

Business Calculus

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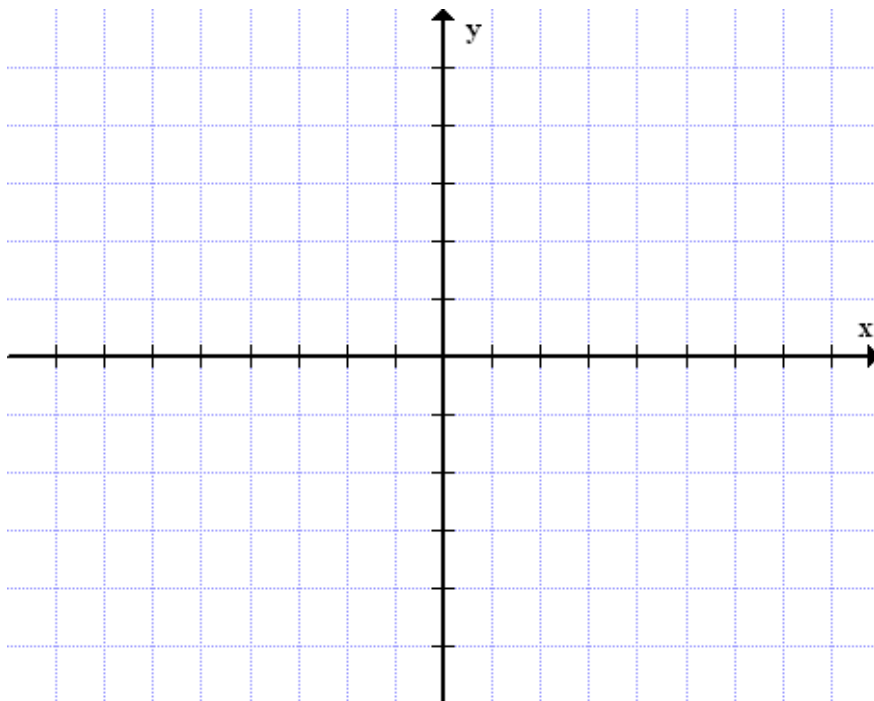
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Chapter R - Functions Graphs and Models Slope and Linear Functions

Cartesian Plane



Plot the following points.

- 1 $(-4, 4)$
- 2 $(0, 5)$
- 3 $(4, 3)$
- 4 $(-2, 1)$
- 5 $(-5, 0)$
- 6 $(-3, -3)$
- 7 $(-1, -4)$
- 8 $(0, -3)$
- 9 $(0, 0)$
- 10 $(3, 0)$
- 11 $(5, -2)$

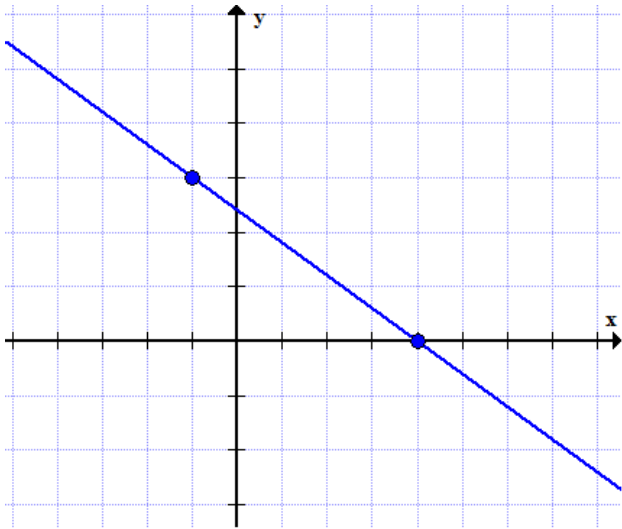
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Intercepts and Slope

Definition 1.1 (Slope of a Line)

The **slope** of a line is defined as the vertical change ('the rise') over the horizontal change ('the run') as one travels along the line. In symbols, taking two different points (x_1, y_1) and (x_2, y_2) on the line, the slope is

$$m = \frac{\text{Change in } y}{\text{Change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$



Find the slope and intercepts for this line.

