PRACTICE PROBLEMS

1. Solve for x:

   a. $7x - 5(8x - 4) = x + 3$

   b. $9(3x + 2) - 10x = 12x - 7$

   c. $7(2x - 1) - x = 5(x + 5)$

   d. $3x + 2(4x - 3) = 3(2x - 3)$

2. Solve the inequality:

   a. $3x - 14 < 6x + 7$

   b. $4x - 3 \geq 3x + 5$

   c. $5x + 2 \leq 2(2x - 3)$

   d. $8x - 7 > 10x + 3$

3. Solve the system of equations for x (for y):

   a. $x + y = 12$
      $3x - y = 8$

   b. $3x + y = 6$
      $x + y = 4$

   c. $x - 4y = -4$
      $x + 2y = 8$

4. What values will make the expression undefined?

   a. $\dfrac{x-3}{x-9}$

   b. $\dfrac{x-7}{x+5}$

   c. $\dfrac{2x-3}{3x-2}$

5. a. Subtract $9x^2 - 4x + 1$ from $5x^2 + 5x - 8$. Add the same polynomials.

   b. Subtract $5x^2 - 3x + 2$ from $8x^2 - 3x - 6$. Add the same polynomials.

   c. Subtract $-3x^2 + 7x + 5$ from $5 - 3x + 4x^2$. Add the same polynomials.

6. a. The bottom of a 10 foot ladder is 5 feet away from the wall. At what height will the top of the ladder touch the wall?

   b. The bottom of a ladder is 4 feet away from the wall and touches the wall at a height of 12 feet. How long is the ladder?

   c. The top of a 12 foot ladder touches 8 feet up the wall. How far away from the wall is the bottom of the ladder?

7. Find the value of the expression:

   a. $|-4| + |4 - 15|$

   b. $|+2| + |-12 + 14|$

   c. $|-15 + 6| - |+15|$

   d. $|-12 + 14| - |8 + \blacktriangleleft 10|$

8. Solve the equation:

   a. $x^2 = x + 1$

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

   c. $x^2 + 5x = 3$

   d. $-2x = 1 - 4x^2$

9. Simplify the expression:

   a. $\dfrac{6x^3y^{-2}}{-2x^3y^2}$

   b. $\dfrac{-15x^{-3}y^{-2}}{10x^3y^2}$

   c. $\dfrac{12x^3y^{-2}}{-16x^{-3}y^2}$

   d. $\dfrac{-7x^3y^2}{-14x^{-3}y^{-2}}$

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10. Evaluate the expression $b^2 - 4ac$:

    a. When $a = -8$, $b = -6$, and $c = 2$

    b. When $a = 3$, $b = -5$, and $c = -2$

    c. When $a = 2$, $b = -7$, and $c = 3$

    d. When $a = -2$, $b = -5$, and $c = -3$

11. Factor completely:

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

    b. $6x^2 - x - 12$

    c. $18x^3 - 32x$

    d. $12x^2 - 31x + 9$

12. Multiply:

    a. $(x - 9)^2$

    b. $(x + 8)^2$

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

    d. $(7x - 5)^2$

13. a. The length of a rectangle is 3 more than its width. If the perimeter of the rectangle is 26 inches, find the length and the width of the rectangle.

    b. The length of a rectangular garden is 4 meters more than 3 times its width. If the perimeter of the garden is 56 meters, what are the dimensions of the garden?

    c. The length of a rectangular playing field is 5 ft less than twice its width. If the perimeter of the field is 230 ft, find the length and the width of the field.

14. Express in simplest terms:

    a. $\sqrt{54x^4y}$ b. $\sqrt{80x^3y^2}$ c. $\sqrt{500xy^7}$ d. $\sqrt{196x^9y^6}$

15. a. Julie took 2 hours longer to drive 600 miles on the first day of a trip than she took to drive 500 miles on the second day. If her speed was the same both days, what was the driving time for each day?

    b. A boat takes a trip upriver against the current in 6 hours. Coming back down river, the boat can travel 6 mph faster and makes the trip in 4 hours. What is the speed of the boat in still water?

    c. At 9am, David left New Orleans for Tallahassee, averaging 47 mph. Two hours later, Gloria left Tallahassee for New Orleans along the same route, driving 5 mph faster than David. If the two cities are 391 miles apart, at what time did David and Gloria meet?

