

Integrated Algebra Review #1 for Final

What You Must Memorize For Final

1) Quadratic Formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

HW. Pg 1, 2, 5
6, 7, 15

2) Standard Form: $ax^2 + bx + c = 0$

KEY

3) Perfect Squares from 0 to 169: $\sqrt{0}, \sqrt{1}, \sqrt{4}, \sqrt{16} \dots, etc$

4) Discriminant: $b^2 - 4ac$

5) Complete the Square: $x^2 - 5x + \frac{25}{4}$

$$y = ab^x$$
$$y = a(1+r)^t$$
$$y = a(1-r)^t$$

6) Direct Variation: $y = kx$

7) Inverse Variation: $y = \frac{k}{x}$

8) Vertex: $-\frac{b}{2a}$

9) Pythagorean Theorem: $a^2 + b^2 = c^2$

10) X and Y Intercepts: To find y-intercept, set x's equal to zero. To find, x-intercepts, set y equal to zero and solve for x.

HW

Integrated Algebra Practice Factoring and Quadratic Equations

NAME: _____
DO OUT THE PROBLEM. THEN, MATH THE ANSWER!

_____ 1. Expand and simplify $(2x - 1)(x + 3)$

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

(b.) $2x^2 + 5x - 3$

c. $2x^2 - 7x + 3$

d. $2x^2 - 5x - 3$

_____ 2. Factor completely: $4x^2 - 9$

a. $(4x - 9)(x + 1)$

b. $(4x + 9)(x - 1)$

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

d. $(2x - 3)^2$

_____ 3. Factor completely: $9x^2 - 24x + 16$

a. $(9x + 4)(x - 4)$

b. $(9x - 16)(x + 1)$

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

d. $(3x + 4)(3x - 4)$

_____ 4. Factor completely: $9x^2 - 16$

(a.) $(3x - 4)(3x + 4)$

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

c. $(9x - 16)(x + 1)$

d. $(9x - 1)(x + 16)$

_____ 5. Factor completely: $2x^2 + 7x + 6$

a. $x(2x + 7) + 6$

b. $(2x + 2)(x + 3)$

c. $(2x + 1)(x + 6)$

(d.) $(2x + 3)(x + 2)$

_____ 6. Expand and simplify $-3x(2x - 1)$

(a.) $-6x^2 + 3x$

b. $6x^2 - 2x$

c. $-2x^2 + 6x$

d. $3x^2 - 6x$

H.W

___ 7. Expand and simplify $(2x - 1)(x - 3)$

$\begin{array}{r} -x \\ -6 \\ \hline \end{array}$

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

b. $2x^2 - 7x + 3$

c. $2x^2 - 5x - 3$

d. $2x^2 + 5x - 3$

___ 8. Factor completely: $3x^2 - 7x + 2$

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

b. $(x - 2)(3x - 1)$
 $\begin{array}{r} -6x \\ -x \\ \hline \end{array}$

c. $(x - 1)(3x - 2)$

d. $(x + 2)(3x + 1)$
 $\begin{array}{r} 6x \\ x \\ \hline \end{array}$

___ 9. Factor completely: $2x^2 + 5x + 3$

a. $x(2x + 5) + 3$

b. $(2x + 3)(x + 1)$

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

d. $(2x + 1)(x + 3)$

___ 10. Expand and simplify $-2x(x - 3)$

a. $-6x^2 + 3x$

b. $3x^2 - 6x$

c. $6x^2 - 2x$

d. $-2x^2 + 6x$

___ 11. Factor completely: $4x^2 - 25$

a. $(2x - 5)(2x + 5)$

b. $(2x - 5)^2$

c. $(4x - 5)(x + 5)$

d. $(4x + 5)(x - 5)$

___ 14. Factor completely: $3x^2 - 3x$

a. $6x(3x - 1)$

b. $3(x - 1)^2$

c. $3x(x - 1)$

d. $(3x - 1)(3x - 2)$

___ 15. Expand and simplify $3x(x - 2)$

a. $6x^2 - 2x$

b. $-2x^2 + 6x$

c. $3x^2 - 6x$

d. $-6x^2 + 3x$

Simplify the following. Leave all answers with positive exponents.

16. $x^2 \cdot x^7$
 x^9

22. $(2w^2x^4)^3$
 $8w^6x^{12}$

17. $(a^4)^{12}$
 a^{48}

23. $\frac{28x^2}{y^{-9}}$
 $28x^2y^9$

18. $(3b)^3$
 $27b^3$

24. $\frac{x^{14}}{x^6}$
 x^8

19. 977^0
 1

25. $\left(\frac{x}{y}\right)^8$
 $\frac{x^8}{y^8} = x^8y^{-8}$

20. $\frac{1}{5^{-3}}$
 $5^3 = 125$

26. $\frac{7d^4}{df^5} \cdot \frac{d^6}{f^5}$
 $7d^9f^{-10}$ or $\frac{7d^9}{f^{10}}$

21. $-6x^8y^{-8}$
 $-\frac{6x^8}{y^8}$

27. $\frac{3t^4v^3}{21t^2v^6}$
 $\frac{t^2}{7v^3}$

Multiply or Divide. Express your answers in scientific notation.

