

# Precalculus

## Chapter P.4 Lines in the Plane

HW: P1-P4 Review Worksheet #23-30

Find which values of x are solutions.

11)  $2x^2 - 7x = 4$

(a)  $x = 4$  (b)  $x = 0$  (c)  $x = -\frac{1}{2}$

A) (b)

B) (a) and (b)  $\frac{1}{2} + \frac{7}{2} = 4$

C) (a) and (c)

D) (a)

11) C

12)  $\sqrt{9-x^2} + 4 = 7$

(a)  $x = 3$  (b)  $x = -3$  (c)  $x = 0$

A) (a) and (b)

B) (b)

C) (c)

D) (a) and (c)

12) C

Determine whether the equation is linear in x.

13)  $7x + 5 = 0.2$

A) No

B) Yes

13) B

14)  $7x^2 - 2.5x = x^2 - 5$

A) No

B) Yes

14) A

Solve the equation.

15)  $12x - 48 = 24$

16)  $\frac{2}{3}x - \frac{1}{3}x - 3$

17)  $\frac{6}{15}x - \frac{5}{15}x = 3$

18)  $\frac{y-2}{4-(-1)} = -2$

19)  $0 \leq 5t + 2 < 9$

20)  $\frac{1}{4}(x+2) - 4x \leq 2(2+x)$

21)  $4x - 3 \leq 8x + 9$

$2(4)^2 - 7(4) = 4$   
 $32 - 28 = 4$   
 $0 = 4$   
 $2(-\frac{1}{2})^2 - 7(-\frac{1}{2}) = 4$   
 $0.5 + 3.5 = 4$   
 $0 = 4$   
 $\sqrt{9-x^2} + 4 = 7$   
 $\sqrt{9-3^2} + 4 = 7$   
 $0 + 4 = 7$   
 $4 \neq 7$   
 $\sqrt{9-(-3)^2} + 4 = 7$   
 $0 + 4 = 7$   
 $4 = 7$   
 $12x - 48 = 24$   
 $12x = 600$   
 $x = 50$   
 $\frac{2}{3}x - \frac{1}{3}x - 3$   
 $\frac{1}{3}x - 3$   
 $\frac{6}{15}x - \frac{5}{15}x = 3$   
 $\frac{1}{15}x = 3$   
 $x = 45$   
 $\frac{y-2}{4-(-1)} = -2$   
 $\frac{y-2}{5} = -2$   
 $y-2 = -10$   
 $y = -8$   
 $0 \leq 5t + 2 < 9$   
 $-2 \leq 5t < 7$   
 $-\frac{2}{5} \leq t < \frac{7}{5}$   
 $\frac{1}{4}(x+2) - 4x \leq 2(2+x)$   
 $\frac{1}{4}x + \frac{1}{2} - 4x \leq 4 + 2x$   
 $-\frac{15}{4}x + \frac{1}{2} \leq 4 + 2x$   
 $-\frac{15}{4}x - 2x \leq 4 - \frac{1}{2}$   
 $-\frac{23}{4}x \leq \frac{7}{2}$   
 $x \geq -\frac{14}{23}$   
 $4x - 3 \leq 8x + 9$   
 $-4x - 12 \leq 9$   
 $-4x \leq 21$   
 $x \geq -\frac{21}{4}$

15) B

Solve the equation.

15)  $12(x - 48) = 24$

A)  $x = 24$

B)  $x = 50$

C)  $x = 48$

D)  $x = 46$

15) B

16)  $\frac{2}{3}x - \frac{1}{3}x - 3$

A)  $x = 50$

B)  $x = -50$

C)  $x = -45$

D)  $x = 45$

16) D

Find the slope of the line through the pair of points.

17) (9, 1) and (6, 5)

A)  $-\frac{4}{3}$

B)  $\frac{2}{5}$

C)  $-\frac{3}{4}$

D)  $\frac{4}{3}$

17) A

Find the value of x or y so that the line through the pair of points has the given slope.

18) (-1, 2) and (4, y);  $m = -2$

A) 11

B) 9

C) -9

D) -8

18) D

$\frac{y-2}{4-(-1)} = -2$   
 $\frac{y-2}{5} = -2$   
 $y-2 = -10$   
 $y = -8$

Solve the inequality.

19)  $0 \leq 5t + 2 < 9$

A)  $-\frac{2}{5} < t \leq \frac{7}{5}$

B)  $-\frac{11}{5} \leq t < \frac{7}{5}$

C)  $-\frac{2}{5} \leq t < \frac{9}{5}$

D)  $-\frac{2}{5} \leq t < \frac{7}{5}$

19) D

20)  $\frac{1}{4}(x+2) - 4x \leq 2(2+x)$

A)  $x \leq \frac{2}{23}$

B)  $x \leq -\frac{14}{23}$

C)  $x \leq \frac{2}{23}$

D)  $x \geq -\frac{14}{23}$

20) D

Solve the inequality and draw a number line graph of the solution.

