Worksheet 4-4: Graphing a Linear Relation (Straight Line)
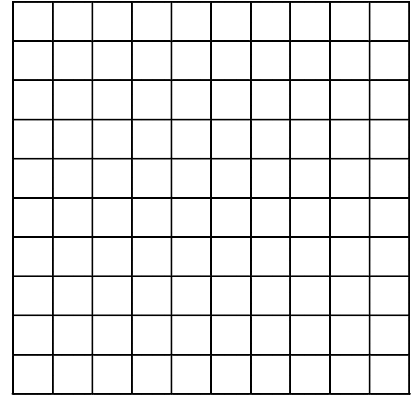
Three Ways to Graph a Linear Relation:

(i) Graph by Table of Value (Find corresponding y-values by substituting chosen x-values into equation.)
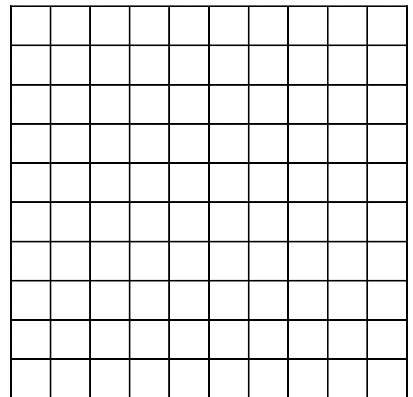
1. Graph each line.
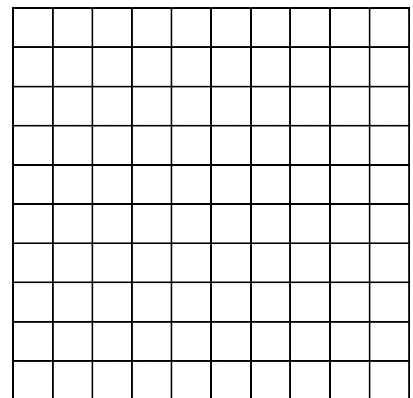
(a) $y = 2x - 3$

x	$2x - 3 = y$	(x, y)
0		
1		
2		

(b) $y = -3x + 4$

x	$-3x + 4 = y$	(x, y)
0		
1		
2		

(c) $y = \dfrac{1}{2}x + 1$

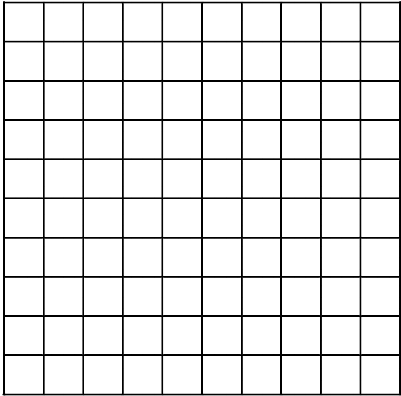| x	$\dfrac{1}{2}x + 1 = y$	(x, y)
0		
2		
4		

**Why do we use 0, 2, and 4 for x instead of 0, 1and 2?

(ii) Graph by Slope and *y*-Intercept (Start at *y*-intercept then move to the next point by rise and run.)
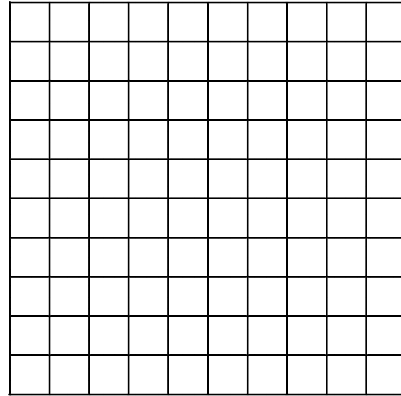
2. Graph each line by its slope and *y*-intercept.

(a) Graph $y = 2x - 3$**.**
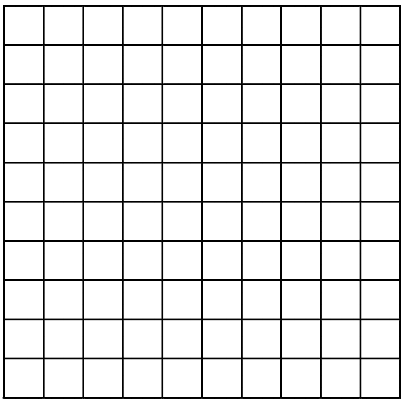
  $b =$ _____, rise = _____, run = _____

