Graphing Linear Functions/Equations using Intercepts

An intercept is the point where the line crosses the x-axis or y-axis.

X-intercept

- where the line crosses the x-axis; (x , 0)
- to find, substitute zero for y and solve the equation

Y-intercept

- where the line crosses the y-axis; (0 , y)
- to find, substitute zero for x and solve the equation

To Graph using Intercepts

- Find the x-intercept.
- Find the y-intercept.
- Plot both points and connect with a straight edge; add arrows to the end of the line.

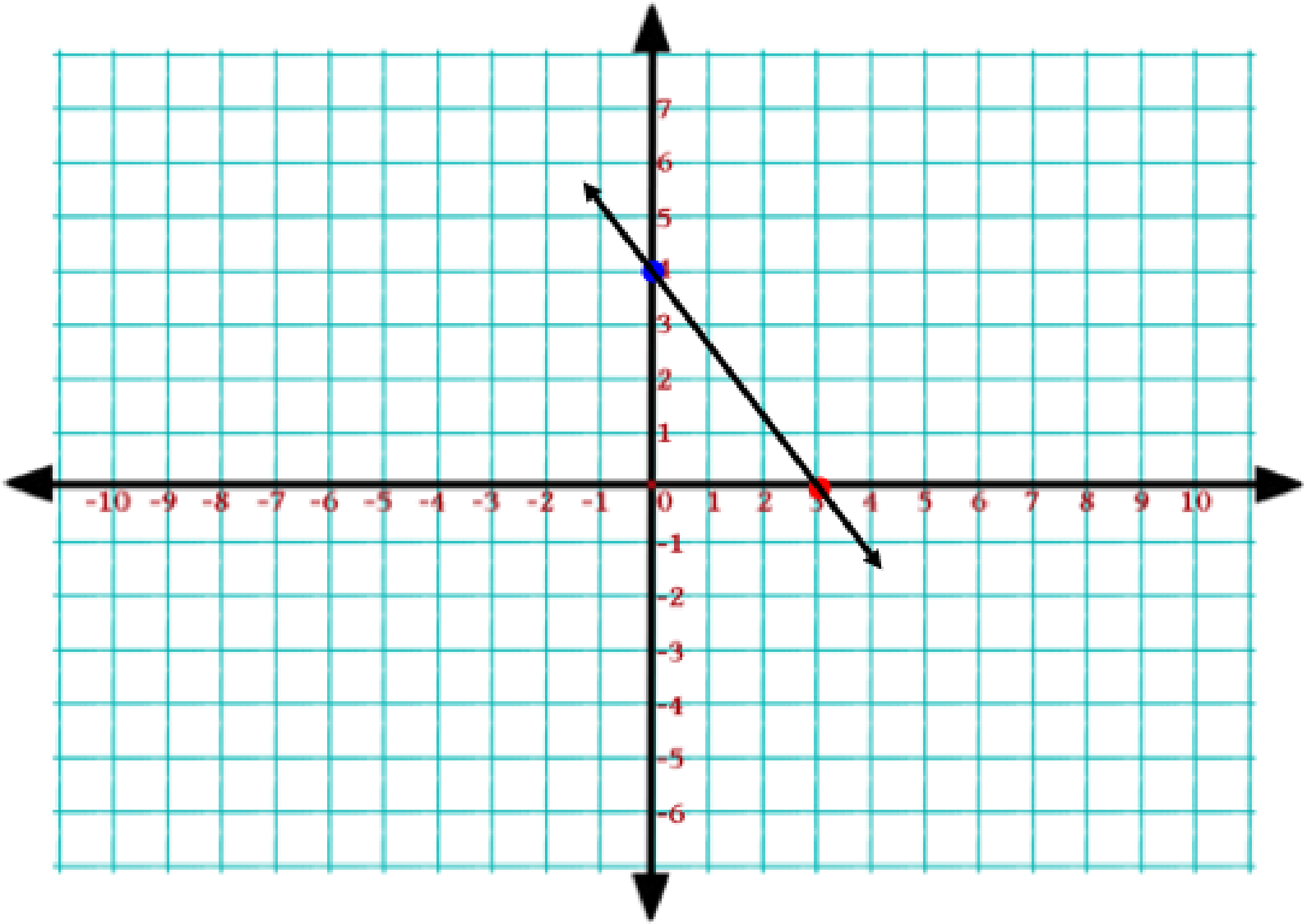
Find the intercepts and graph the equation.

