Workplace and Apprenticeship 20

Final Review

You will need your reference sheets for Ch 1, Ch 2 and Ch 4 to be handy.

Calculating slope

From rise and run: $\text{slope} = \dfrac{\text{rise}}{\text{run}}$

A ramp has a height of 2.5 m and a horizontal run of 8 m. Calculate the slope of the ramp.
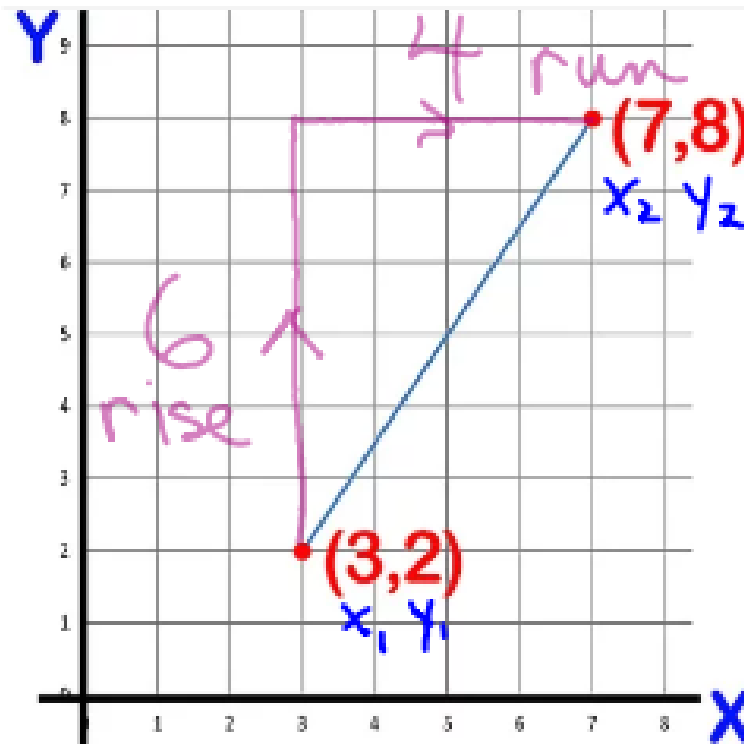
$$\text{slope} = \frac{2.5}{8} = 0.3125$$

Calculating slope

From a graph:

$$m = \frac{6}{4} = \frac{3}{2}$$

$$m = 1.5$$

Y

4 run

(7,8)
$x_2\ y_2$

6 rise

(3,2)
$x_1\ y_1$

X
1 2 3 4 5 6 7 8

$$m = \frac{8-2}{7-3}$$

$$m = \frac{6}{4} = \frac{3}{2}$$

$$m = 1.5$$

Calculating slope

From a graph:

$$m = \frac{-4}{2} = -2$$

Calculations involving pitch

The pitch of a roof is 3 : 8. (rise run)
How much will it rise for a run of 6 m?

$$\frac{rise}{run} = \frac{rise}{run} \qquad \frac{3}{8} = \frac{rise}{6}$$

$$\frac{8(rise)}{8} = \frac{18}{8}$$

$$rise = 2.25 \; m$$

Calculations involving grade

A highway has a posted grade of 3%. Calculate the
$\overset{rise}{\underline{\text{vertical change}}}$ over a $\underline{\text{horizontal distance}}$ of 240 m.

