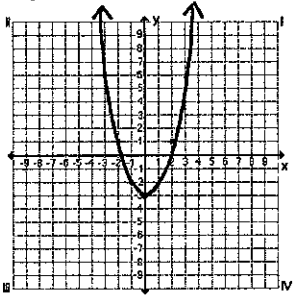
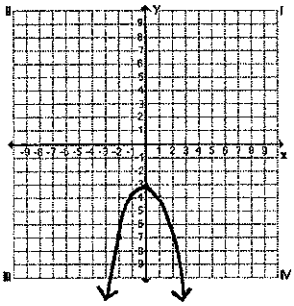


C.

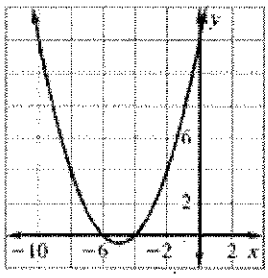


D.

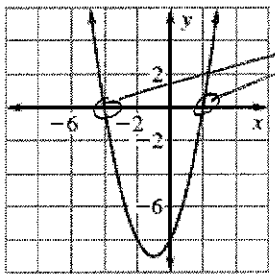


Use the graph to find the solutions of the following equations:

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



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



$x = -4, \; x = 2$

Solve the following quadratic equations using square roots.

36. $2x^2 + 12 = -8$

37. $\frac{25x^2}{25} = \frac{49}{25}$

$\sqrt{x^2} = \sqrt{\frac{49}{25}}$

$x = \pm\frac{7}{5}$

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

$3x^2 + 2x - 10 = 0$

$x = \frac{-2 \pm \sqrt{2^2 - 4(3)(-10)}}{2(3)}$

$x = \frac{-2 \pm \sqrt{124}}{6}$

$x = \frac{-2 \pm 2\sqrt{31}}{6}$ $\quad x = \frac{-1 \pm \sqrt{31}}{3}$

$x = 1.52, \; x = -2.19$

40. $2x^2 + 7x = 9$

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

$x = \frac{-3 \pm \sqrt{3^2 - 4(1)(1)}}{2(1)}$

$x = \frac{-3 \pm \sqrt{9 - 4}}{2}$

$x = \frac{-3 \pm \sqrt{5}}{2}$

$x = -.38 \quad x = -2.62$

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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?

$h = -16(1.25)^2 + 40(1.25) + 5$

$x = \frac{-40}{(2(-16))}$

$h = 30$

$x = 1.25$

30 feet

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

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?

$5.5 = -16t^2 + 45t + 2.5$

$0 = -16t^2 + 45t - 3$

$x = \frac{-45 \pm \sqrt{(45)^2 - 4(-16)(-3)}}{2(-16)}$

$x = \frac{-45 \pm \sqrt{1833}}{-32}$ $x = \frac{-45 \pm 42.81}{-32}$ $x = .07$

$x = 2.7$ seconds

Chapter 11 – Simplifying Radicals & Solving Radical Equations

Simplify each radical expression.

46. $4\sqrt{25}$

47. $\sqrt{16x^2y^2}$

$4xy$

48. $\sqrt{75n^3}$

49. $\sqrt{300xy^4}$

$\sqrt{100 \cdot 3xy^4}$

$10y^2\sqrt{3x}$

50. $\sqrt{27} \cdot \sqrt{3}$

51. $\sqrt{7x^5} \cdot \sqrt{14x^3}$

$\sqrt{98x^8} = \sqrt{49 \cdot 2x^8}$

$7x^4\sqrt{2}$

52. $2\sqrt{5} \cdot 7\sqrt{35}$

53. $\sqrt{18b^5} \cdot 3\sqrt{2ab}$

$3\sqrt{36ab^6}$

$3 \cdot 6b^3\sqrt{a}$

$18b^3\sqrt{a}$

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54. $\frac{14}{\sqrt{2}}$

55. $\frac{8}{\sqrt{20}} = \frac{8}{2\sqrt{5}}$

$= \frac{4}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$

$= \boxed{\frac{4\sqrt{5}}{5}}$

56. $\frac{5\sqrt{3}}{\sqrt{10}}$

57. $\sqrt{\frac{3x^3}{18x}} = \sqrt{\frac{x^2}{6}}$

$= \frac{\sqrt{x^2}}{\sqrt{6}} = \frac{x}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}}$

$= \boxed{\frac{x\sqrt{6}}{6}}$

58. $7\sqrt{x} - 15\sqrt{x}$

59. $5\sqrt{8} + 9\sqrt{200} + \sqrt{32}$

$5 \cdot 2\sqrt{2} + 9 \cdot 10\sqrt{2} + 4\sqrt{2}$

$10\sqrt{2} + 90\sqrt{2} + 4\sqrt{2}$

$\boxed{104\sqrt{2}}$

60. $\sqrt{63} - \sqrt{28}$

61. Which expression is equivalent to $\sqrt{24} + 5\sqrt{6}$?

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

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

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

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

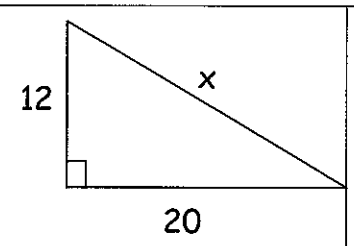
63.

$12^2 + 20^2 = x^2$

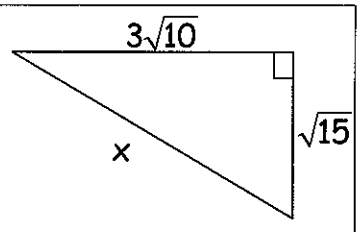
$144 + 400 = x^2$

$\sqrt{544} = \sqrt{x^2}$

$\boxed{x = 4\sqrt{34}}$



64.



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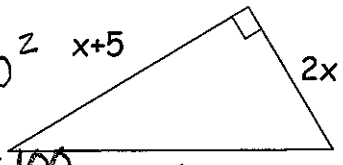
65.



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

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

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

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

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

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

$x=\cancel{-5}$

$\boxed{x=3}$

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	~~40~~ 40

×2 ×2 ×2 ×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	$\frac{3}{2}$

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

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