Mid-Chapter Review

1. a) For safety, a moving van's ramp should have a maximum slope of $\frac{3}{10}$. Explain what this means.

e.g., The ramp must rise at most 3 units for every 10 units of run.

b) Is a ramp with a rise of 2.5 ft and a run of 9 ft safe?

e.g., Slope: $\frac{2.5 \text{ ft}}{9 \text{ ft}} = 0.277...$ Maximum slope: $\frac{3}{10} = 0.3$

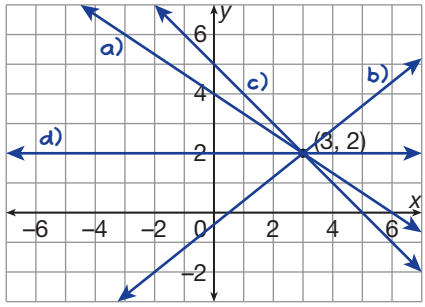
$0.277... < 0.3$ So the ramp is safe.

c) What is the grade of the ramp in Part b)?

The grade is $0.277... \times 100\%$, or about 28%.

2. Draw a line through the point (3, 2) with each slope.

a) $-\frac{2}{3}$ **b)** 0.8 **c)** -1 **d)** 0



3. A sign is needed for any road with a grade greater than 6%. A scale drawing of the cross-section of a road has points with coordinates (45, 143) and (145, 150). Is a sign needed?

Grade: $\frac{150 - 143}{145 - 45} \times 100\% = 7\%$ A sign is needed.

4. Mikka is a conservationist. She looked up to the top of a sitka spruce tree. She measured the angle of elevation as 50°.

a) What is the slope of the line Mikka is looking along?

The slope is $\tan 50° = 1.1917...$

b) Mikka's eyes are 1.52 m above the ground. She is standing 100 m from the tree. What is the height of the sitka, to the nearest metre?

$$1.1917... = \frac{x}{100 \text{ m}}$$

$119.175... \text{ m} = x$

Height: $119.175... \text{ m} + 1.52 \text{ m} = 120.695... \text{ m}$

The sitka is 121 m tall, to the nearest metre.