

## Semester 1 Final Review

1) What does it mean for two terms to be like terms? Give an example along with your definition.

Same base same exponent,  $3x^2$  and  $2x^2$

**Simplify each expression.**

$$2) -4n + n$$

$$-3n$$

$$3) 7 - 5p + 7 - 7p$$

$$14 - 12p$$

$$4) 3n + 2 - 3n$$

$$2$$

$$5) 8x - x$$

$$7x$$

**Find each product.**

$$6) (5x + 1)(3x - 2)$$

$$15x^2 - 7x - 2$$

$$7) (7v - 8)(3v + 1)$$

$$21v^2 - 17v - 8$$

$$8) (2n + 5)(2n + 6)$$

$$4n^2 + 22n + 30$$

$$9) (6x - 5)(x + 3)$$

$$6x^2 + 13x - 15$$

**Simplify. Your answer should contain only positive exponents.**

$$10) ba^{-3} \cdot 2a^3b^2$$

$$2b^3$$

$$11) 2x^{-2}y^3 \cdot 2x^2y^3$$

$$4y^6$$

$$12) x^{-1}y^{-3} \cdot 2x^4$$

$$\frac{2x^3}{y^3}$$

$$13) (4u^4v^3)^3$$

$$64u^{12}v^9$$

$$14) (4x^2)^{-2}$$

$$\frac{1}{16x^4}$$

$$15) (4x^2y^2)^{-1} \frac{1}{4x^2y^2}$$

$$16) \frac{3uv^2}{2uv^{-4}}$$

$$\frac{3v^6}{2}$$

$$17) \frac{4x^2y^3}{4x^{-2}}$$

$$x^4y^3$$

$$18) \frac{2x^{-2}y^4}{x^4y^{-4}} \frac{2y^8}{x^6}$$

$$19) \frac{u^{-3}}{3u^4v^2 \cdot u^4v^{-2}} \frac{1}{3u^{11}}$$

$$20) \frac{2n \cdot 4m^4 n^2}{3m^3}$$

$$\frac{8n^3 m}{3}$$

$$21) (x^{-3}y^2 \cdot yx^3)^3$$

$$y^9$$

$$22) x^4 y^3 \cdot (yx^3)^3$$

$$x^{13} y^6$$

$$23) \frac{2x^4}{(2y^4)^3}$$

$$\frac{x^4}{4y^{12}}$$

$$24) \frac{x^2}{(2x^4 y^{-4})^{-4}}$$

$$\frac{16x^{18}}{y^{16}}$$

$$25) \frac{(2m^4 n^4)^3}{2m}$$

$$4m^{11} n^{12}$$

26) What does it mean to have a rational (fraction) exponent?

There will be a radical

Write each expression in exponential form.

$$27) (\sqrt[4]{10r})^3$$

$$(10r)^{\frac{3}{4}}$$

$$28) (\sqrt[4]{n})^3$$

$$n^{\frac{3}{4}}$$

$$29) \sqrt{2n}$$

$$(2n)^{\frac{1}{2}}$$

$$30) \sqrt{x}$$

$$x^{\frac{1}{2}}$$

Write each expression in radical form.

$$31) (7r)^{\frac{1}{3}}$$

$$\sqrt[3]{7r}$$

$$32) (7r)^{\frac{3}{2}}$$

$$(\sqrt{7r})^3$$

$$33) (2k)^{\frac{1}{2}}$$

$$\sqrt{2k}$$

$$34) x^{\frac{3}{2}}$$

$$(\sqrt{x})^3$$

List all the sets two which the following numbers belong.

35) -5

Real, Rational, Integer

36) 0

Real, rational, integer, whole

37) 12

Real, rational, integer, whole, natural

38) 0.75

Real, rational

39) 4.8673999573658...