(b) Graph $y = \dfrac{2}{3}x + 1$**.**

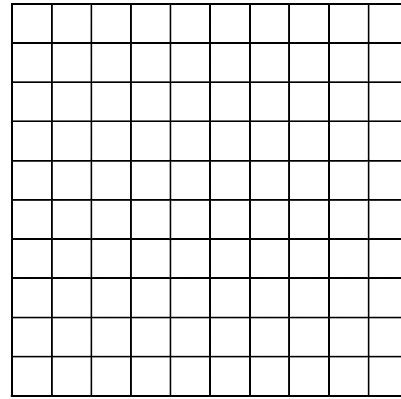 $b =$ _____, rise = _____, run = _____

(c) Graph $y = -4x + 5$**.**

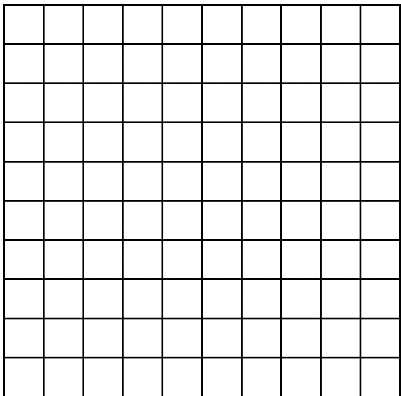 $b =$ _____, rise = _____, run = _____

(d) Graph $y = -\dfrac{3}{2}x + 3$**.**

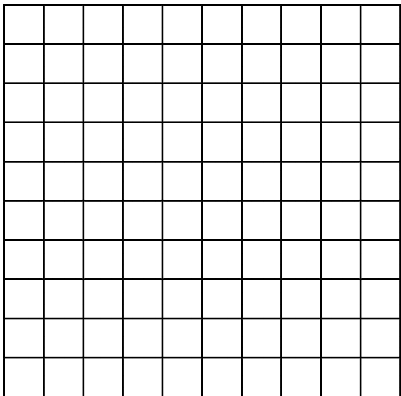 $b =$ _____, rise = _____, run = _____

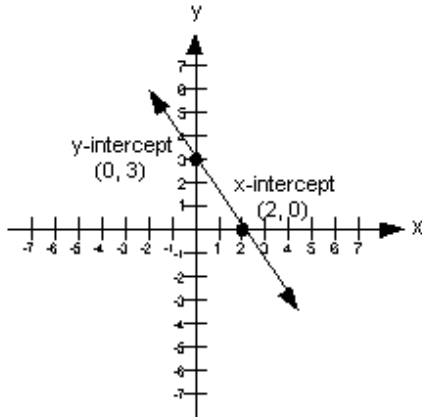**(e) Graph** $y = 7$

  $b =$ _____, rise = _____, run = _____

(f) Graph $x = 5$

  $b =$ _____, rise = _____, run = _____

(iii) Graph by *x*-and *y*-Intercepts (Plot the *x*- and *y*-intercepts of the graph and connect with a line.)
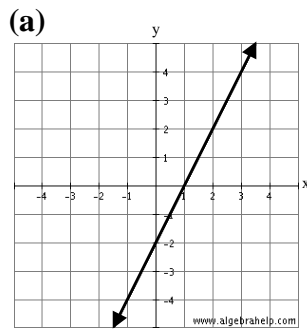
 <u>The *x*- and *y*-intercepts of a graph</u>

The ***x*-intercept** of a graph is where the line crosses the *x*-axis. It is the ***x*-value of the point** (*x*, *y*) on the *x*-axis.

To find the *x*-intercept, we have to **find that value of *x* where *y* = 0** because at *every* point on the *x*-axis, *y* = 0**.**

The ***y*-intercept** of a graph is where the line crosses the *y*-axis. It is the ***y*-value of the point** (*x*, *y*) on the *y*-axis.

To find the *y*-intercept, we have to **find that value of *y* where *x* = 0** because at *every* point on the *y*-axis, *x* = 0.
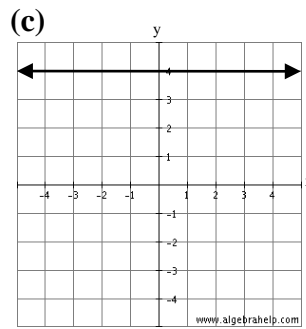
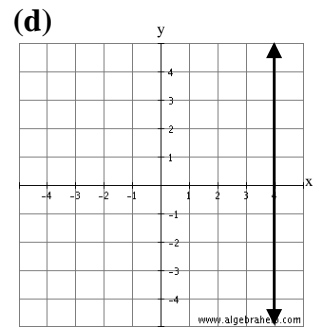**3.** State the *x*- and *y*-intercepts of the following graphs.

