Math 4

Name_____

Prerequisite Algebra Skills Practice 1

Date_____

1. **Multiply the following expressions:**

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

$= 4x^2 + 6x + 6x + 9$

$= \boxed{4x^2 + 12x + 9}$

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

$= 2x^3 + 3x^2 - 5x - 4x^2 - 6x + 10$

$= \boxed{2x^3 - x^2 - 11x + 10}$

2. **Simplify the following expressions.** *No negative exponents allowed!*

a.) $2x^2 + 2x^4 - 5x^2 + x^4 - 3x^4$

$= \boxed{-3x^2}$

b.) $(3x^2y^{-2})^4$

$= 81x^8 y^{-8}$

$= \boxed{\dfrac{81x^8}{y^8}}$

c.) $\dfrac{(3x^4 y)^2 x^2}{6x^6 y^4}$

$= \dfrac{9x^8 y^2 x^2}{6x^6 y^4}$

$= \dfrac{3 x^2 \cdot x^2 y^2}{2 y^4} = \boxed{\dfrac{3x^4}{2y^2}}$

3. **Simplify the following rational expressions:**

a.) $8 \cdot \dfrac{2x^2 + 6}{8 \cdot 3}$

$= \boxed{\dfrac{2x^2 + 6}{3}}$ or $\dfrac{2(x^2 + 3)}{3}$

or $\dfrac{2x^2}{3} + 2$

b.) $\dfrac{1/x}{7x^2}$

$= \dfrac{1}{x} \cdot \dfrac{1}{7x^2}$

$= \boxed{\dfrac{1}{7x^3}}$

c.) $\dfrac{12x}{4x/3y}$

$= \dfrac{\overset{3}{12x} \cdot 3y}{4x}$

$= \boxed{9y}$

4. **Factor the following expressions.**

a. $x^2 + 14x + 24$

$= \boxed{(x + 12)(x + 2)}$

b. $4x^2 + 12x$

$= \boxed{4x(x + 3)}$

c. $5a^2b - 10a^2$

$= \boxed{5a^2(b-2)}$

d. $4x^2 - 25x - 21$

$= \boxed{(x-7)(4x+3)}$

5.   Write the equation of the line that has a slope of 4 and passes through the point $(19,2)$

$2 = 4(19) + b$

$2 = 76 + b$

$-74 = b$

$\boxed{y = 4x - 74}$

6.   Write the equation of the line that passes through the points $(10,-5)$ and $(52,-19)$

$M = \dfrac{-19--5}{52-10} = \dfrac{-14}{42} = -\dfrac{1}{3}$

$\boxed{f(x) = -\dfrac{1}{3}x + \dfrac{25}{3}}$

$-5 = -\dfrac{1}{3}(10) + b$

$-5 = \dfrac{-10}{3} + b$

$b = 8\dfrac{1}{3} \text{ or } \dfrac{25}{3}$

Simplify the following so that it is written as x^a

7. $(x^2)^3$

$= x^6$

8. $\dfrac{1}{x^2}$

$= x^{-2}$

9. $\sqrt{x}$

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

10. $x^2 \cdot x^3$

$= x^5$

11. $\sqrt[3]{x^2}$

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

12. $\dfrac{1}{\sqrt{x^5}}$

$= \dfrac{1}{x^{\frac{5}{2}}} = \boxed{x^{-\frac{5}{2}}}$

Solve the following equations for the given variable.

13. $\dfrac{3}{x} = 2\pi$

$3 = 2\pi x$

$\boxed{\dfrac{3}{2\pi} = x}$

14. $3 \cdot 5^{x-2} = 46$

$5^{x-2} = 15.3$

$\log_5 15.3 = x - 2$

$1.186 = x - 2$

$\boxed{3.186 = x}$

$b^c = a$

$\log_b a = C$

15. $\dfrac{5x+6}{2} = 5x - 8$

$5x + 6 = 10x - 16$

$22 = 5x$

$\boxed{x = \dfrac{22}{5}}$

16. $3x^2 - 6x = 2(24 - 3x)$

$3x^2 - 6x = 48 - 6x$

$3x^2 = 48$

$x^2 = 16$

$\boxed{x = \pm 4}$

Don't forget the $\pm$!!

Solve using the zero product property.

17. $a(a+2) = 0$

$a = 0$

$a = -2$

18. $(z-3)(z+19) = 0$

$z = 3$

$z = -19$

19. $4g(g^2 - 9) = 0$

$\boxed{g = 0}$ $\quad g^2 - 9 = 0$

$g^2 = 9$

$\boxed{g = \pm 3}$

20. $7x^2 - 17x - 12 = 0$

$(7x + 4)(x - 3) = 0$

$7x + 4 = 0 \qquad \boxed{x = 3}$

$7x = -4$

$\boxed{x = \dfrac{-4}{7}}$