16. Simply the expression:

    a. $\dfrac{6a^2b}{12b^2} \div \dfrac{9ab}{16b^3}$ b. $\dfrac{4x^2y^2}{9x^3} \div \dfrac{8y^2}{27xy}$ c. $\dfrac{8a^3b}{27ab^3} \div \dfrac{16a^3b}{45b}$ d. $\dfrac{3x^2y}{8xy^3} \div \dfrac{9x^3}{4y^4}$

17. Simplify the expression:

    a. $\dfrac{-72y^3 + 24y^2}{-8y}$ b. $\dfrac{-3a^2b^2 + 9a^3b}{-3a^2b^2}$ c. $\dfrac{-49x^4y^5 + 28x^2y}{-7x^3y^2}$ d. $\dfrac{3ab^3 - 12a^3b^2}{-9ab}$

18. Simplify the expression:

    a. $5(3ab)^3$ b. $(3x^3y)^2$ c. $x^{-4}(2x^3)^5$ d. $(y^{-3})^5(3y^2)^2$

PRACTICE PROBLEMS

19. a. The model for an experimental airplane has scale of 2 to 5 in comparison with the full-size airplane. The main body of the model is 18 feet. How large is the main body of the full-size plane?

    b. A model car has a scale 1 to 25 in comparison with the full-size car. If the sun visor is 5 inches by 14 inches in the full-size car, what are the dimensions in the scale model?

    c. At 3:00 in the afternoon a 30-foot tree casts a 125-ft shadow. A person 4 feet tall will cast how long of a shadow?

20. Find the distance and midpoint between the points:

    a. (13, 7) and (17, 4) b. (–2, –5) and (11, 3) c. (1, –7) and (–3, 8)

21. Find the slope between the points:

    a. (13, 7) and (17, 4) b. (–2, –5) and (11, 3) c. (1, –7) and (–3, 8)

22. a. Find the equation of the line with slope = –2 and goes through the point (–2, 1)

    b. Find the equation of the line with slope = $\frac{2}{3}$ and goes through the point (4, 0)

    c. Find the equation of the line with slope = $-\frac{3}{5}$ and goes through the point (5, 3)

    d. Find the equation of the line through the points (5, 2) and (3, 6)

23. Find the *x*- and *y*-intercepts of the line:

    a. $3x - 4y = 12$ c. $4y - 3x = 10$

    b. $20 = 5y + 4x$ d. $18 = 5x + 6y$

24. Solve for the indicated variable:

    a. $v = k + gt$ for t c. $L = 2\pi rh$ for r

    b. $K = \frac{mv^2}{2g}$ for g d. $A = P + \Pr t$ for P

25. Solve for *x*:

    a. $\sqrt{2x-9} = 7$ c. $\sqrt{2x+3} = \sqrt{5x-3}$

    b. $\sqrt{x-4} - 6 = -2$ d. $\sqrt{x+15} = x+3$

26. Graph:

    a. $y = \frac{1}{2}x - 3$ b. $y = -\frac{2}{3}x + 5$ c. $y = \frac{3}{2}x + 3$ d. $y = -\frac{1}{2}x + 1$

PRACTICE PROBLEMS

27. Graph:

a. $3x+4y<16$ b. $5x-3y\geq 15$ c. $4x+3y\geq 6$ d. $2x-3y<9$

28. Simplify the Expression :

a. $\dfrac{\dfrac{12}{15x}}{\dfrac{-3}{2x}-\dfrac{6}{5x}}$ b. $\dfrac{\dfrac{2}{x}+\dfrac{3}{y}}{\dfrac{x}{y}-\dfrac{1}{x}}$ c. $\dfrac{\dfrac{x^2-1}{xy}}{\dfrac{x^2-4x-5}{x^2y^3}}$ d. $\dfrac{\dfrac{x}{y}-\dfrac{1}{3}}{\dfrac{5}{x}-\dfrac{2}{y}}$