$$\text{slope} = \overset{rise}{\frac{3}{100}}_{run} (3\%)$$

$$\frac{3}{100} \nearrow \frac{rise}{240}$$

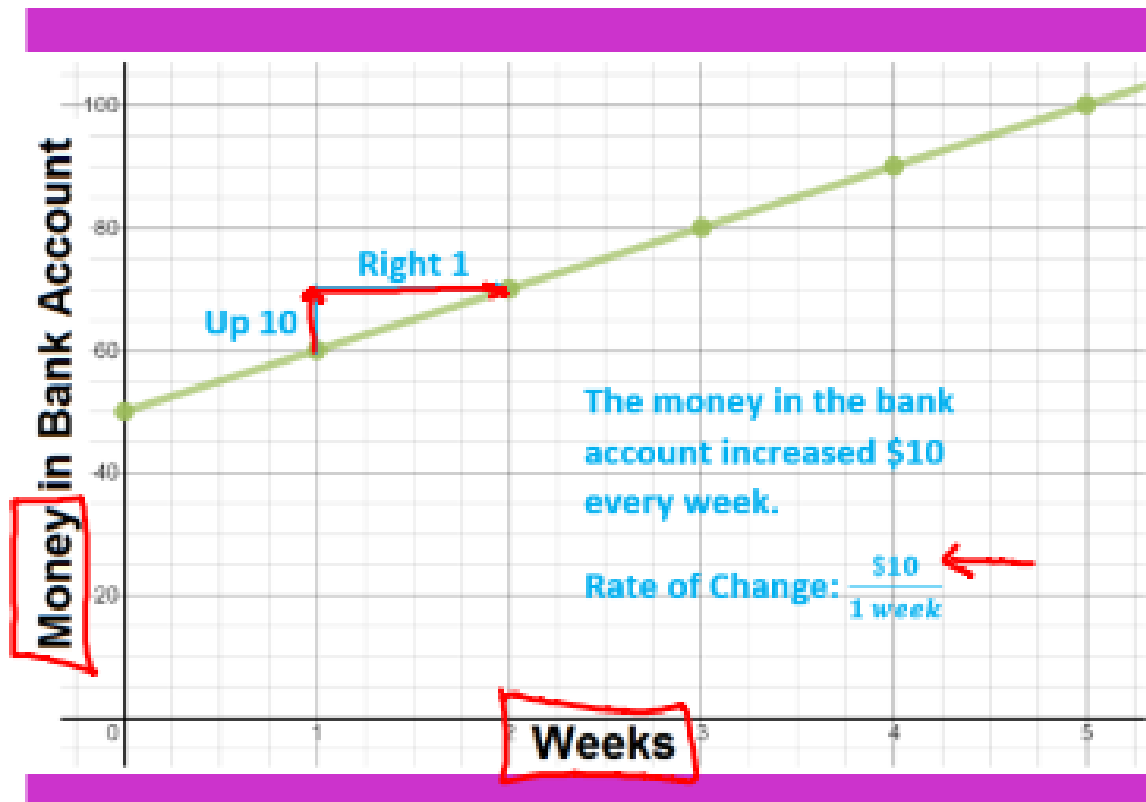$$\frac{100(rise)}{100} = \frac{720}{100} \qquad rise = 7.2\,m$$

Calculations involving rate of change

A cyclist rode their bike 85 km in 4 hours. If he rode at a constant speed, what was his rate of travel?

$$\text{rate of travel} = \frac{\text{how far}}{\text{how long}} = \frac{85 \text{ km}}{4 \text{ hr}}$$
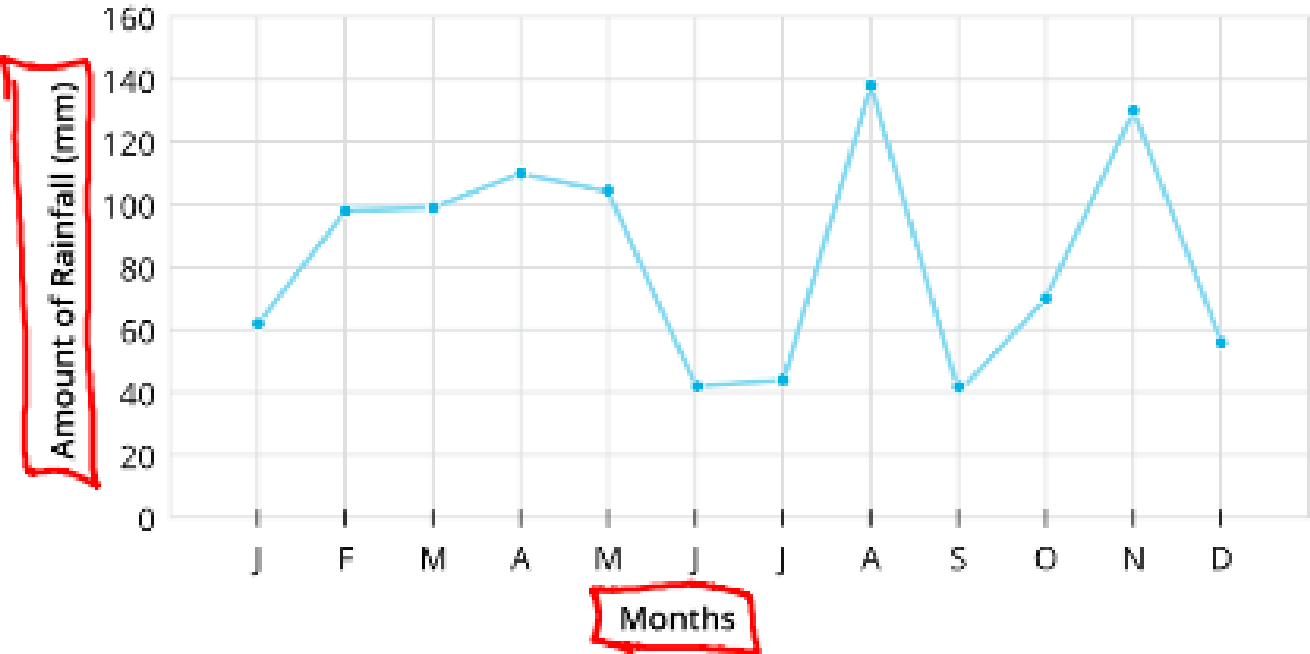
$$= 21.25 \text{ km/h}$$

