Unit 9 Answers

Exercise 9.1

1 **a** 200 cm

b 6.2 m

c 1.35 km

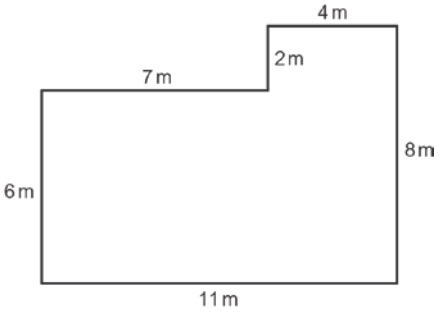
2 **a** 25 cm

b 30 cm

c 75 cm

d 22.5 cm

3



4 **a** 1800 m

b 1440 m

c 5400 m

d 720 m

5 **a** 20 cm

b 300 cm

c 45 cm

d 50 cm

e 250 cm

f 450 cm

6 **a** **i** 250 m

ii 150 m

iii 100 m

b 6 minutes

7 **a** 1 cm on the map is 200 km in real life.

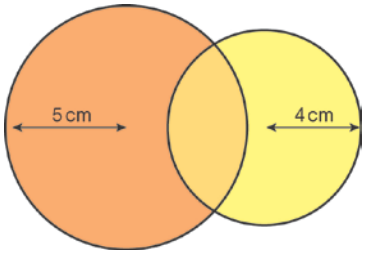
b **i** 300 km

ii 540 km

iii 900 km

8 Angle is 78°

9



Unit 9 Answers

Exercise 9.2

1 Angles accurately drawn.

2 **a** a = 323°

b b = 98°

c c, d = 70°

3 **a** 120 km

b 6 cm

4 **a** 090°

b 180°

c 270°

d 135°

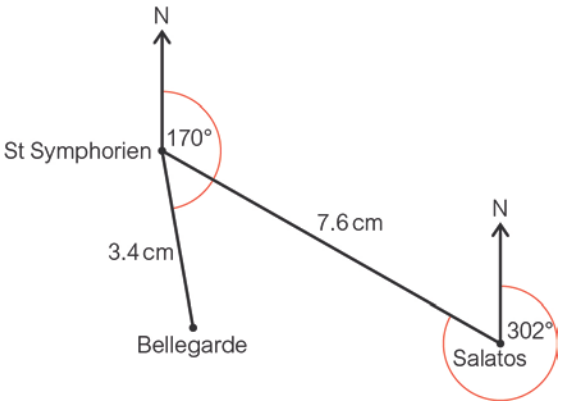
e 225°

f 315°

5 **a** 115°

b 295°

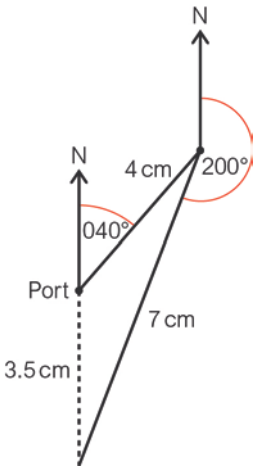
6



7 **a**

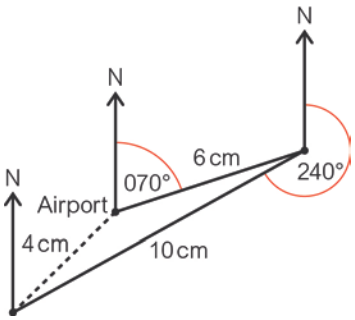
b Bearing 095°, distance 104 km

8 a



b 7 km

9 a



b 40 miles

c 050°

10a 300°

b 060°

c 140°

Unit 9 Answers

Exercise 9.3

1 a 250 m

b 400 m

c 1 km

d 1.5 km

2 a 1 : 5

b 1 : 3

c 1 : 15

d 1 : 10

3 a 300

b 150

c 1000

d 1500

4 a 800 m

b 1200 m

c 900 m

d 100 m

5 A iv

B i

C iii

D ii

6 a i 1.7 cm

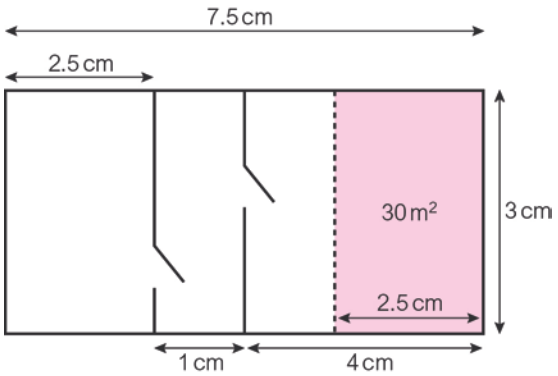
ii 8.5 km

6 b i 12.5 km

ii 5 km

iii 15.5 km

7 a, b



c 18 m^2

8 a 1: 100

b 1 : 500 000

c 1: 20 000

d 1: 75 000

9 a i 400 m

ii 2 km

iii 10 km

b **i** 100 cm

ii 20 cm

iii 4 cm

Unit 9 Answers

Exercise 9.4

1 a 2

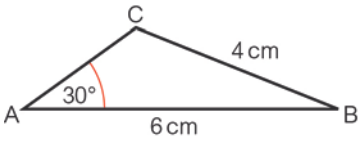
b $\frac{1}{2}$

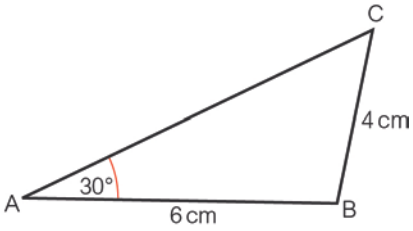
2 a a = c and b = d (vertically opposite).

b a = c and b = d (alternate angles).

3 A and C, B and E are congruent.

4





5 a SAS

b SSS

c ASA

6 DEF congruent – SSS

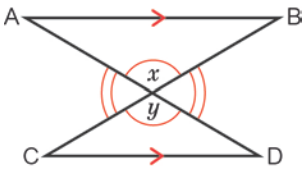
HGI congruent – SAS

JKL not congruent because the 93° angle is adjacent to the 4.2 cm dimension, not opposite to it.

7 Yes – because SAS

8 a $x = y$ (vertically opposite angles)

b



c Angle AEB = Angle CED (vertically opposite)