1) $4x + 3y = 12$

x	y
3	0
0	4

$$4x + 3(0) = 12$$
$$4x = 12$$
$$x = 3$$

$$4(0) + 3y = 12$$
$$3y = 12$$
$$y = 4$$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-1
-2
-3
-4
-5
-6

Find the intercepts and graph the equation.

2) $y = -2x - 8$

x	y
-4	0
0	-8

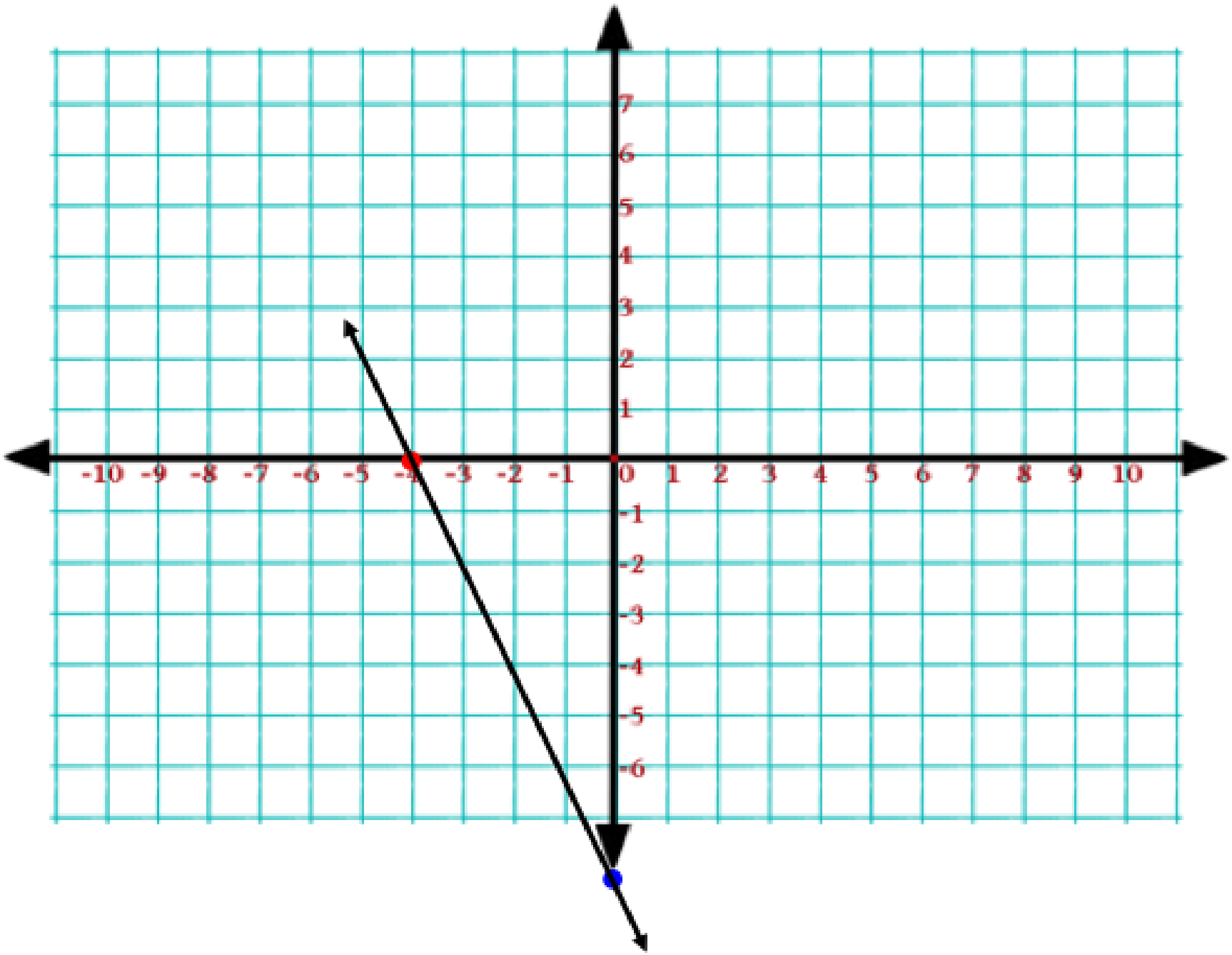
$0 = -2x - 8$

$2x = -8$

$x = -4$

$y = -2(0) - 8$

$y = -8$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-4
-5
-6

Find the intercepts and graph the equation.

