SUMMER MATH PACKET for students

entering 9th grade Geometry (2018)

Dear Students,

Welcome to Ma'ayanot. We are very happy that you will be here. The teachers in the math department are looking forward to working with you and helping you to be very successful in mathematics.

The problems in this packet are a review of concepts that you have learned in your previous math classes. A strong knowledge of this material will help you in geometry and in future math courses.

- Print out the packet.

- **Your assignment is to complete the ODD PROBLEMS.**

- Problems 1-70 have multiple choice answers. For most of them, work is required.   There is space to the right of the problem to show work. **Show your work neatly** (except in questions such as 1-4)

- The rest of the problems are short answer. Make sure to show all work in the space provided

- No calculator for this problem set!

- Hand it in to your teacher on the first day of class.

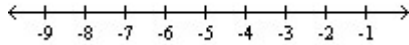Good Luck and have a great summer!

The Math Department

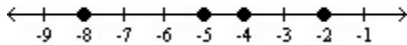# REMEMBER YOU ARE ONLY REQUIRED TO DO THE ODD PROBLEMS

SHOW WORK IN THE SPACE PROVIDED AT THE RIGHT.
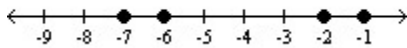
1) **On the real number line, label the points with the given coordinates.**
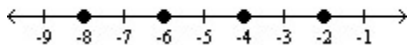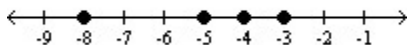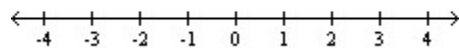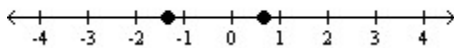
-8, -6, -4, -2

a.

b.

c.

d.

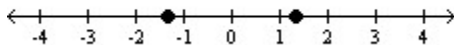2) **On the real number line, label the points with the given coordinates.**

$$\frac{4}{3}, -\frac{4}{3}$$

a.

b.

c.

d.

3) **Replace the question mark by <, >, or =, whichever is correct.**

$\frac{1}{8}$? 0.125

a. =   c. <
b. >

4) **Replace the question mark by <, >, or =, whichever is correct.**

2.23 ? $\sqrt{5}$
a. =   c. <
b. >

5) **Evaluate the expression using the given values.**

x + 6y   x = -5, y = -2
a.   1   c. -32
b. -7   d. -17

6) **Evaluate the expression using the given values.**

$\frac{3x - 2y}{2}$ x = 7, y = 8

a.   5   c. $\frac{37}{2}$

b. $\frac{19}{2}$ d. $\frac{5}{2}$

7) **Evaluate the expression using the given values.**

$|6x - 7y|$ x = 5, y = 5
a. -65   c. 5
b. 65   d. -5

8) **Use the formula C = $\frac{5}{9}$ (F - 32) for converting degrees Fahrenheit into**

 degrees Celsius to find the Celsius measure of the Fahrenheit temperature.

F = 41°
a.   5° C   c.   10° C
b.   15° C   d. 0° C
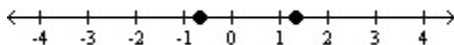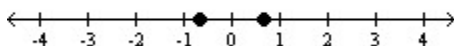
9) **Express the statement as an equation involving the indicated variables.**

The area A of a rectangle is the product of its length l and its width w.
a. $A = l + w$ c. $A = 2(l + w)$
b. $A = lw$ d. $A = \dfrac{l}{w}$

10) **Express the statement as an equation involving the indicated variables.**

The circumference C of a circle is the product of π and its diameter d.
a. $C = \pi + d$ c. $C = \dfrac{\pi}{d}$

b. $C = 2\pi d$ d. $C = \pi d$

11) **Express the statement as an equation involving the indicated variables.**

The surface area S of a sphere is 4 times π times the square of the radius r.
a. $S = 4\pi r^2$ c. $S = 4\pi \sqrt{r}$
b. $S = 4\pi r$ d. $S = \pi r^2$