Graphs involving rate of change

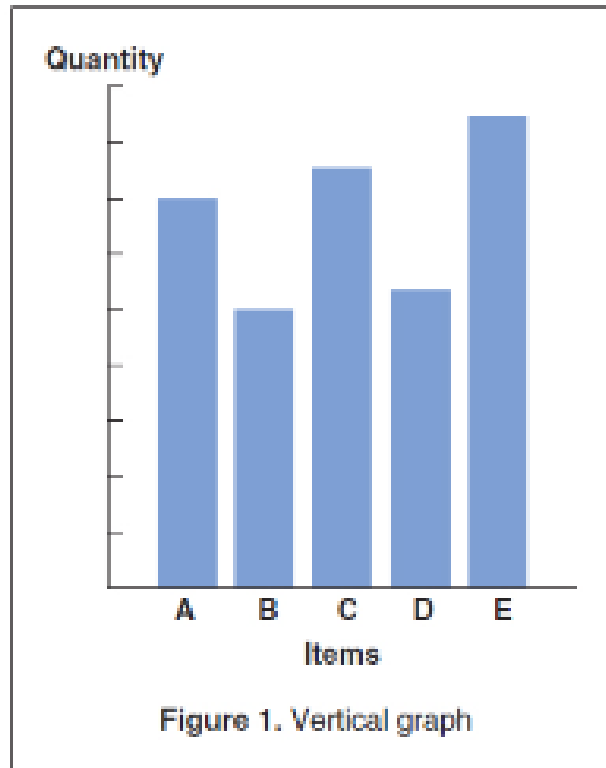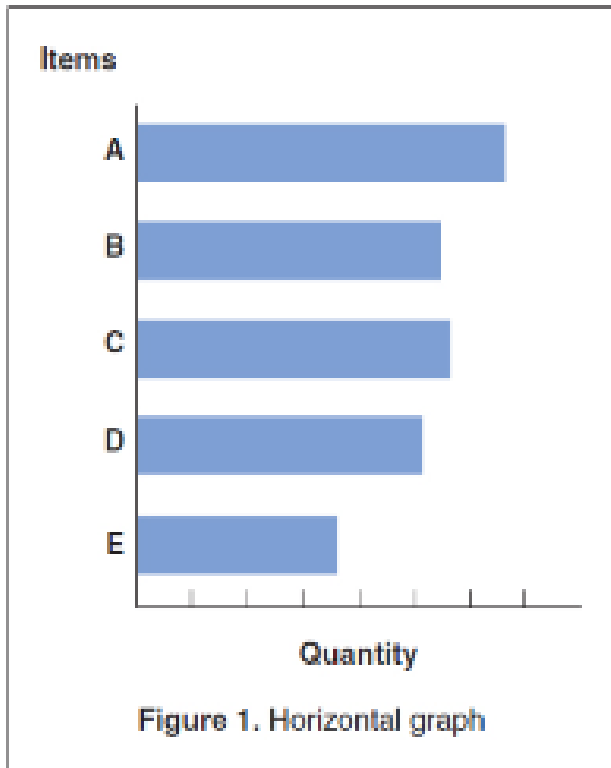# Creating Line Graphs and Bar Graphs

Annual Precipitation

Creating Line Graphs and Bar Graphs

Items

Figure 1. Horizontal graph

Quantity


Figure 1. Vertical graph

Horizontal bars are best for showing quantities such as speed and distance. Vertical bars are best for showing quantities such as height, size, and amount. However, these distinctions are not ironclad; as long as the axes are clearly labeled, readers should have no trouble understanding the graph.