29. Simplify the expression :

a. $\dfrac{3x}{x-1}-\dfrac{2}{x+2}$ b. $\dfrac{x^2+x-2}{x^2-x-12}\div\dfrac{x^2+8x+12}{x^2-9}$ c. $\dfrac{2}{x^2-9}+\dfrac{x}{x+3}$

30. Simplify the expression :

a. $\sqrt{\dfrac{27x^5}{64y^4}}$ b. $\sqrt{\dfrac{32x^5}{75y^3}}$ c. $\dfrac{1}{\sqrt{2}+1}$ d. $\dfrac{8}{\sqrt{5}-\sqrt{3}}$

31. Solve for x :

a. $\dfrac{3x}{x-1}-\dfrac{2}{x+2}=3$ b. $\dfrac{x-1}{x+3}-\dfrac{x-3}{x+1}=1$ c. $\dfrac{x}{x-4}-\dfrac{12x}{x^2+x-20}=\dfrac{x-1}{x+5}$

PRACTICE PROBLEMS - ANSWERS

1. a. $x = \frac{1}{2}$
   b. $x = -5$
   c. $x = 4$
   d. $x = -3/5$

2. a. $x > -7$
   b. $x \geq 8$
   c. $x \leq -8$
   d. $x < -5$

3. a. (5, 7)
   b. (1, 3)
   c. (4, 2)

4. a. $x = 9$
   b. $x = -5$
   c. $x = 2/3$

5. a. $-4x^2 + 9x - 9$, $14x^2 + x - 7$
   b. $3x^2 - 8$, $13x^2 - 6x - 4$
   c. $7x^2 - 10x$, $x^2 + 4x + 10$

6. a. $\sqrt{75} = 5\sqrt{3}$
   b. $\sqrt{160} = 4\sqrt{10}$
   c. $\sqrt{80} = 4\sqrt{5}$

7. a. 15
   b. 4
   c. -6
   d. 0

8. a. $\frac{1 \pm \sqrt{5}}{2}$
   b. $\frac{3 \pm \sqrt{37}}{2}$
   c. $\frac{-5 \pm \sqrt{37}}{2}$
   d. $\frac{2 \pm 2\sqrt{5}}{8} = \frac{1 \pm \sqrt{5}}{4}$

9. a. $\frac{-3}{y^4}$
   b. $\frac{-3}{2x^6y^4}$
   c. $\frac{-3x^6}{4y^4}$
   d. $\frac{x^6y^4}{2}$

10. a. 100
    b. 49
    c. 25
    d. 1

11. a. $(2x - 1)(x + 3)$
    b. $(3x + 4)(2x - 3)$
    c. $2x(3x - 4)(3x + 4)$
    d. $(4x - 9)(3x - 1)$

12. a. $x^2 - 18x + 81$
    b. $x^2 + 16x + 64$
    c. $4x^2 + 12x + 9$
    d. $49x^2 - 70x + 25$

13. a. l = 8in, w = 5in
    b. l = 22m , w = 6m
    c. l = 75ft , w = 40ft

14. a. $3x^2\sqrt{6y}$
    b. $4|xy|\sqrt{5x}$
    c. $10|y^3|\sqrt{5xy}$
    d. $14x^4|y^3|\sqrt{x}$

15. a. 10, 12
    b. 15
    c. 2:00 pm

16. a. $\frac{8ab}{9}$
    b. $\frac{3y}{2}$
    c. $\frac{5}{6ab^2}$
    d. $\frac{y^2}{6x^2}$