28. $(2.3 \times 10^2)(4.5 \times 10^{-7})$

29. $\frac{4.8 \times 10^2}{1.2 \times 10^5}$

Multiply.

30. $3x(4x - 9)$

$$\underline{12x^2 - 27x}$$

31. $4x^2(x + 6)$

$$\underline{4x^3 + 24x^2}$$

32. $2x^2(15x^3 - 10)$

$$\underline{30x^5 - 20x^2}$$

Multiply the following. Use your choice of methods, but show your work!!

33. $(x + 9)(x - 6)$

$$\begin{array}{r} x^2 + 9x - 6x - 54 \\ x^2 + 3x - 54 \end{array}$$

36. $(x - 6)(x - 8)$

$$\begin{array}{r} x^2 - 8x - 6x + 48 \\ x^2 - 14x + 48 \end{array}$$

34. $(x + 3)(4x + 5)$

$$\begin{array}{r} 4x^2 + 12x + 5x + 15 \\ 4x^2 + 17x + 15 \end{array}$$

37. $(7x + 3)(7x - 2)$

$$\begin{array}{r} (7x)^2 - 14x + 21x - 6 \\ 49x^2 + 7x - 6 \end{array}$$

35. $(3x - 1)(8x + 1)$

$$\begin{array}{r} 24x^2 + 3x - 8x - 1 \\ 24x^2 - 5x - 1 \end{array}$$

38. $(3x^3 - 2x^2 + 6)(x + 5)$

$$\begin{array}{r} 3x^4 + 15x^3 - 2x^3 - 10x^2 + 6x + 30 \\ 3x^4 + 13x^3 - 10x^2 + 6x + 30 \end{array}$$

Chapter 6

Factor out the largest possible *monomial*.

39. $5x^2 - 15$

$5x(x-3)$

40. $8a + 10b - 16$

$2(4a + 5b - 8)$ ✓
 ~~$(\quad)(\quad)$~~

41. $3c^4 - 6c^2 - 15c$

✓ $3c(c^3 - 2c - 5) = 0$
 $c^3 - 2c - 5 = 0$
 ~~$(c^2 - 5)(c + 1)$~~

Factor completely (remember – they are not always “ready” to go...).

42. $x^2 + 9x + 14$

$(x+7)(x+2)$

54
 ^
 227
 ^
 93
 356

43. $y^2 - 15y + 54$

$(y-6)(y-9)$

44. $t^2 + 8t + 15$

$(t+5)(t+3)$

45. $m^2 + 23m - 24$

$(m-1)(m+24)$

46. $x^2 - x - 12$

$(x-4)(x+3)$

47. $x^2 + xy - 42y^2$

$(x+7)(x-6)$

Factor the following *differences of squares* completely.

48. $x^2 - 121$

$(x+11)(x-11)$

49. $100a^2 - 144$

$(10a-12)(10a+12)$

50. $5m^2 - 20$

$5(m^2 - 4)$
 $5(m+2)(m-2)$

Factor the following *perfect square trinomials* completely.

51. $x^2 + 18x + 81$

$$(x+9)(x+9)$$

52. $25m^2 + 30m + 9$

$$(5m+3)(5m+3)$$

53. $4y^3 - 16y^2 + 16y$

$$4y(y^2 - 4y + 4)$$

$$4y(y-2)(y-2)$$

Factor completely (remember – they are not always “ready” to go...).

54. $3y^2 - 20y + 12$

$$(3y - 2)(y - 6)$$

55. $2x^2 - 13x - 45$

$$(2x+5)(x-9)$$

56. $18n^3 + 33n^2 - 6n$

$$= n(18n^2 + 33n - 6)$$

$$= n(18n-3)(n+2)$$

Solve for the given variable.

57. $(a-5)(a+2) = 0$

factored = 0

$$a^2 + 2a - 5a - 10 = 0$$

$$a^2 - 3a - 10 = 0$$

$$a - 5 = 0 \quad a + 2 = 0$$

$$\boxed{a=5} \quad \boxed{a=-2}$$

58. $x(x-3) = 0$

factored = 0

$$\cancel{x^2 - 3x} = 0$$

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

$$\boxed{x=0} \quad \boxed{x=3}$$

59. $y^2 + 23y - 24 = 0$

$$(y+24)(y-1) = 0$$

$$\boxed{y = -24}$$

$$\boxed{y = 1}$$

Chapter 10

Multiply or Divide.

<p>60. $\frac{2}{3} \cdot \frac{3}{16}$</p> $= \frac{1}{8}$	<p>61. $\frac{3}{4} \div \frac{7}{8}$</p> $\frac{3}{4} \cdot \frac{8}{7} = \frac{24}{28} = \frac{12}{14} = \frac{6}{7}$
<p>62. $\frac{5x}{2} \cdot \frac{x}{15}$</p> $\frac{x^2}{2 \cdot 3} = \frac{x^2}{6}$	<p>63. $\frac{5x}{2} \div \frac{x}{15}$</p> $\frac{5x}{2} \cdot \frac{15}{x} = \frac{75}{2}$

Add or Subtract.