Solving Triangles

If you know 2 sides and the right angle:
- find 3rd side with the Pyth Thm
- find 1st angle with an inverse trig ratio
- find 2nd angle with an inverse trig ratio or the 180° angle rule for triangles

Solving Triangles

B

adj
9
opp

hyp
14
hyp

C

x

A
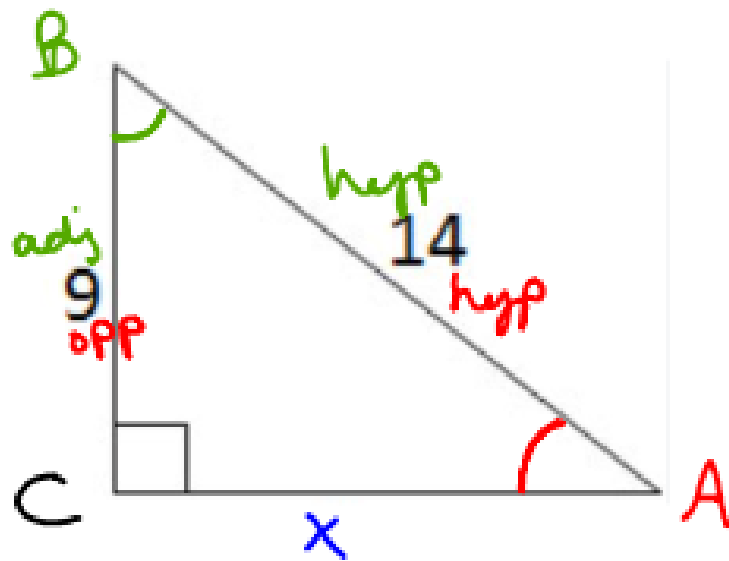
$$x^2 = 14^2 - 9^2$$

$$x^2 = 196 - 81$$

$$\sqrt{x^2} = \sqrt{115}$$

$$x = 10.72\ldots \approx 10.7$$

$$\angle A = \sin^{-1}\left(\frac{9}{14}\right)$$

$$\angle A = 40°$$
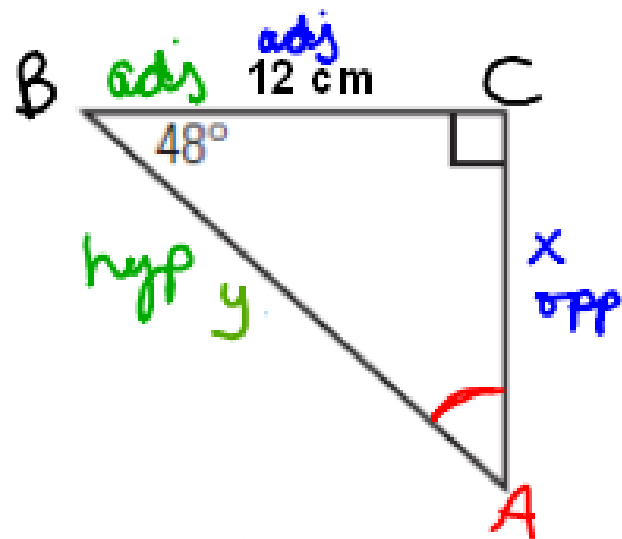
$$\angle B = \cos^{-1}\left(\frac{9}{14}\right)$$

$$\angle B = 50°$$

Solving Triangles

If you know 1 side, one acute angle, and the right angle:

- find 3rd angle with the 180° angle rule for triangles
- find 1st side with a trig ratio
- find 2nd side with a trig ratio or the Pyth Thm