17. a. $9y^2 - 3y$
    b. $1 - \frac{3a}{b}$
    c. $7xy^3 - \frac{4}{xy}$
    d. $\frac{-b^2}{3} + \frac{4a^2b}{3}$

18. a. $135a^3b^3$
    b. $9x^6y^2$
    c. $32x^{11}$
    d. $\frac{9}{y^{11}}$

19. a. $x = 45\text{ft}$
    b. $\frac{1}{5}in \times \frac{14}{25}in$
    c. $16\frac{2}{3}\text{ft}$

20. a. 5, $\left(15, \frac{11}{2}\right)$
    b. $\sqrt{233}$, $\left(\frac{9}{2}, -1\right)$
    c. $\sqrt{241}$, $\left(-1, \frac{1}{2}\right)$

21. a. $\frac{-3}{4}$
    b. $\frac{8}{13}$
    c. $\frac{-15}{4}$

22. a. $y = -2x - 3$
    b. $y = \frac{2}{3}x - \frac{8}{3}$
    c. $y = \frac{-3}{5}x + 6$
    d. $y = -2x + 12$

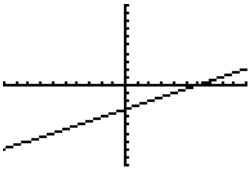
23. a. $(4,0), (0,-3)$
    b. $(5,0), (0,4)$
    c. $\left(\frac{-10}{3}, 0\right), \left(0, \frac{5}{2}\right)$
    d. $\left(\frac{18}{5}, 0\right), (0,3)$

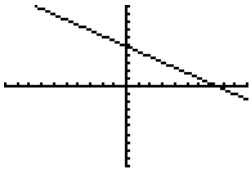
24. a. $t = \frac{V - k}{g}$
    b. $g = \frac{mv^2}{2K}$
    c. $r = \frac{L}{2\pi h}$

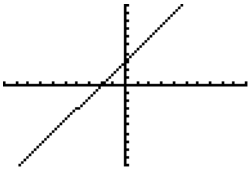
PRACTICE PROBLEMS - ANSWERS

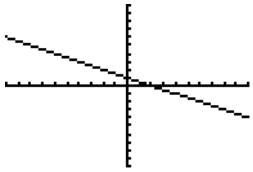
d. $P = \dfrac{A}{1+rt}$

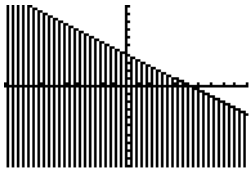
25. a. $x = 29$
    b. $x = 20$
    c. $x = 2$
    d. $x = 1$

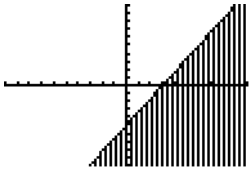
26. a. 

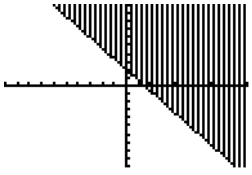
    b. 

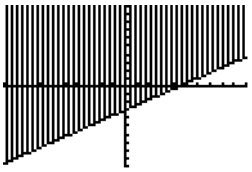
    c. 

    d. 

27. a. dashed


    b. solid


    c. solid


    d. dashed


28. a. $\dfrac{-8}{27}$
    b. $\dfrac{2y+3x}{x^2-y}$
    c. $\dfrac{xy^2(x-1)}{x-5}$
    d. $\dfrac{3x^2-xy}{15y-6x}$

29. a. $\dfrac{3x^2+4x+2}{(x-1)(x+2)}$
    b. $\dfrac{(x-1)(x-3)}{(x-4)(x+6)}$
    c. $\dfrac{x^2-3x+2}{(x+3)(x-3)}$

30. a. $\dfrac{3x^2\sqrt{3x}}{8y^2}$
    b. $\dfrac{4x^2\sqrt{6xy}}{15y^2}$
    c. $\sqrt{2}-1$
    d. $4\sqrt{5}+4\sqrt{3}$

31. a. $x = -8$
    b. $x = -5, 1$
    c. $x = -2$