Real, irrational

40)  $\sqrt{7}$

Real, irrational

41)  $5 + i$

Complex

42)  $-7i$

Complex, imaginary

43) What are the values for  $i$  and  $i^2$  ?

$$i = \sqrt{-1}, i^2 = -1$$

**Simplify.**

44)  $(-8 - 3i) - (7 - 5i)$

$$-15 + 2i$$

45)  $(-2 - i) - (-1 - 4i)$

$$-1 + 3i$$

46)  $(-6 + i) - (5 - 8i)$

$$-11 + 9i$$

47)  $(4 - 5i) + 6 - (7i)$

$$10 - 12i$$

48)  $(-4 - 8i)(-2 - 5i)$

$$-32 + 36i$$

49)  $(4 - i)(6 - 5i)$

$$19 - 26i$$

50)  $(-2 - 4i)(1 - 3i)$

$$-14 + 2i$$

51)  $(7 + 6i)(-8 + 5i)$

$$-86 - 13i$$

**Simplify. Use absolute value signs when necessary.**

52)  $\sqrt{100n^2}$

$$10|n|$$

53)  $\sqrt{448x^4}$

$$8x^2\sqrt{7}$$

54)  $\sqrt{256m^3}$

$$16|m|\sqrt{m}$$

55)  $\sqrt{100u^4v}$

$$10u^2\sqrt{v}$$

56)  $\sqrt{12xy^3}$

$$2|y|\sqrt{3xy}$$

57)  $\sqrt{150x^4y^2}$

$$5x^2|y|\sqrt{6}$$

58) Why are absolute value signs necessary on some answers when simplifying radicals?

In order to keep the answer positive

**Determine whether your answer will be rational or irrational with the following operations.**

59) Sum of a rational number with a rational number

**Rational**

61) Product of an irrational number with an irrational number

**Rational or irrational**

63) Sum of an irrational number with an irrational number

**Rational or irrational**

60) Product of a rational number with an irrational number

**Irrational**

62) Sum of an irrational number with a rational number

**Irrational**

64) Product of a rational number with a rational number

**Rational**

**Factor each completely.**

65)  $x^3 + 5x^2 - 14x$

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

67)  $b^2 - 10b + 16$

$(b - 8)(b - 2)$

69)  $2k^2 - 9k + 9$

$(2k - 3)(k - 3)$

71)  $3n^2 + 5n$

$n(3n + 5)$

73)  $9x^2 + 13x + 4$

$(x + 1)(9x + 4)$

75)  $8x^3 + 24x^2$

$8x^2(x + 3)$

66)  $p^2 - 3p - 18$

$(p - 6)(p + 3)$

68)  $v^2 + 17v + 70$

$(v + 10)(v + 7)$

70)  $5n^4 - 51n^3 + 54n^2$

$n^2(5n - 6)(n - 9)$

72)  $3n^2 + 32n + 64$

$(3n + 8)(n + 8)$

74)  $48n^3 + 60n^2$

$12n^2(4n + 5)$

76)  $45m^3 - 400m^2 - 500m$

$5m(m - 10)(9m + 10)$

**Solve each equation by factoring.**

77)  $k^2 - 24 = 5k$

$\{8, -3\}$

78)  $p^2 + 5p = 0$

$\{-5, 0\}$

79)  $8m^2 = 17m - 2$

$$\left\{ \frac{1}{8}, 2 \right\}$$

80)  $5b^2 = 42 - 23b$

$$\left\{ \frac{7}{5}, -6 \right\}$$

**Solve each equation by completing the square.**

81)  $m^2 + 8m = -3$

$$\{-4 + \sqrt{13}, -4 - \sqrt{13}\}$$

82)  $v^2 - 8v - 83 = -10$

$$\{4 + \sqrt{89}, 4 - \sqrt{89}\}$$

83)  $x^2 + 14x - 63 = -9$

$$\{-7 + \sqrt{103}, -7 - \sqrt{103}\}$$

84)  $n^2 - 10n + 20 = 4$

$$\{8, 2\}$$

**Solve each equation with the quadratic formula.**

85)  $12r^2 - 2r = 12$

$$\left\{ \frac{1 + \sqrt{145}}{12}, \frac{1 - \sqrt{145}}{12} \right\}$$

86)  $12x^2 = -5 - 8x$

$$\left\{ \frac{-2 + i\sqrt{11}}{6}, \frac{-2 - i\sqrt{11}}{6} \right\}$$

87)  $6k^2 - 4 = 11k$

$$\left\{ \frac{11 + \sqrt{217}}{12}, \frac{11 - \sqrt{217}}{12} \right\}$$

88)  $2n^2 + 10 = -4n$

$$\{-1 + 2i, -1 - 2i\}$$

89) Where do solutions to a quadratic show up on a graph?

The solutions are the x-intercepts