Intercepts and Graphing

General Form of a line Ax + By = C where A, B, and C are integers and A is nonnegative.

Examples: Rewrite the following equations in general form.

1. $y = 2x + 10$

$-2x \quad -2x$

$-2x + y = 10 \rightarrow \div -1 \rightarrow 2x - y = -10$

2. $y = \frac{1}{2}x - \frac{4}{7}$

LCD: 2·7 = 14

$-14\left(-\frac{1}{2}x\right) + -14(y) = \left(-\frac{4}{7}\right)^{-14}$

$7x - 14y = 8$

3. $y = 3x - 15 \rightarrow -3x + y = -15 \rightarrow 3x - y = 15$

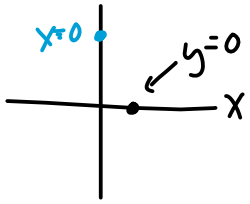
$\frac{-3x}{-1} + \frac{y}{-1} = \frac{-15}{-1}$

4. $y = \frac{1}{5}x + \frac{3}{8}$

LCD = 5·8 = 40

$-40\left(-\frac{1}{5}x\right) + -40(y) = \left(\frac{3}{8}\right)^{-40} \rightarrow 8x - 40y = -15$

Strategy – As an intercept is always a point on an axis, in order to find an intercept we can set the other variable value as zero and solve.



output input

Examples: Find the vertical and horizontal intercepts. Explain their meaning in the given situation.

1. Let $D = 0.28t + 5.95$ be the percentage of adults aged 18 years old and over in the United States that have been diagnosed with diabetes, *t* years since 2000.

vert intercept 5.95 (t=0) in 2000, 5.95% diabetes

horiz int $0 = 0.28t + 5.95$

$\frac{-5.95}{0.28} = \frac{0.28t}{0.28}$ — $t = -21.25$ { In 1978, Sept there were no adults ~~with~~ diagnosed w.th diabetes

2. The pressure inside a vacuum chamber can be represented by $P = 35 - 0.07s$, where *P* is the pressure in pounds per square inch (psi) of the vacuum chamber after being pumped down for *s* seconds.

(P) vert intercept (s=0) P=35 Pressure inside vacuum chamber starts at 35 psi.

s horiz intercept (P=0)

$0 = 35 - 0.07s$

$0.07s = 35$

$s = 500$

} after 500 seconds, pressure will be zero.

3. The cost for making tacos at a local stand can be represented by $C = 0.55t + 140.00$, where *C* is the cost in dollars to make tacos at the neighborhood stand when *t* tacos are made.

(C) vert intercept (t=0) C=140 Costs $140 to just open the stand w.th no tacos.

(t) horiz. int. (C=0)

$0 = 0.55t + 140$

$\frac{-0.55t}{-0.55} = \frac{140}{-0.55}$

$t = -245.\overline{54}$

} in order to have no costs, they must make — 245 tacos.

??

model break-down

Intercepts and Graphing, Part 2

y x

Examples: Find the vertical and horizontal intercepts. Use the intercepts to graph the lines.

1. $8x + 2y = 40$

vert $x=0$

$\frac{2y}{2} = \frac{40}{2}$

$y = 20$

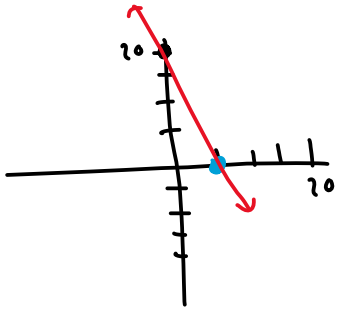
$(0, 20)$

horiz $y=0$

$\frac{8x}{8} = \frac{40}{8}$

$x = 5$

$(5, 0)$



2. $3x - 4y = 24$

$x=0$

$-4y = 24$

$y = -6$

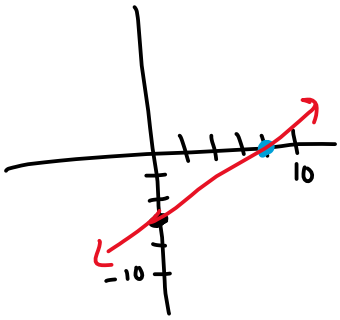
$(0, -6)$

$y=0$

$3x = 24$

$x = 8$

$(8, 0)$



3. $5x - 6y = 10$

$x=0$

$-6y = 10$

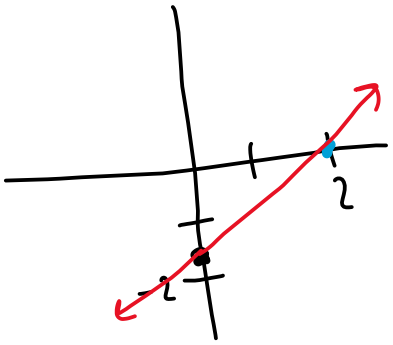
$y = \frac{10}{-6} = \frac{5}{-3}$ $\left(0, -\frac{5}{3}\right)$

$y=0$

$5x = 10$

$x = 2$

$(2, 0)$



4. $2x + 3y = 18$

$x=0$

$3y = 18$

$y = 6$

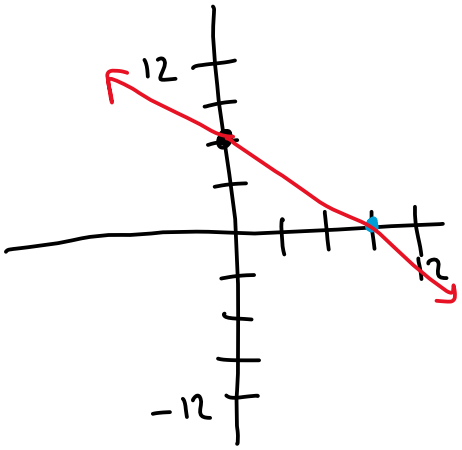
$(0, 6)$

$y=0$

$2x = 18$

$x = 9$

$(9, 0)$

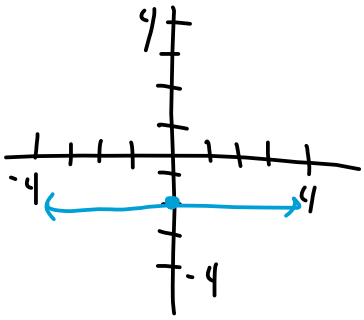


Horizontal Lines – A horizontal line has an equation of the form $y = k$ and a slope $m = 0$.

Vertical Lines – A vertical line has an equation of the form $x = k$ and a slope *m* undefined.

Examples: Sketch the graph of each line.

1. $y = -2$



2. $x = 3$