12) **Solve the problem.**

The weekly production cost C of manufacturing x calendars is given by $C(x) = 20 + 3x$, where the variable C is in dollars. What is the cost of producing 231 calendars?
a.   \$4623.00   c.   \$713.00
b.   \$693.00   d.   \$251.00

13) **Determine which value(s), if any, must be excluded from the domain of the variable in the expression.**

$\dfrac{x}{x - 4}$

a. $x = 4$ c. $x = 0$
b. $x = -4$ d.   none

14) **Determine which value(s), if any, must be excluded from the domain of the variable in the expression.**

$\dfrac{x - 8}{x - 4}$

a. $x = 0$ c.   none
b. $x = 4$ d. $x = -4$

15) **Simplify the expression.**

-5^3

a. 15

b. -125

c. 125

d. -15

b. $\dfrac{9x^8}{49y^8}$

d. $\dfrac{9y^8}{49x^8}$

16) **Simplify the expression.**

$\sqrt{(-9)^2}$

a. $\dfrac{1}{81}$

b. 6561

c. 9

d. not a real number

17) **Find the value of the expression using the given values.**

$\sqrt{x^2 + y^2}$ for x = 3, y = -2

a. 6

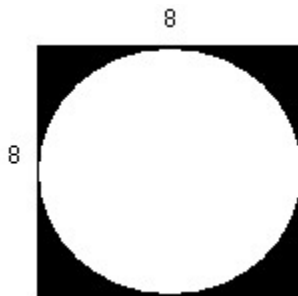b. $\sqrt{13}$

c. 1

d. 5

18) **Solve the problem.**

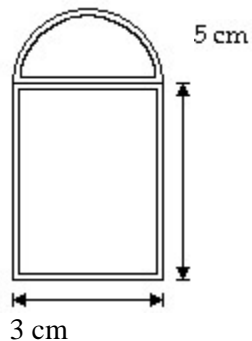Find the area of the shaded region. Express the answer in teems of π.

a. 256 - 64π square units

b. 16π + 64 square units

c. 64 - 32π square units

d. 64 - 16π square units

19) **Solve the problem.**

Find the perimeter. Approximate the result to the nearest tenth using 3.14 for π.

3 cm

   a. 17.7 cm   c. 20.7 cm

   b. 22.4 cm   d. 25.4 cm

20) **Tell whether the expression is a monomial. If it is, name the variable(s) and coefficient, and give the degree of the monomial.**

$16x^9$

   a. Monomial; variable x; coefficient 9; degree 0

   b. Monomial; variable x; coefficient 9; degree 16

   c. Not a monomial

   d. Monomial; variable x; coefficient 16; degree 9

21) **Tell whether the expression is a monomial. If it is, name the variable(s) and coefficient, and give the degree of the monomial.**

$\dfrac{19}{x}$

   a. Not a monomial

   b. Monomial; variable x; coefficient 19; degree -1

   c. Monomial; variable x; coefficient 19; degree 1

   d. Monomial; variable x; coefficient 19; degree 0

22) **Tell whether the expression is a polynomial. If it is, give its degree.**

$7x^2 - \dfrac{4}{x}$

   a. Polynomial; degree 1   c. Not a polynomial

   b. Polynomial; degree -1   d. Polynomial; degree 2

23) **Perform the indicated operation.**

$(5x^2 + 7x - 8) + (5x^2 + 6x + 6)$

a. $-3x^2 + 11x + 13$ c. $10x^2 - 13x - 2$
b. $10x^2 + 13x - 2$ d. $10x^2 + 13x + 2$

24) Perform the indicated operation
$(-9x^2 + 4) - (-x^3 - 2x^2 + 3)$
a. $-8x^3 - 2x^2 + 1$ c. $x^3 - 7x^2 + 1$
b. $-8x^3 + 2x^2 - 3$ d. $x^3 - 11x^2 + 7$

25) Perform the indicated operation
$8 (1 - y^3) + 5(1 + y + y^2 + y^3)$

a. $3y^3 + 5y^2 + 5y + 13$ c. $-3y^3 - 5y^2 + 5y - 13$
b. $-3y^3 + 5y^2 + 5y + 13$ d. $-3y^3 + 5 - ay^2 + 5y + 13$

26) Multiply the polynomials.