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Finding the Slope

Example 1.2

Find the slope between the following points

1 $(-2, 4)$ and $(0, 6)$

2 $(\frac{2}{3}, 3)$ and $(-\frac{1}{3}, 8)$

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Definition 1.3 (Slope-Intercept Form)

If a line has slope m and y -intercept b , then the equation of the line is **slope-intercept form** is

$$y = mx + b$$

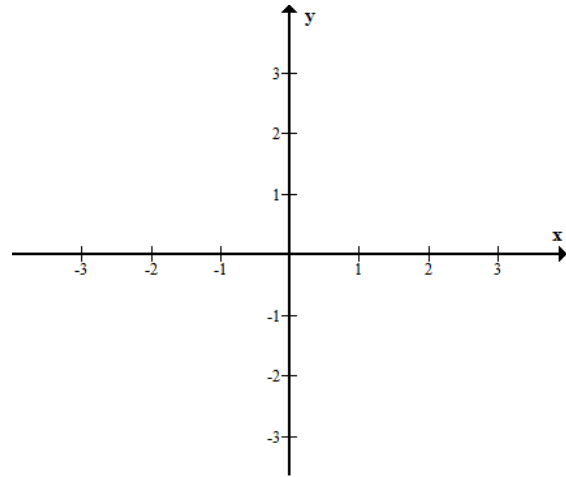
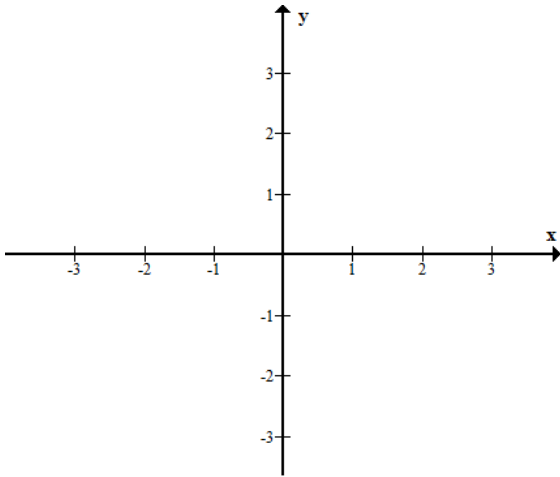
Definition 1.4 (Point-Slope Form)

If a line has slope m and passes through the point (x_1, y_1) , then an equation of the line is given by

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

Find the equation of the line passing through the set of points from the previous example.

Special Cases



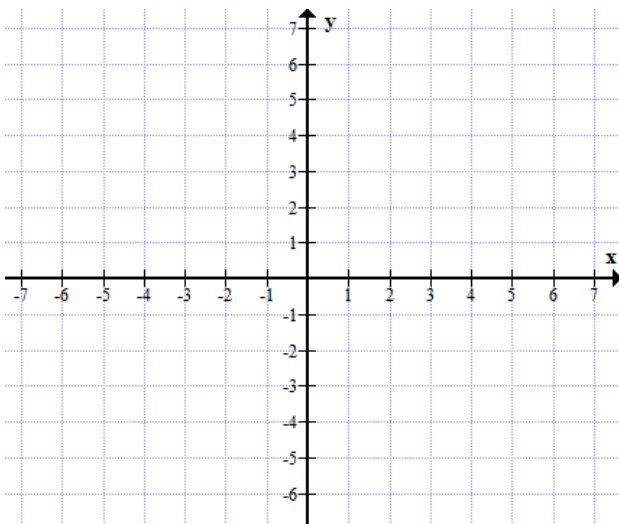
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Graphing

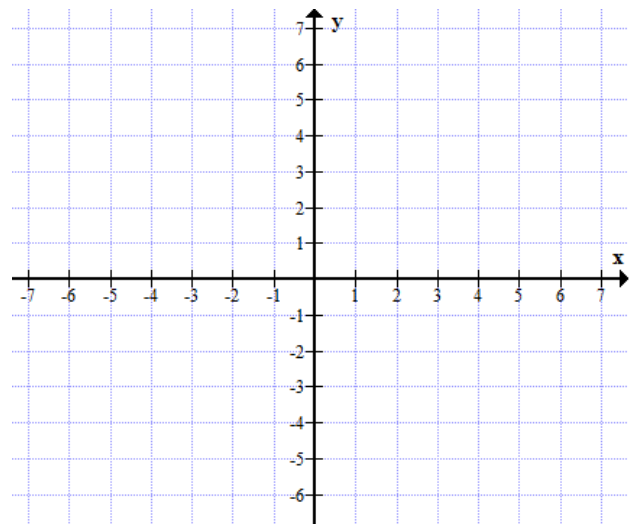
Example 1.5

Graph the following lines

$$y = \frac{2}{5}x - 5$$



$$6x + 5y = 15$$



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Cost, Revenue, Profit, and Breaking Even

Fixed Costs do not depend on the number of items produced.

Examples:

Variable Costs depend on the number of items produced.

Examples:

1 $C(x)$

2 $R(x)$

3 $P(x)$

4 Break Even value

Example 1.6

Suppose you start a bicycle business with a fixed cost of \$5,000. You determine that each bicycle will cost \$400 to manufacture. You decide to sell each bicycle for \$600. Find the total cost, total revenue, total profit functions and the break-even value of x .