(a)   **(b)**   **(c)**   **(d)**

x-intercept =   *x*-intercept =   *x*-intercept =   *x*-intercept =
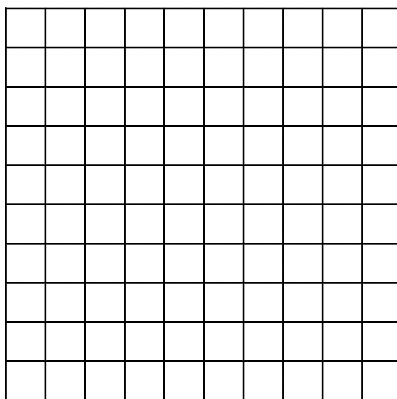
y-intercept =   *y*-intercept =   *y*-intercept =   *y*-intercept =
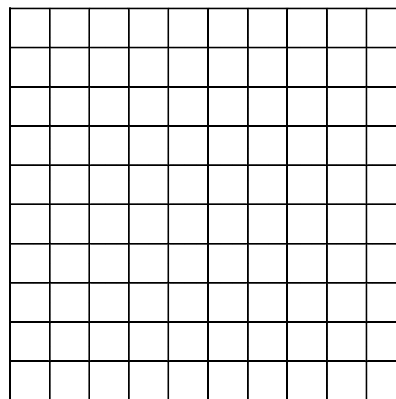
4. Graph each line by its *x*- and *y*-intercepts.

(a) $y = x - 4$ **(b)** $3x + y = 6$
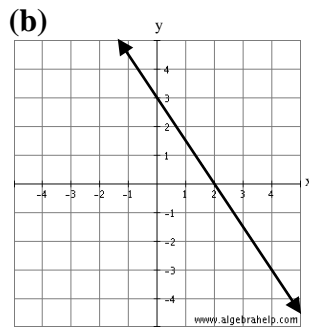
x-intercept: *y*-intercept: *x*-intercept: *y*-intercept:
when $y = 0$ when $x = 0$ when $y = 0$ when $x = 0$
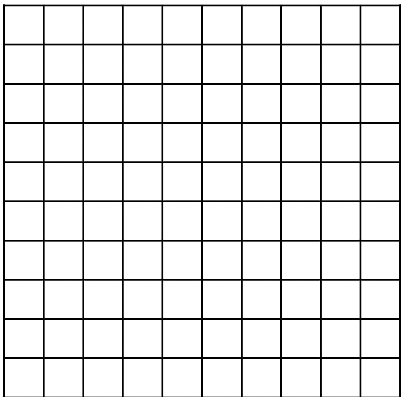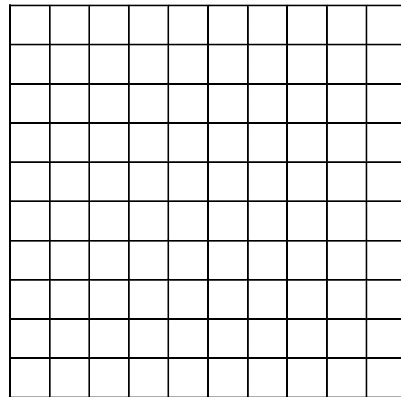
(c) $y = \dfrac{1}{2}x - 3$
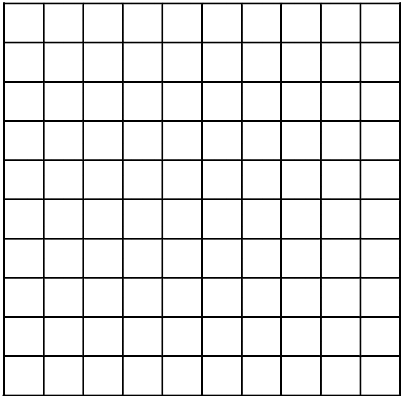
(d) $y = -5$
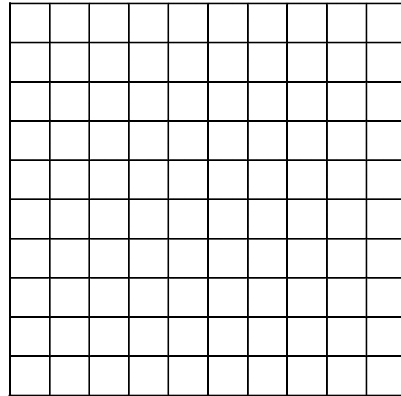
(e) $x = 4$

(f) $2x + y + 4 = 0$

Answers: 3. (a) 1 and –2**, (b)** 2 and 3**, (c)** none and 3**, (d)** 2 and none**; 4. (a)** $(4, 0)$ and $(0, -4)$**, (b)** $(2, 0)$ and $(0, 6)$**,**
(c) $(6, 0)$ and $(0, -3)$**, (d)** none and $(0, -5)$**, (e)** $(4, 0)$ and none**, (f)** $(-2, 0)$ and $(0, -4)$