Geometry Prerequisite Skills Practice Worksheet

Name: ____Key_____ Date: _____

The following problems represent many of the algebraic skills that are needed throughout your geometry course.

I. Solving Quadratic Equations

Solve. Check your solutions. Simplify your answer whenever possible.

1. $x^2 = 500$
   $\sqrt{x^2} = \sqrt{500}$
   $x = \pm\sqrt{500}$
   $x = 10\sqrt{5}, x = -10\sqrt{5}$

2. $x^2 + 3x - 28 = 0$
   (x+7)(x-4) = 0
   x+7 = 0, x-4 = 0
   x = -7, x=4

3. $x^2 = 5x$
   x^2-5x = 0
   x(x-5) = 0
   x = 0, x-5 = 0
   x = 0, x = 5

4. $x^2 - 9x = -18$
   x^2-9x+18 = 0
   (x-6)(x-3) = 0
   x-6 = 0, x-3 = 0
   x = 6, x = 3

5. $2x^2 + 11x - 21 = 0$
   (2x-3)(x+7) = 0
   2x-3 = 0, x+7 = 0
   x = $\frac{3}{2}$, x = -7

6. $2x^2 + 4x - 7 = 0$
   Discriminant is 72
   Use Quadratic Formula $x = \frac{-4 \pm \sqrt{16-4(2)(-7)}}{4}$
   $x = \frac{-4 \pm \sqrt{72}}{4}$
   $x = \frac{-4 \pm 6\sqrt{2}}{4} = \frac{-2 \pm 3\sqrt{2}}{2}$

II. Systems of Equations –

Solve the following systems of equations. Check your solutions.

7. $\begin{cases} 3x - 2y = 16 \\ 5x + 2y = 8 \end{cases}$

   8x = 24
   x = 3

3(3)-2y = 16
9-2y = 16
-2y = 7
y = $-\frac{7}{2}$

Check
5(3)+2($-\frac{7}{2}$) = 8
15-7 = 8
8 = 8

Answer is (3, $-\frac{7}{2}$)

8. $\begin{cases} x + 2y = 6 \\ 3x + 4y = 10 \end{cases}$

(x+2y = 6)(-2)
3x+4y = 10

-2x-4y = -12
3x+4y = 10
x = -2

-2+2y = 6
2y = 8
y = 4

Check
3(-2)+4(4) = 10
-6+16 = 10
10 = 10

Answer is (-2,4)

9. $\begin{cases} y = 2x + 7 \\ y = -3x - 13 \end{cases}$

(y = -3x-13)(-1)

2x+7 = y
3x+13 = -y
5x+20 = 0

5x = -20
x = -4

y = 2(-4)+7
y = -8+7
y = -1

Check
-1 = -3(-4)-13

-1 = 12-13
-1 = -1

Answer is (-4,-1)

10. $\begin{cases} \frac{1}{2}x + \frac{1}{3}y = -4 \\ \frac{1}{5}x + \frac{1}{5}y = -2 \end{cases}$

$6(\frac{1}{2}x + \frac{1}{3}y = -4)$

$5(\frac{1}{5}x + \frac{1}{5}y = -2)$

3x+2y = -24
(x+y = -10)(-2)

3x+2y = -24
-2x-2y = 20
x = -4

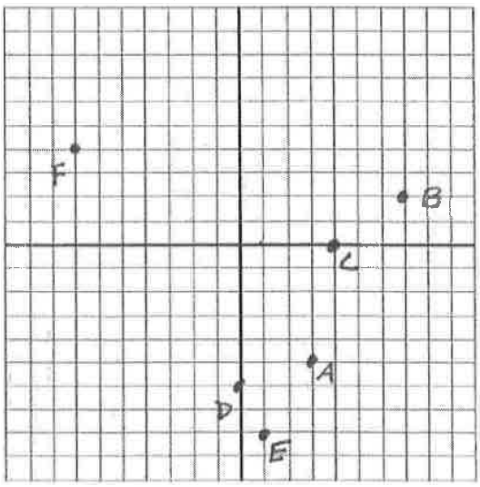
x+y = -10
-4+y = -10
y = -6

Check
3(-4)+2(-6) = -24
-12+(-12) = 24
-24 = -24

Answer is (-4,-6)

III. Determining the Slope and Equation of a Line, and Plotting Points

11. Plot the following points on the coordinate plane:
    a. A(3, -5)
    b. B(7, 2)
    c. C(4, 0)
    d. D(0, -6)
    e. E(2, -8)
    f. F(-7, 4)



Questions 12 – 15 refer to the points in Question 11.