$(x + 5)(x - 5)$
a. $x^2 - 10x - 25$ c. $x^2 + 10x - 25$
b. $x^2 - 25$ d. $x^2 - 10$

27) Multiply the polynomials.

$(2x - 10)(2x + 10)$
a. $4x^2 + 40x - 100$ c. $4x^2 - 40x - 100$
b. $4x^2 - 100$ d. $2x^2 + 40x - 100$

28) Multiply

$(7x + 11)^2$
a. $49x^2 + 121$
b. $7x^2 + 154x + 121$
c. $49x^2 + 154x + 121$
d. $7x^2 + 121$

29) **Find the quotient and the remainder.**

$9x^8 - 15x^4$ divided by $3x$
a. $3x^7 - 5x^3$; remainder 0
b. $3x^9 - 5x^5$; remainder 0
c. $9x^7 - 15x^3$; remainder 0
d. $3x^8 - 5x^4$; remainder 0

30) **Factor completely. If the polynomial cannot be factored, say it is prime.**

$x^2 - 9$
a. $(x + 9)(x - 9)$
b. $(x^2 + 3)(x^2 - 3)$
c. $(x + 3)(x - 3)$
d. $(x - 3)(x - 3)$

31) **Factor completely. If the polynomial cannot be factored, say it is prime.**

$9x^2 - 1$
a. $(3x - 1)^2$
b. $(3x + 1)^2$
c. $(3x - 1)(3x + 1)$
d. prime

32) **Factor completely. If the polynomial cannot be factored, say it is prime.**

$25x^2 - 64$
a. $(25x + 1)(x - 64)$
b. $(5x + 8)^2$
c. $(5x + 8)(5x - 8)$
d. $(5x - 8)^2$

33) **Factor completely. If the polynomial cannot be factored, say it is prime.**

$x^2 + 2x + 1$
a. $(x - 1)^2$
b. $(x + 2)(x - 2)$
c. $(x + 1)^2$
d. $(x + 1)(x - 1)$

34) **Factor completely. If the polynomial cannot be factored, say it is prime.**

$81x^2 - 126x + 49$

a. $(9x + 7)^2$ c. $(9x - 8)^2$

b. $(9x + 7)(9x - 7)$ d. $(9x - 7)^2$

35) **Factor completely. If the polynomial cannot be factored, say it is prime.**

$6x^2 - 13xt + 6t^2$

a. $(3x + 2t)(2x + 3t)$ c. prime

b. $(3x - 2t)(2x - 3t)$ d. $(6x - 2t)(x - 3t)$

36) **Reduce the rational expression to lowest terms.**

$$\frac{x^2 - 25}{x - 5}$$

a. $x - 5$ c. $x + 5$

b. $\dfrac{1}{x + 5}$ d. $\dfrac{1}{x - 5}$

37) **Reduce the rational expression to lowest terms.**

$$\frac{x^2 + 14x + 49}{x^2 + 16x + 63}$$

a. $\dfrac{x + 7}{x + 9}$ c. $\dfrac{14x + 49}{16x + 63}$

b. $\dfrac{14x + 7}{16x + 9}$ d. $-\dfrac{x^2 + 14x + 49}{x^2 + 16x + 63}$

38) **Perform the indicated operations and simplify the result. Leave the answer in factored form.**

$$\frac{5x}{10x + 5} \cdot \frac{4x + 2}{3}$$

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

b. $\dfrac{2x}{15}$ d. $\dfrac{2}{3}$

39) **Perform the indicated operations and simplify the result. Leave the answer in factored form.**