3) $\frac{3}{8}x + \frac{1}{2}y = -3$

x	y
-8	0
0	-6

$\frac{3}{8}x + \frac{1}{2}(0) = -3$

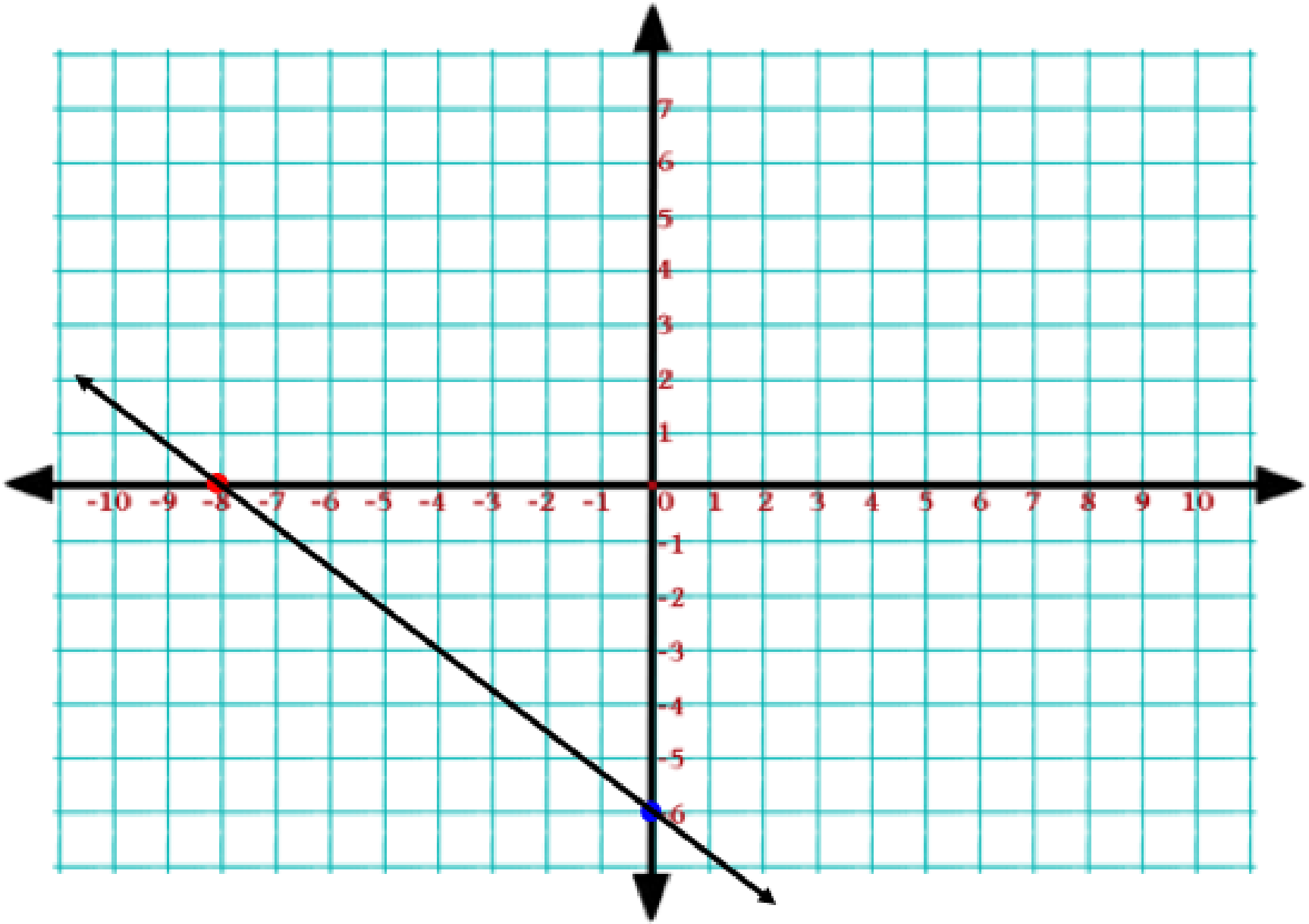
$\frac{8}{3} \cdot \frac{3}{8}x = -\frac{3}{1} \cdot \frac{8}{3}$