12. Find the slope of the line passing through A and B.
    A(3, -5) B(7, 2)
    $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2-(-5)}{7-3} = \frac{7}{4}$

13. Find an equation of the line passing through D with a slope of $-\frac{4}{3}$.
    D(0, -6)
    Point-Slope Form
    (y-y1)=m(x-x1)
    y+6 = $-\frac{4}{3}$(x-0)

14. Find an equation of the line passing through E that is parallel to the graph of $y = 3x + 5$.
    Parallel lines have the same slope
    Line passes through E(2, -8) with m = 3
    y+8 = 3(x-2)

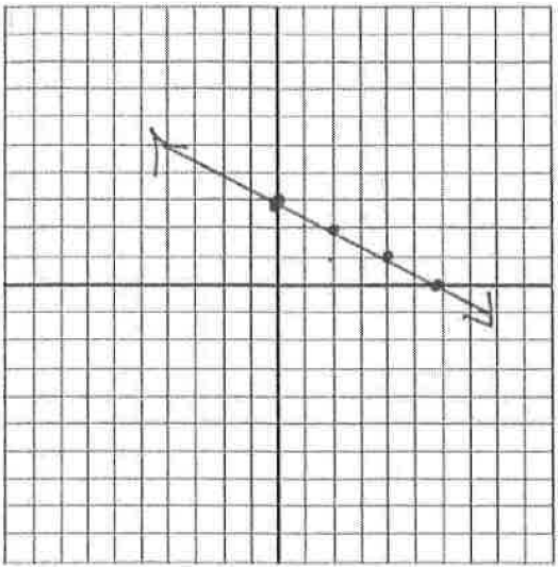
15. Find an equation of the line passing through E that is perpendicular to the graph of $y = \frac{2}{3}x + 1$.
    Perpendicular lines have slopes that are opposite reciprocals of each other
    Line passes through E(2, -8) with m = $-\frac{3}{2}$
    y+8 = $-\frac{3}{2}$(x-2)

16. Graph the equation $y = -\frac{1}{2}x + 3$. Identify the slope, the *y*-intercept, and the *x*-intercept.
    slope: $-\frac{1}{2}$

    *y-i*ntercept: _(0,3)__

    x-intercept: _(6,0)__

    value of x when y = 0
    0 = $-\frac{1}{2}$x+3
    -3 = $-\frac{1}{2}$x
    -2(-3) = x
    6 = x



IV. Simplifying Rational Expressions

Simplify. Rationalize denominators.

17. $\sqrt{50} = \sqrt{2 \cdot 25} = 5\sqrt{2}$

18. $2\sqrt{27} = 2\sqrt{3 \cdot 9} = 2 \cdot 3\sqrt{3} = 6\sqrt{3}$

19. $\sqrt{\frac{2}{3}} = \sqrt{\frac{2}{3}} \cdot \sqrt{\frac{3}{3}} = \sqrt{\frac{6}{9}} = \frac{\sqrt{6}}{3}$

20. $\frac{8}{\sqrt{2}} = \frac{8}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{8\sqrt{2}}{2} = 4\sqrt{2}$

V. Solving Linear Equations

Solve. Check your solutions.

21. $5x - 7 = -10x + 8$
    15x-7 = 8
    15x = 15
    x = 1

22. $7y + 3 = 4y - 18$
    3y+3 = -18
    3y = -21
    y = -7

23. $-3(y + 3) = 2y + 3$
    -3y-9 = 2y+3
    -9 = 5y+3
    -12 = 5y
    $-\frac{12}{5}$ = y

24. $2(-3a + 5) = -4(a + 4)$
    -6a+10 = -4a-16
    10 = 2a-16
    26 = 2a
    a = 13

25. $6x - 4 = 2(3x - 2)$
    6x-4 = 6x-4
    -4 = -4
    All real numbers

26. $-6x + 9 = 4(5 - x)$
    -6x+9 = 20-4x
    9 = 20+2x
    -11 = 2x
    x = $-\frac{11}{2}$

27. $3(x + 2) = -5 - 2(x - 3)$
    3x+6 = -5-2x+6
    3x+6 = 1-2x
    5x+6 = 1
    5x = -5
    x = -1

28. $2(x-3)=\frac{1}{2}(4x+12)$
    2x-6 = 2x+6
    -6 = 6
    No Solution

29. $2(x-3)=(x-1)+7$
    2x-6 = x-1+7
    2x-6 = x+6
    x-6 = 6
    x = 12

30. $-(x+7)=-6x+8$
    -x-7 = -6x+8
    5x-7 = 8
    5x = 15
    x = 3

31. $\frac{2}{x}=7$
    x($\frac{2}{x}$) = 7x
    2 = 7x
    x = $\frac{2}{7}$

32. $\frac{3}{x}=\frac{4}{5}$
    4x = 15
    x = $\frac{15}{4}$

33. $\frac{3}{x}=\frac{x+8}{-5}$
    x(x+8) = 3(-5)
    x^2+8x = -15
    x^2+8x+15 = 0
    (x+3)(x+5) = 0
    x = -3, x = -5

34. Solve for a.
    $ax+by=c$
    ax = c-by
    a = $\frac{c-by}{x}$