$$\frac{3x-3}{x} \cdot \frac{6x^2}{4x-4}$$

a. $\dfrac{2}{9x}$

c. $\dfrac{18x^3 - 18x^2}{4x^2 - 4x}$

b. $\dfrac{9x}{2}$

d. $\dfrac{12x^2 + 24x + 12}{6x^3}$

40) **Perform the indicated operations and simplify the result.**

$$\frac{x^2 + 15x + 56}{x^2 + 14x + 48} \cdot \frac{x^2 + 15x + 54}{x^2 + 16x + 63}$$

a. 1

c. $\dfrac{x+6}{x+9}$

b. $\dfrac{x+7}{x+6}$

d. $\dfrac{1}{x+9}$

41) **Perform the indicated operations and simplify the result.**

$$\frac{\dfrac{9x-9}{2}}{\dfrac{3x-3}{22}}$$

a. $\dfrac{1}{33}$

c. $\dfrac{11(9x-9)}{3x-3}$

b. $\dfrac{27(x-1)^2}{44}$

d. 33

42) **Perform the indicated operations and simplify the result.**

$$\frac{x}{11} - \frac{9}{5}$$

  a. $\dfrac{x-9}{55}$ c. $\dfrac{5x+99}{99}$

  b. $\dfrac{5x-99}{55}$ d. $\dfrac{x-9}{16}$

43) **Perform the indicated operations and simplify the result. .**

$$\frac{9x+3}{2} - \frac{9x-3}{2}$$

  a. 9   c. 9x
  b. 3   d. 0

44) **Perform the indicated operations and simplify the result**

$$\frac{1}{2x} + \frac{2}{3x}$$

  a. $\dfrac{6}{7x}$ c. $\dfrac{7}{6x}$

  b. 1   d. $\dfrac{7}{12x}$

45) **Perform the indicated operations and simplify the result.**

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

  a. $\dfrac{2x}{x-1}$ c. 0

  b. $\dfrac{2x(x+1)}{x-1}$ d. 2x

46) **Find the Least Common Multiple of the given polynomials.**

  x, x + 9
  a. x + 9   c. $x^2(x+9)$
  b. x(x + 9)   d. x

47) **Perform the indicated operations and simplify the result**

$$\frac{x}{x^2 - 16} - \frac{6}{x^2 + 5x + 4}$$

a. $\dfrac{x^2 - 5}{(x - 4)(x + 4)(x + 1)}$

c. $\dfrac{x^2 - 5x + 24}{(x - 4)(x + 4)}$

b. $\dfrac{x^2 - 5x + 24}{(x - 4)(x + 4)(x + 1)}$

d. $\dfrac{x^2 + 5x + 24}{(x - 4)(x + 4)(x + 1)}$

48) Simplify:

48) $\dfrac{\dfrac{4}{x} + 1}{\dfrac{4}{x} - 1}$

a. $\dfrac{4 + x}{4 - x}$

c. $\dfrac{x^2}{x^2 + 4}$

b. 4

d. $x^2 + 4$

49) **Solve the equation.**

$x(5x - 3) = (5x + 1)(x - 4)$

a. $\left\{ -\dfrac{4}{17} \right\}$

c. $\{-2\}$

b. $\left\{ -\dfrac{1}{4} \right\}$

d. $\{4\}$

50) **Solve the equation.**

$$\frac{9}{2x - 2} = \frac{5}{x + 5}$$

a. $\{-55\}$

c. $\{55\}$

b. $\{-35\}$

d. $\{40\}$

51) Solve the equation.

$$\frac{3}{x+6} = \frac{7}{x-6}$$

a. $\langle 15 \rangle$ c. $\langle -3 \rangle$

b. $\langle -15 \rangle$ d. $\left\{ \frac{6}{5} \right\}$

52) Solve the equation by factoring.

$x^2 + 3x = 0$

a. $\{0, 3\}$ c. $\{-3\}$

b. $\{3\}$ d. $\{0, -3\}$

53) Solve the equation by factoring.