$x = -8$

$\frac{3}{8}(0) + \frac{1}{2}y = -3$

$\frac{2}{1} \cdot \frac{1}{2}y = -\frac{3}{1} \cdot \frac{2}{1}$

$y = -6$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-4
-5
-6

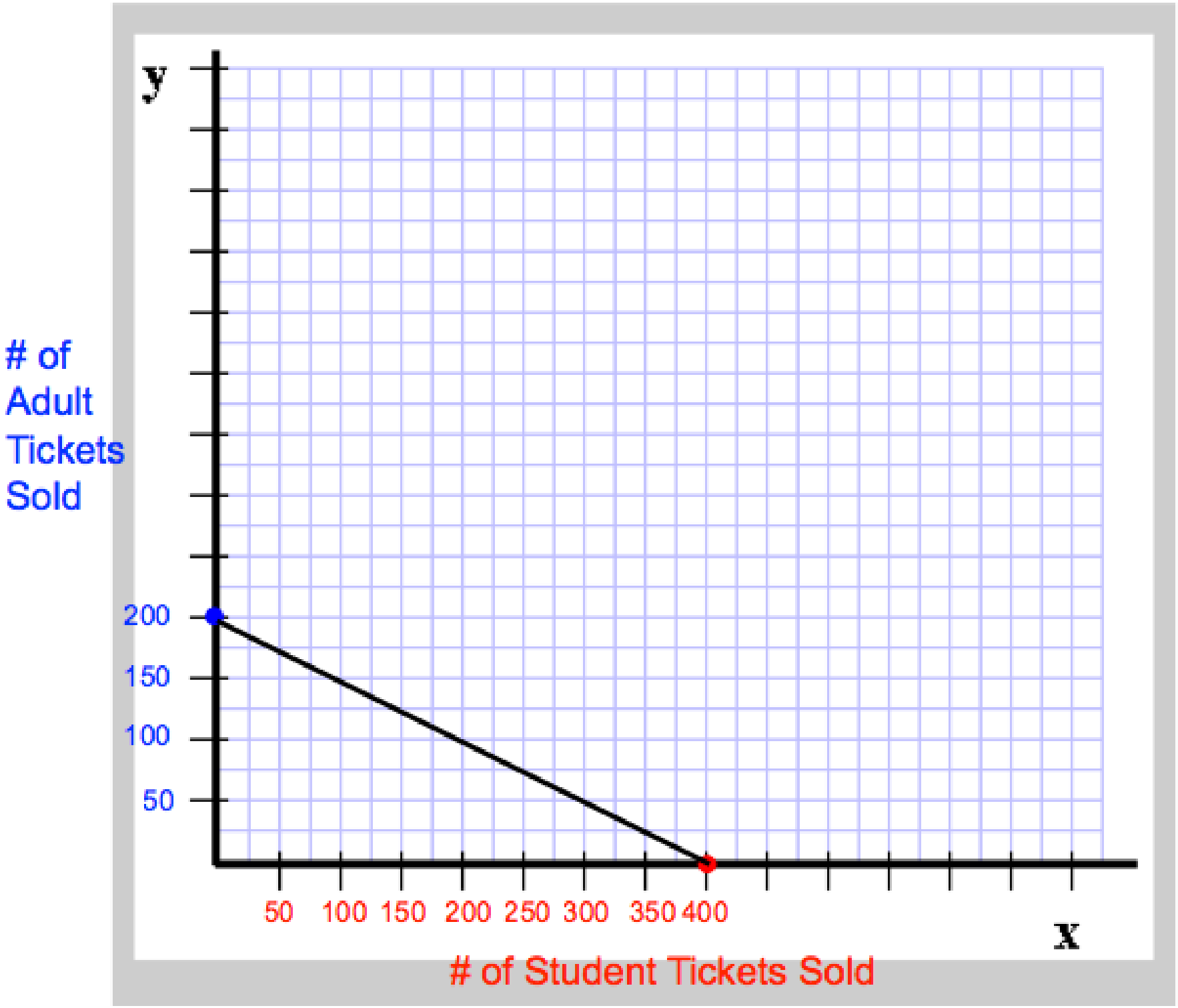
Using intercepts in a real-life problem.
The middle school student council is selling tickets to its fall carnival. They would like to sell $2000 worth. The cost of a student ticket is $5; the cost of an adult ticket is $10

Let x = the number of student tickets sold
Let y = the number of adult tickets sold

Write a linear equation to represent the ticket sales.
Find the intercepts and graph using the intercepts.

$$5x + 10y = 2000$$

x	y
400	0
0	200


y
# of Adult Tickets Sold
200
150
100
50
50 100 150 200 250 300 350 400
x
# of Student Tickets Sold

What does the x-intercept represent in this situation?

It represents 400 student tickets sold and no adult tickets sold.

What does the y-intercept represent in this situation?

It represents 200 adult tickets sold and no student tickets sold.

List three other ticket sale combinations that would allow the student council to reach their goal of $2000.

50 student, 175 adult
100 student, 150 adult
150 student, 125 adult
200 student, 100 adult

250 student, 75 adult
300 student, 50 adult
350 student, 25 adult