Solving Triangles

B $\overset{\overset{\text{adj}}{\text{adj}}}{\underset{48°}{\rule{0pt}{0pt}}}$ 12 cm C

hyp y

x opp

A

$\tan 48° = \dfrac{x}{12}$

$12 \tan 48° = x$

$13.3 \text{ cm} = x$

$\cos 48° = \dfrac{12}{y}$

$y = \dfrac{12}{\cos 48°}$

$y = 17.9 \text{ cm}$

$\angle A = 180° - 90° - 48°$

$\angle A = 42°$

Angles of Elevation

$$\cos 60° = \frac{2.5}{l}$$

$$l = \frac{2.5}{\cos 60°}$$

$$l = 5m$$
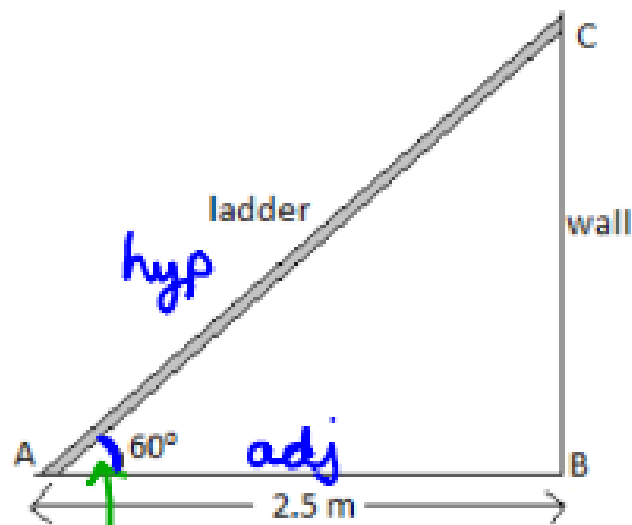
2-Triangle Problems
- find the common side first
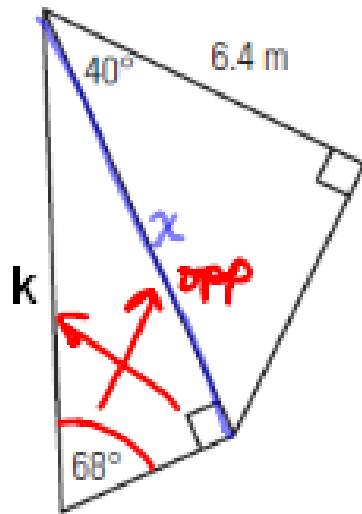
How long is side k?

$$\cos 40° = \frac{6.4}{x}$$

$$x = \frac{6.4}{\cos 40°}$$

$$x = 8.35 \text{ m}$$

$$\sin 68° = \frac{8.35}{k}$$

$$k = \frac{8.35}{\sin 68°}$$

$$k = 9 \text{ m}$$

Chapter 1 - Chapter Test
pg. 55 - 57, #1 - 9

Chapter 2 - Chapter Test
pg. 119 - 123, # 1 - 5

Chapter 4 - Chapter Test
pg. 226 - 230, #1 - 7

Answer Key - Chapter 1:

1. $\frac{2}{5}$ or 0.4

2. 167 cm

3. 0.95 m

4. a) 10 ft   b) 10.7 ft

   c) 20.6°

5. a) $\frac{1}{3}$ or about 0.33   b) 18.4°

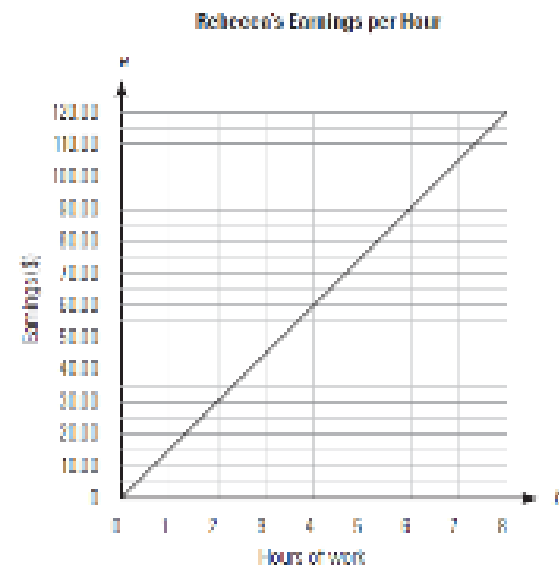6. 0.9 km or 900 m

7. a) 126.1 m   b) 5.4%

8. 1.4 m

9. a)

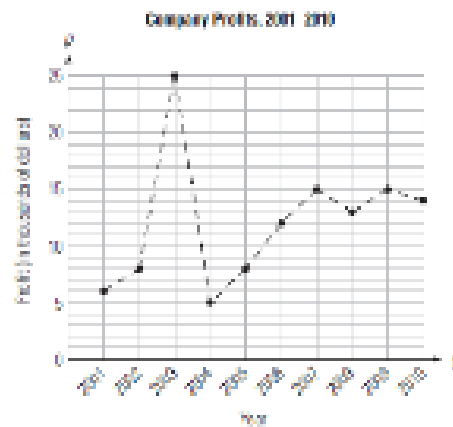Rebecca's Earnings per Hour

b) $m = 15$

   The slope represents Rebecca's earnings per hour.