$39x^2 + 27x = 0$

a. $\left\{ \frac{9}{13}, -\frac{9}{13} \right\}$ c. $\left\{ \frac{9}{13}, 0 \right\}$

b. $\left\{ -\frac{9}{13}, 0 \right\}$ d. $\{0\}$

54) Solve the equation by factoring.

$x^2 - 5x + 6 = 0$

a. $\{2, 3\}$ c. $\{-2, -3\}$

b. $\{-2, 3\}$ d. $\{2, -3\}$

55) Solve the equation by factoring.

$x(x - 10) + 24 = 0$

a. $\{-6, 4\}$ c. $\{6, 4\}$

b. $\{6, -4\}$ d. $\{-6, -4\}$

56) Solve the equation by factoring.

$6x - 17 = \frac{3}{x}$

a. $\left\{ \frac{1}{17}, -\frac{1}{6} \right\}$ c. $\left\{ -\frac{1}{6}, 6 \right\}$

b. $\{-6, 3\}$ d. $\left\{ -\frac{1}{6}, 3 \right\}$

13

State the slope and intercept to graph the following lines.

57) $y = 2x + 5$

Slope: _____   Intercept: _____
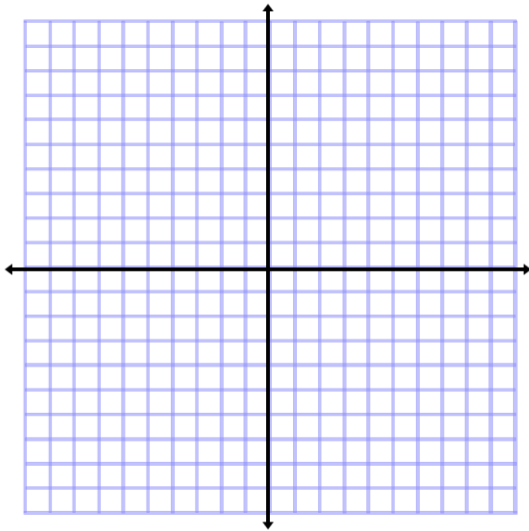
58) $y = -3x$

Slope: _____   Intercept: _____
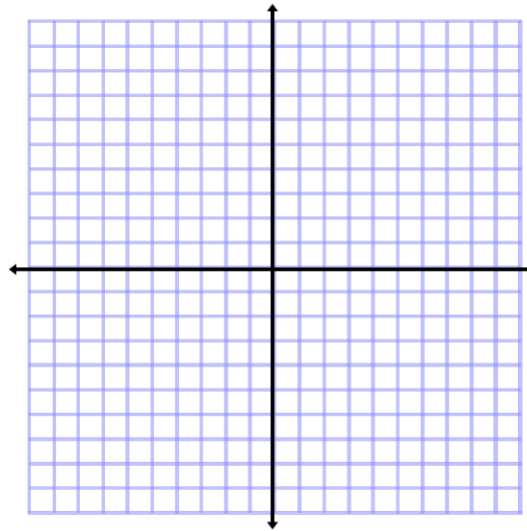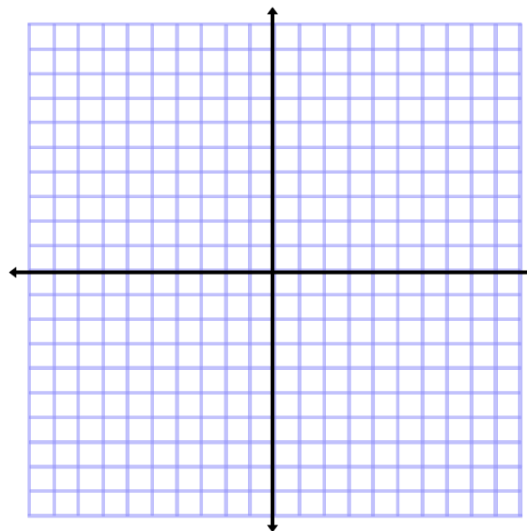
59) $y = -\frac{2}{5}x + 4$

