Math 4
Necessary Algebra Practice

Name Key

1. **Multiply the following expressions:**

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

$4x^2+12x+9$

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

$2x^3-x^2-11x+10$

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

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

$-3x^2$

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

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

$\frac{81x^8}{y^8}$

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

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

$\frac{3x^4}{2y^2}$

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

a.) $3\cdot\frac{2x^2+6}{9x}$

$\frac{2x^2+6}{3}$

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

$\frac{1}{x}\cdot\frac{1}{7x^2}$

$\frac{1}{7x^3}$

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

$\frac{12x}{1}\cdot\frac{3y}{4x}$

$9y$

4. **Factor the following expressions.**

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

$(x+2)(x+12)$

b. $4x^2+12x$

$4x(x+3)$

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

$5a^2(b-2)$

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

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

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

$y = mx + b$

$2 = 4 \cdot 19 + b$

$b = -74$

$y = 4x - 74$

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

$m = \frac{-19 - -5}{52 - 10}$

$= \frac{-14}{42} = -\frac{1}{3}$

$-5 = -\frac{1}{3} \cdot 10 + b$

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

$-\frac{5}{3} = b$

$y = -\frac{1}{3}x - \frac{5}{3}$

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

7. $(x^2)^3$	8. $\frac{1}{x^2}$	9. $\sqrt{x}$	10. $x^2 \cdot x^3$	11. $\sqrt[3]{x^2}$	12. $\frac{1}{\sqrt{x^5}}$
x^6	x^{-2}	$x^{1/2}$	x^5	$x^{2/3}$	$x^{-5/2}$

Solve the following equations for the given variable.

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

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

14. $3(2x-1) = 4 - (5x+7)$

$6x - 3 = 4 - 5x - 7$

$11x = 0$

$x = 0$

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

$5x+6 = 10x-16$

$5x = 22$

$x = \frac{22}{5}$

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

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

$3x^2 - 48 = 0$

$3(x^2-16) = 0$

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

$x = \pm 4$

Solve using the zero product property.

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

$x = 0$ | $x = -2$

18. $(x-3)(x+2) = 0$

$x = 3$ | $x = -2$

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

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

$x = \pm 3$

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

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

$x = -\frac{4}{7}, \; x = 3$