c) $120.00

# Answer Key - Chapter 2:

1. a)

Company Profits, 2001–2010

b) 2003

c) 2003 was the peak year for the company's profits; profits were much higher that year than in 2002 or 2004. In 2004, the profits then dropped down to what they had been during the two previous years (2001–2002). They made a steady increase over the next three years and seem to have levelled off over the last three years.
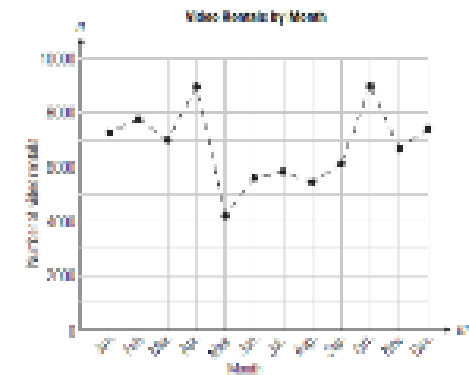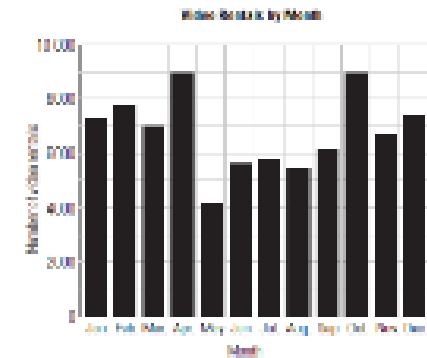
2. a)

Number of Motors Bought and Sold
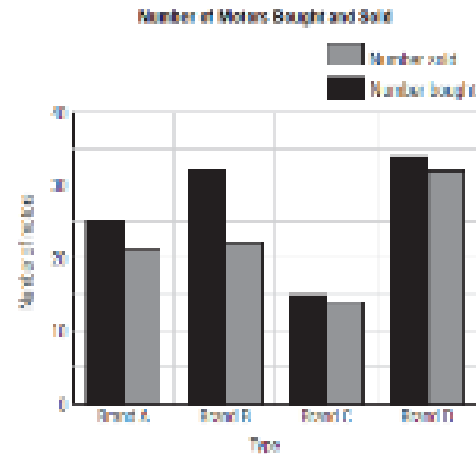
b) Brand C, 1   c) Brand B, 10

3. a) Either a broken line graph or a bar graph (vertical or horizontal) could be used, because the data is discrete.

Video Rentals by Month

Video Rentals by Month

b) Most: October (8678)

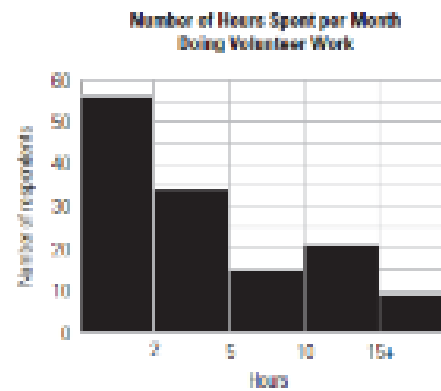Least: May (4190)

c) Rentals tend to be lower in the summer months, but are otherwise stable.

Answer Key - Chapter 2:

4. Housing: $1140.00; Food: $600.00;
   Car: $480.00; Miscellaneous: $390.00;
   Charitable donations: $180.00;
   Entertainment: $120.00; Savings: $90.00.

5. a)

b) 90

c) 33%

Answer Key - Chapter 4:

1. a) 2.8 m   b) 35.0°

   c) 73.9°   d) 39.8 in

2. a) $x \approx 10.1$ cm, $Y \approx 47.7°$

   b) $X = 53.6°$, $y = 8.4$ cm, $z = 10.4$ cm

   c) $x = 5.9$ cm, $Y = 48.4°$, $z = 3.3$ cm

3. 173.9 m²

4. 87.4 cm

5. 45 m

6. a) 67.5 m   b) 32.7°

7. a) 82.8 km   b) 4.1°