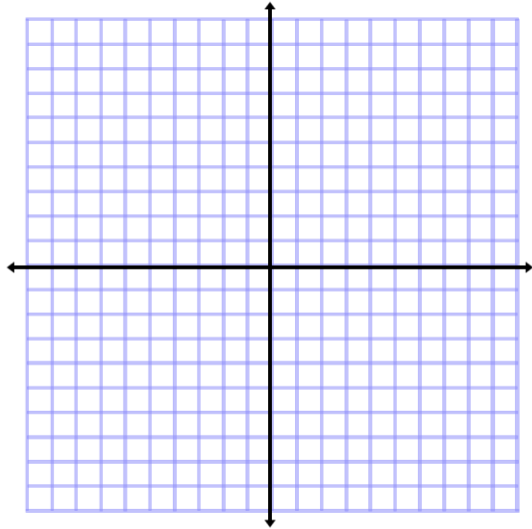Slope: _____   Intercept: _____
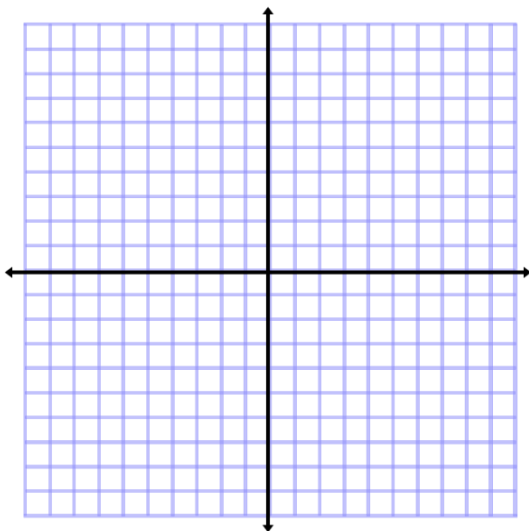
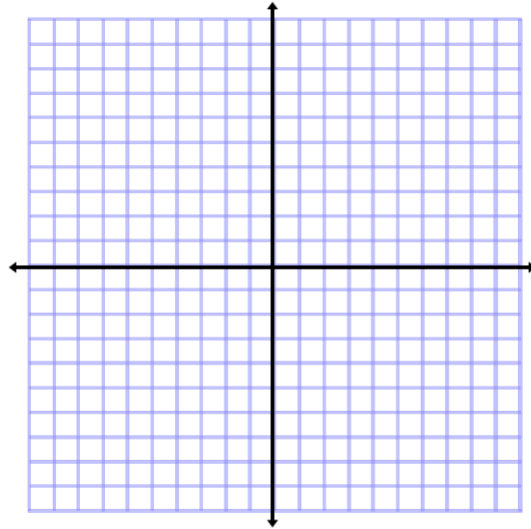60) $y = \frac{1}{2}x - 3$

Slope: _____   Intercept: _____

61) $y = -x + 2$
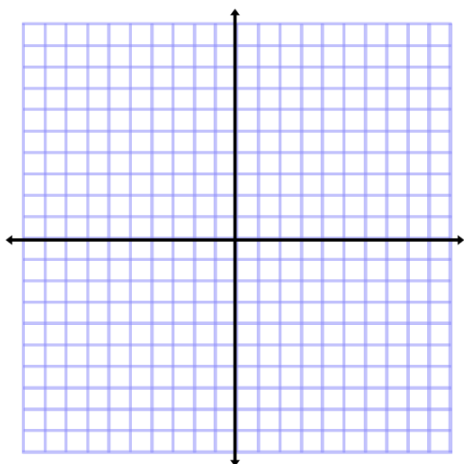
Slope: _____   Intercept: _____

62) $y = x$

Slope: _____   Intercept: _____

The following equations are in standard form.   Rewrite them in slope intercept form, identify the y -intercept and slope, and then graph them.