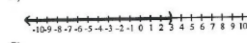
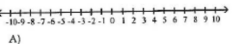
21)  $4x - 3 \leq 8x + 9$

A)

B)

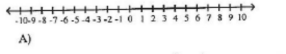
$0 \leq 5t + 2 < 9$   
 $-2 \leq 5t < 7$   
 $-\frac{2}{5} \leq t < \frac{7}{5}$   
 $\frac{1}{4}x + \frac{1}{2} - 4x \leq 4 + 2x$   
 $-\frac{15}{4}x + \frac{1}{2} \leq 4 + 2x$   
 $-\frac{15}{4}x - 2x \leq 4 - \frac{1}{2}$   
 $-\frac{23}{4}x \leq \frac{7}{2}$   
 $x \geq -\frac{14}{23}$


21) D

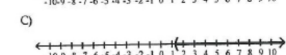


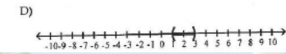
22)  $2 < 3x - 2 < 10$

$-3 \leq x$   
 $x \geq -3$       22) A

A) 

B) 

C) 

D) 

$2 < 3x - 2 < 10$   
 $4 < 3x < 12$   
 $\frac{4}{3} < x < 4$

### Using the Point-Slope Form

Use the point-slope form to find an equation of the line that passes through the point  $(-3, -4)$  and has slope 2.

$y - y_1 = m(x - x_1)$

$y - (-4) = 2(x - (-3))$

\*  $y + 4 = 2(x + 3)$

$y = 2x + 6 - 4$

$y = 2x + 2$

### Using the Slope-Intercept Form

Write an equation of the line with slope 3 that passes through the point  $(-1, 6)$  using the slope-intercept form.

$y - 6 = 3(x + 1)$

$y = 3x + 9$

### Graphing in General (Standard) Form

$Ax + By + C = 0$

Draw the graph of  $2x + 3y - 6 = 0$ .

$2x + 3y - 6 = 0$

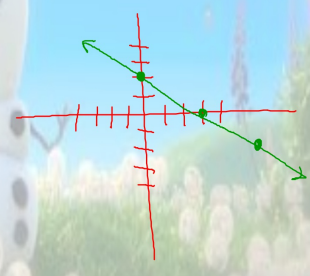
$2x + 3y = 6$

$-2x \quad -2x$

$3y = -2x + 6$

$y = -\frac{2}{3}x + 2$

$m$        $b$



### Finding an Equation of a Parallel Line

Find an equation of the line through  $P(1, -2)$  that is parallel to line  $L$  with equation  $3x - 2y = 1$ .

① slope:

$$\begin{array}{r} 3x - 2y = 1 \\ -3x \quad -3x \\ \hline -2y = -3x + 1 \\ \frac{-2y}{-2} = \frac{-3x + 1}{-2} \\ y = \frac{3}{2}x - \frac{1}{2} \end{array}$$

$$\begin{array}{l} y + 2 = \frac{3}{2}(x - 1) \\ y + 2 = \frac{3}{2}x - \frac{3}{2} \\ \frac{y + 2}{-2} = \frac{\frac{3}{2}x - \frac{3}{2}}{-2} \\ \boxed{y = \frac{3}{2}x - \frac{7}{2}} \end{array}$$

### Finding an Equation of a Perpendicular Line

Find an equation of the line through  $P(2, -3)$  that is perpendicular to line  $L$  with equation  $4x + y = 3$ .

Slope:

$$\begin{array}{r} 4x + y = 3 \\ -4x \quad -4x \\ \hline y = -4x + 3 \\ \perp = \frac{1}{4} \end{array}$$

$$\begin{array}{l} y + 3 = \frac{1}{4}(x - 2) \\ y + 3 = \frac{1}{4}x - \frac{1}{2} \\ \frac{y + 3}{-3} = \frac{\frac{1}{4}x - \frac{1}{2}}{-3} \\ \boxed{y = \frac{1}{4}x - \frac{7}{2}} \end{array}$$

### Word Problems

Camelot Apartments purchased a \$50,000 building and depreciates it \$2000 per year over a 25-year period.

1. Write a linear equation giving the value  $y$  of the building in terms of the years  $x$  after the purchase.

$$y = -2000x + 50,000$$

2. In how many years will the value of the building be \$24,500?

$$\begin{array}{l} 24,500 = -2000x + 50,000 \\ \boxed{x = 12.75 \text{ years}} \end{array}$$