

LESSON: Calculating X-Intercepts

Algebra 1

HOMEWORK

Find the x- and y-intercepts of the line that passes through the given points.

1. $(4, -2), (5, -4)$

$$\text{SLOPE: } m = \frac{-4 - (-2)}{5 - 4} = \frac{-2}{1} = -2$$

$$\text{Y-INT: } y = mx + b \quad \text{SIF: } y = -2x + 6$$

$$-2 = 4(-2) + b$$

$$-2 = -8 + b$$

$$\begin{array}{r} +8 \\ -2 \\ \hline 6 \end{array} = b$$

$$6 = b$$

$$\text{X-INT: } y = -2x + 6$$

$$0 = -2x + 6$$

$$\begin{array}{r} +2x \\ 0 \\ \hline 2x \end{array} = 6$$

$$\frac{2x}{2} = \frac{6}{2} \quad \boxed{\text{X-INT} = 3}$$

3. $(-3, 2), (-4, 10)$

$$\text{SLOPE: } m = \frac{10 - 2}{-4 - (-3)} = \frac{8}{-1} = -8$$

$$\text{Y-INT: } y = mx + b$$

$$2 = -8(-3) + b$$

$$2 = 24 + b$$

$$\begin{array}{r} -24 \\ 2 \\ \hline -22 \end{array} = b$$

$$-22 = b$$

$$\text{X-INT: } y = -8x - 22$$

$$0 = -8x - 22$$

$$\begin{array}{r} +8x \\ 0 \\ \hline 8x \end{array} = -22$$

$$\frac{8x}{8} = \frac{-22}{8}$$

$$x = -2.75$$

$$\boxed{\text{X-INT} = -2.75}$$

2. $(1, 1), (-5, 7)$

$$\text{SLOPE: } m = \frac{7 - 1}{-5 - 1} = \frac{6}{-6} = -1$$

$$\text{Y-INT: } y = mx + b \quad \text{SIF: } y = -x + 2$$

$$1 = (-1)(1) + b$$

$$1 = -1 + b$$

$$\begin{array}{r} +1 \\ 1 \\ \hline 2 \end{array} = b$$

$$2 = b$$

$$\text{X-INT: } y = -x + 2$$

$$0 = -x + 2$$

$$\begin{array}{r} +x \\ 0 \\ \hline x \end{array} = 2$$

$$\frac{x}{1} = \frac{2}{1} \quad \boxed{\text{X-INT} = 2}$$

4. $(-10, -4), (-7, 2)$

$$\text{SLOPE: } m = \frac{2 - (-4)}{-7 - (-10)} = \frac{6}{3} = 2$$

$$\text{Y-INT: } y = mx + b$$

$$2 = 2(-7) + b$$

$$2 = -14 + b$$

$$\begin{array}{r} +14 \\ 2 \\ \hline 16 \end{array} = b$$

$$16 = b$$

$$\text{X-INT: } y = 2x + 16$$

$$0 = 2x + 16$$

$$\begin{array}{r} -2x \\ 0 \\ \hline -2x \end{array} = 16$$

$$\frac{-2x}{-2} = \frac{16}{-2}$$

$$x = -8$$

$$\boxed{\text{X-INT} = -8}$$

OBJECTIVE (Students will...): Calculate the X-Intercept of a linear function.

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5. (8, 6), (9, 12)

SLOPE: $m = \frac{12-6}{9-8} = \frac{6}{1} = 6$

Y-INT: $y = mx + b$
 $6 = 6(8) + b$
 $6 = 48 + b$
 $\begin{array}{r} -48 \\ 6 = 48 + b \\ \hline -42 = b \end{array}$

X-INT: $y = 6x - 42$
 $0 = 6x - 42$
 $\begin{array}{r} -6x \\ 0 = 6x - 42 \\ \hline -6x = -42 \\ \hline -6 \quad -6 \\ \hline \boxed{x = +7} \end{array}$

SIF: $y = 6x - 42$

6. (15, -25), (-20, 45)

SLOPE: $\frac{45 - (-25)}{-20 - 15} = \frac{70}{-35} = -2$

Y-INT: $y = mx + b$
 $-25 = -2(15) + b$
 $-25 = -30 + b$
 $\begin{array}{r} +30 \\ -25 = -30 + b \\ \hline 5 = b \end{array}$

X-INT: $y = -2x + 5$
 $0 = -2x + 5$
 $\begin{array}{r} +2x \\ 0 = -2x + 5 \\ \hline 2x = 5 \\ \hline \frac{2x}{2} = \frac{5}{2} \\ \hline \boxed{x = 2.5} \end{array}$

7. (-2, 1), (7, 1)

SLOPE: $m = \frac{1-1}{7-(-2)} = \frac{0}{9} = 0$

Y-INT: $y = mx + b$
 $1 = 7(0) + b$
 $1 = b$

SIF: $y = 0x + 1$
 $y = 1$

X-INT: $y = 0x + 1$
 $0 = 0x + 1$
 $\begin{array}{r} -1 \\ 0 = 0x + 1 \\ \hline -1 \neq 0 \end{array}$
 NO X-INTERCEPT BECAUSE A 0 SLOPE LINE DOES NOT INTERSECT THE X-AXIS.

8. (4.25, 0), (3.5, 3)

SLOPE: $m = \frac{3-0}{3.5-4.25} = \frac{3}{-0.75} = -4$

Y-INT: $y = mx + b$
 $0 = -4(4.25) + b$
 $0 = -17 + b$
 $\begin{array}{r} +17 \\ 0 = -17 + b \\ \hline 17 = b \end{array}$

X-INT: $y = -4x + 17$
 $0 = -4x + 17$
 $\begin{array}{r} -17 \\ 0 = -4x + 17 \\ \hline -17 = -4x \\ \hline \frac{-17}{-4} = \frac{-4x}{-4} \\ \hline \boxed{4.25 = x} \end{array}$

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HOMEWORK: Standard Form - PART 3

9. Given two coordinates, find the equation of a line in Slope Intercept Form. Then explain the process you used to solve the problem. Finally, list the X Intercept of this problem.

COORDINATES: (-26, -35), (-40, -7)

SLOPE:

$$m = \frac{-7 - (-35)}{-40 - (-26)} = \frac{28}{-14} = -2$$

Y-INT: $y = mx + b$

$$-7 = -2(-40) + b$$

$$-7 = 80$$

$$\underline{-80} \quad \underline{-80}$$

$$-87 = b$$

SIF: $y = -2x - 87$

X-INT: $0 = -2x - 87$

$$\underline{+2x} \quad \underline{+2x}$$

$$2x = -87$$

$$\underline{2} \quad \underline{2}$$

$$\boxed{x^{\text{INT}} = -43.5}$$