63) $5x + 2y = 10$

Slope: _____   Intercept: _____

64) $4x - 3y = 9$

Slope: _____   Intercept: _____
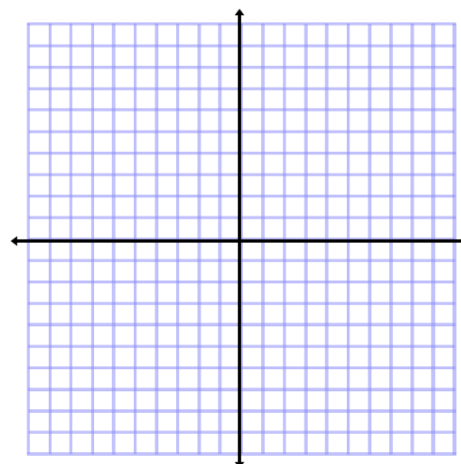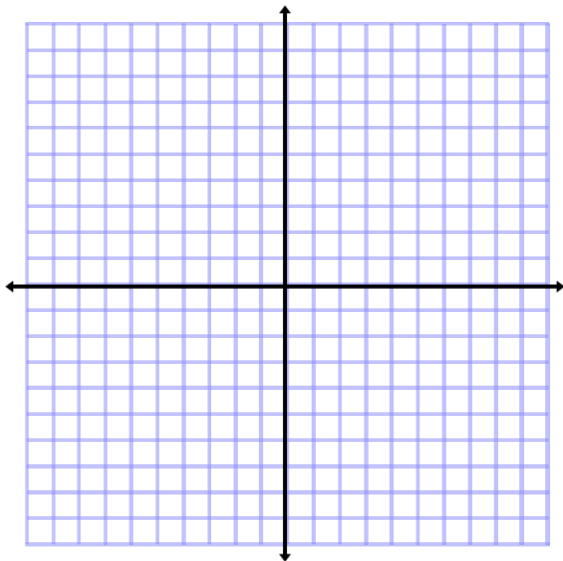
The following equations are in standard form.   Solve for the *x*-intercept and *y*-intercept.   Then graph the lines by plotting these points on the appropriate axes and connecting them.
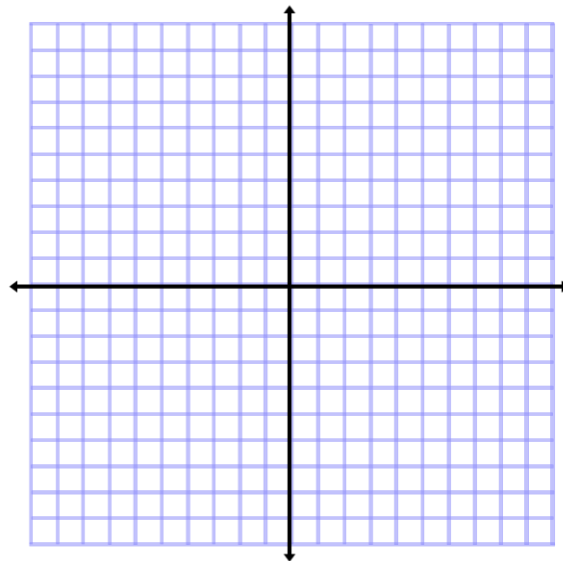
65) $3x + y = 3$	66) $-2x + 6y = 12$
To find the x-intercept, let $y = 0$ and solve for x.	To find the x-intercept, let $y = 0$ and solve for x.
To find the y-intercept, let $x = 0$ and solve for y.	To find the y-intercept, let $x = 0$ and solve for y.

67) Find the x-intercept of the equation $x + 5y = 20$.

68) Find the x- and y-intercepts of $3x - y = 6$.

69) Find the slope of the line that contains the points $(6, 8)$ and $(2, 1)$.

70) Find the slope of the line that contains the points $(4, 5)$ and $(7, 11)$.

