

I. Fractions

a. Simplify each expression completely.

$$1. -\frac{3}{2} + \frac{8}{5}$$

$$2. \frac{7}{4} - \frac{1}{5}$$

$$3. \frac{4}{3} - 2\frac{4}{5}$$

$$4. -3\frac{7}{9} - 9\frac{2}{3}$$

$$5. \frac{2}{5} + \frac{11}{15}$$

$$6. \frac{1}{2} - \left(-3\frac{1}{3}\right)$$

$$7. 2 \cdot -\frac{4}{7}$$

$$8. \frac{3}{5} \cdot \frac{7}{11}$$

$$9. 3\frac{1}{3} \cdot \frac{3}{7}$$

$$10. \frac{\frac{5}{4}}{-3}$$

$$11. \frac{1}{2} \div \frac{8}{7}$$

$$12. -3\frac{5}{9} \div \frac{2}{6}$$

II. Proportions

a. Find the value of each variable by solving the proportion.

$$1. \frac{10}{8} = \frac{n}{10}$$

$$2. \frac{7}{b+5} = \frac{10}{5}$$

$$3. \frac{7}{9} = \frac{x}{x-10}$$

$$4. \frac{n}{n-3} = \frac{2}{3}$$

$$5. \frac{5}{r-9} = \frac{8}{r+5}$$

$$6. \frac{n-5}{n+8} = \frac{2}{7}$$

III. System of Equations

a. Solve each system of equation using the substitution or elimination (linear combination) methods.

1. $-14 = -20y - 7x$
 $10y + 4 = 2x$

2. $5x + y = 9$
 $10x - 7y = -18$

3. $3 + 2x - y = 0$
 $-3 - 7y = 10x$

4. $-2x - y = -9$
 $5x - 2y = 18$

5. $5x + 4y = -14$
 $3x + 6y = 6$

IV. Factoring

a. Simplify the expression using any method of factoring.

1. $x^2 + 8x + 15$

2. $x^2 - 7x + 12$

3. $x^2 + 6x + 8$

4. $x^2 - x - 90$

5. $x^2 - 13x + 40$

6. $x^2 + 11x + 18$

7. $5x^2 + 10x + 20$

8. $3x^2 - 2x - 5$

9. $4x^2 - 35x + 49$

10. $7x^2 - 20x + 12$

11. $x^2 - 5x$

12. $4x^2 - 16$

b. Solve each equation by factoring.

13. $8x^2 + 21 = -59x$

14. $15a^2 - 3a = 3 - 7a$

15. $5r^2 - 44r + 120 = -30 + 11r$

16. $6b^2 - 13b + 3 = -3$

17. $35k^2 - 22k + 7 = 4$

18. $9m^2 + 48m = -64$

c. Solve each equation using the quadratic formula. $\left(x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}\right)$

19. $9n^2 = 4 + 7n$

20. $5x^2 + 9x = -4$

21. $x^2 + 2x - 1 = 2$

22. $5r^2 = 80$

V. Radicals

a. Simplify each. Leave answers in simplest radical form.

1. $\sqrt{48}$

2. $\sqrt{84}$

3. $\sqrt{75}$

4. $\sqrt{126}$

5. $3\sqrt{8}$

6. $5\sqrt{128}$

7. $(3\sqrt{5})^2$

8. $(-4\sqrt{7})^2$

9. $\frac{7}{\sqrt{2}}$

10. $\frac{11}{\sqrt{3}}$

11. $\frac{12}{\sqrt{2}}$

12. $\frac{15}{\sqrt{3}}$

VI. Linear Equations

a. Find the x and y intercepts of the graph of the equation.

1. $x + 6y = 7$

2. $4x + y = 3$

3. $y - 3x = 4$

b. Find the slope of the line passing through the following points.

4. $(3,4), (1,3)$

5. $(2, -7), (-5,6)$

6. $(-3,0), (-3,10)$

c. Determine whether the slope of the line passing through the points is positive, negative, undefined, or zero.

7. $(4,7), (4,2)$

8. $(3,8), (5,1)$

9. $(1,6), (4,6)$

d. Write the equation of a line using the given information. Write the equation in slope-intercept form, standard form, and point-slope form.

10. $(1, -8); m = 5$

11. $(-2, -9), (-1,7)$

12. $m = 4, b = -3$

e. Solve each.

13. Write the equation of a line parallel to the line that is the answer to question #10 above and passes through $(4, -3)$.

14. Write the equation of a line perpendicular to the line that is the answer to question #11 above and passes through $(4, -3)$.