<p>64. $\frac{3}{4} + \frac{7}{4} = \frac{10}{4} = \frac{5}{2}$</p>	<p>65. $\frac{1}{3} - \frac{5}{7}$</p> $\frac{7}{21} - \frac{15}{21} = \frac{-8}{21}$
<p>66. $(5x - 7) - (8x - 12)$</p> <p>sub</p> $5x - 7 - 8x + 12$ $= -3x + 5$	<p>67. $\frac{(12x + 4)}{5} - \frac{(4x + 3)}{5}$</p> $\frac{12x + 4 - 4x - 3}{5}$ $= \frac{8x + 1}{5}$

Simplify Completely.

<p>68. $\frac{12x^4y^6}{8x^7y^2}$</p> $= \frac{12}{8} \frac{x^4}{x^7} \frac{y^6}{y^2}$ $= \frac{3}{2} \frac{y^4}{x^3}$	<p>69. $\frac{3x + 9}{3x}$</p> $= \frac{3x}{3x} + \frac{9}{3x}$ $= 1 + \frac{3}{x}$
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factor 1st!

70. $\frac{3a + 9b}{12a^2} = \frac{3a}{12a^2} + \frac{9b}{12a^2}$

or $\frac{3(a+3b)}{3(4a^2)}$

$= \frac{1}{4a} + \frac{3b}{4a^2}$

$= \frac{a+3b}{4a^2}$

71. $\frac{6y^2 + 3y}{3y^2 + 6y} = \frac{3y(2y+1)}{3y(y+2)}$

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

72. $\frac{14a^2 - 14b^2}{21a - 21b}$

$\frac{14(a^2 - b^2)}{21(a-b)} = \frac{14(a+b)(a-b)}{21(a-b)}$

$= \frac{2(a+b)}{3}$

73. $\frac{b^2 - 10b + 21}{b^2 - 11b + 28}$

$\frac{(b-7)(b-3)}{(b-7)(b-4)}$

$= \frac{b-3}{b-4}$

Multiply.

74. $\frac{5}{2x} \cdot \frac{4x}{17}$

$= \frac{10}{17}$

75. $\frac{2x^2}{x} \cdot \frac{5}{2x}$

$\frac{2 \cdot 5 \cdot x \cdot x}{2 \cdot x \cdot x} = 5$

76. $\frac{4x}{2x+2} \cdot \frac{4x+4}{8x}$

$\frac{4x}{2(x+1)} \cdot \frac{4(x+1)}{8x}$

$= \frac{16}{16} = 1$

77. $\frac{m^2 - 4}{5m} \cdot \frac{4m^2}{m+2}$

$\frac{(m-2)(m+2)}{5m} \cdot \frac{4m^2}{(m+2)}$

$= \frac{4(m-2)}{5}$

107. Solve each of the following using the **zero-product property**. SHOW WORK.

a) $(x + 10)(x + 24) = 0$

already set = 0 and factored
 $x = -10 \quad x = -24$

b) $(2x - 6)(5x + 2) = 0$

$x = 3 \quad x = -\frac{2}{5}$
 $2x - 6 = 0 \quad x = 3$
 $5x + 2 = 0 \quad x = -\frac{2}{5}$
 $10x + 4 - 30x - 12 = 0$
 $10x^2 - 26x - 12 = 0$
 $2(5x^2 - 13x - 6) = 0$
 $5x^2 - 13x - 6 = 0$

c) $x(x + 158) = 0$

$x = 0$
 $x + 158 = 0$
 $x = -158$

d) $5x(4x - 16)(x + 9) = 0$

$5x = 0$
 $4x - 16 = 0$
 $x + 9 = 0$
 $x = 0$
 $x = 4$
 $x = -9$

108. Solve each of the following equations by **factoring**: SHOW WORK.

a) $x^2 - 8x + 16 = 0$

$(x - 4)(x - 4) = 0$
 ~~$x = 8$~~
 ~~$x = 2$~~
 $x = 4$

b) $x^2 + 4x - 21 = 0$

$(x + 7)(x - 3) = 0$
 $x = -7$
 $x = 3$

109. Complete the square for the following:

a) $x^2 + 20x$ _____

b) $u^2 - 26u$ _____

110. Solve using any method you want... **show work!!**

a) $x^2 - 49 = 0$

$(x + 7)(x - 7) = 0$
 $x + 7 = 0 \quad x - 7 = 0$
 $x = -7 \quad x = 7$

b) $x^2 + 10x = -4$

$x^2 + 10x - 4 = 0$
 $(x - 4)(x + 1) = 0$
 $x^2 + 10x + 4 = 0$
 $a = 1 \quad b = 10 \quad c = 4$
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
 $x = \frac{-10 \pm \sqrt{100 - 16}}{2} = \frac{-10 \pm \sqrt{84}}{2} = \frac{-10 \pm 2\sqrt{21}}{2} = -5 \pm \sqrt{21}$

QF $5 \pm \sqrt{21}$