71) Find the distance between the points $A(6, 7)$ and $B(2, 4)$.

72) Find the distance between the points $A(5, 6)$ and $B(1, 3)$.

73) Find the coordinates of the midpoint of $\overline{AB}$ with endpoints $A(2,-6)$ and $B(-6,2)$.

74) Write an equation in slope-intercept form for the line that passes through $(0,-1)$ and is perpendicular to the line

described by $=\frac{1}{8}x + 4$.

75) Write an equation in slope-intercept form for the line that passes through $(-3,2)$ and is perpendicular to the line
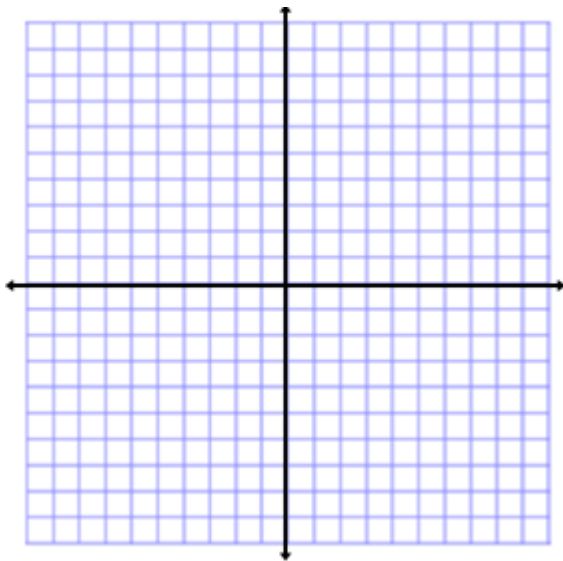
described by $y = \frac{3}{2}x + 4$

76) Write an equation in slope-intercept form for the line that passes through $(24, 5)$ and is parallel to the line described

by $= \frac{1}{8}x + 4$.

77) Solve the system of equations graphically. State your solution and check in both equations
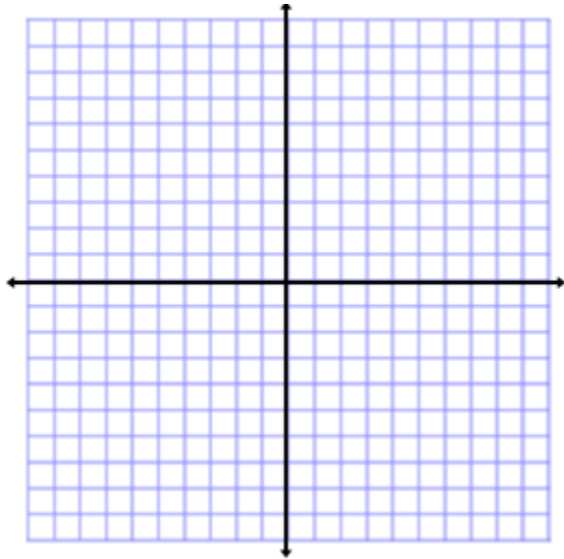
$y = -x + 2$
$y = 2x + 5$

78)   Solve the system of equations graphically. State your solution and check in both equations

$$3x - 9y = 0$$
$$-x + 3y = -3$$

79)   Solve the system algebraically using the substitution method. Check.

A)   x + y = 8
        - x + 2y = 7

B)   Solve using the substitution method. Check.

$$2x - y = 17$$
$$3x + 4y = -13$$

C)   Solve the system using the addition (elimination method). Check.

$$3x - 8y = 7$$
$$x + 2y = -7$$

80)   Solve the system using all three methods.

$$18x - 5y = 17$$
$$6x + 10y = -6$$

81)   Simplify each of the following radicals as much as possible

a. $\sqrt{32}$ b. $\sqrt{108}$ c. $3\sqrt{12}$

d) $\sqrt{18}$ + $\sqrt{72}$ + $3\sqrt{8}$