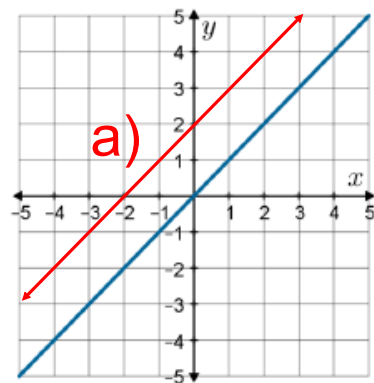# Solutions

Page 194 #s 2, 3, 9, 11, 12

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2. Consider the graph of the line $y = x$ on the right.

a) Sketch the graph of the line after it undergoes a translation up 2 units.

b) Does translating the line affect its slope?

c) If the given line is translated down 3 units, what is its new y-intercept?

d) If the given line is translated up 4 units, what is the equation of the resulting line?

a)

b) Translating DOES NOT affect slope.

c) $y = x$ down 3 $\Rightarrow$ y-intercept is $(0, -3)$

d) $y = x$ up 4 $\Rightarrow$ $y = x + 4$

3. The line $y = 3x$ is translated up 7 units. What is the equation of the resulting line?
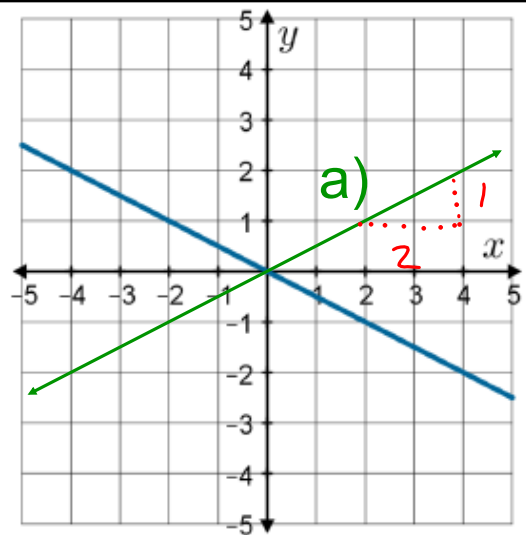
Remember, slope doesn't change

$$\Rightarrow y = 3x \text{ up } 7$$

$$\Rightarrow y = 3x + 7$$

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9. The graph of $y = -\dfrac{1}{2}x$ shown on the right undergoes a reflection in the x-axis.

   a) Sketch the graph of the transformed line.

   b) State the equation of the resulting graph.

b)

$$\text{Slope} = \frac{1}{2}$$

$$y\text{-intercept is } (0, 0)$$

$$\Rightarrow \text{Equation is}$$

$$y = \frac{1}{2}x + 0$$

$$y = \frac{1}{2}x$$

11. State the equation of the line $y = -8x$ after it undergoes each of the following transformations.

    a) translation up 14 units   b) vertical reflection (in the x-axis)

    c) translation down 3.5 units   d) reflection in the x-axis followed by a translation up 6 units

Translations affect the y-intercept, not slope

Reflections in the x-axis will affect the sign of the slope.

a) $y = -8x$ up 14 $\implies y = -8x + 14$

b) $y = -8x$ reflected in x-axis $\implies y = 8x$

c) $y = -8x$ down 3.5 $\implies y = -8x - 3.5$

d) $y = -8x$ reflected in x-axis, up 6 $\implies y = 8x + 6$

12. State the vertical transformation(s) that can be applied the graph of $y = \frac{4}{3}x$ to obtain the graph of each of the following lines.

    a) $y = \frac{4}{3}x - 17$ b) $y = -\frac{4}{3}x$ c) $y = 15 + \frac{4}{3}x$ d) $y = -\frac{4}{3}x - \frac{2}{3}$

a) Vertical translation down 17

b) Reflection in x-axis

c) Vertical translation up 15

d) Reflection in x-axis

vertical translation down $\frac{2}{3}$