Angle BAE = Angle EDC (alternate angles)

Angle ABE = Angle ECD (alternate angles)

AB = CD

As all angles are the same and one side is equal , the two triangles are congruent.

9 Angle BAC = 85° which is equal to angle EDF

Angle EFD = 30° which is equal to angle BCA

As all angles are the same the triangles are similar

10 12 cm

11a a = 4.5, b = 2

b c = 2.5 cm, d = 2.4 cm

12 A and C are similar.

Unit 9 Answers

Exercise 9.5

1 No, they are not similar.

2 x = 5 cm

3 **a** Vertically opposite

b d is equal to b – alternate angles

c c is equal to f – alternate angles

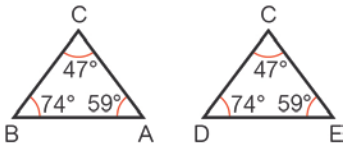
4 **a** Angle DCE = 47° – vertically opposite

Angle CDE = 74° – alternate angles

Angle CED = 59° – alternate angles

b As all angles are the same the triangles ABC and CDE are similar.

c



5 **a** Angle MPN = Angle QPR – vertically opposite

Angle NMP = Angle PRQ – alternate angles

Angle MNP = Angle PQR – alternate angles

As all angles are the same the two triangles are similar.

b 6 cm

6 **a** Angle AEC = Angle BDC

Angle CAE = Angle CBD = 90°

Angle DCB = Angle ECA

As the triangles have the same angles they are similar.

b 6 cm

c 4 cm

7 **a** Angle ACB = Angle AED

Angle ABC = Angle ADC

Angle BAC = Angle DAE = 36°

As the triangles have the same angles they are similar.

b 14 cm

c 7 cm

d 3 cm

8 320 m

Unit 9 Answers

9 Check up

Maps and scales

1 48 cm

2 0.5 cm

3 a 250 m

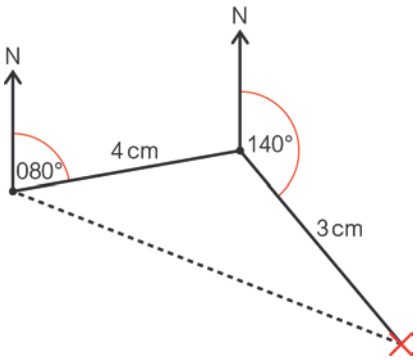
b 8 cm

4 1000 m

Bearings

5 020°

6 a



b 18 km

c 285°

Congruence and similarity

7 A and C as they are SAS

8 b x = 8 cm

c y = 6 cm

9 Angle AED = Angle ACB = 90°

Angle ABC = Angle ADE

Angle A is the same in both

AAA so are similar

10a Angle DAE = Angle BAC, vertically opposite

Angle DEA = Angle ACB, alternate angles

Angle EDA = Angle ABC, alternate angles

AAA, so are similar

b a = 10 b = 3

Challenge

12a Yes (AAA)

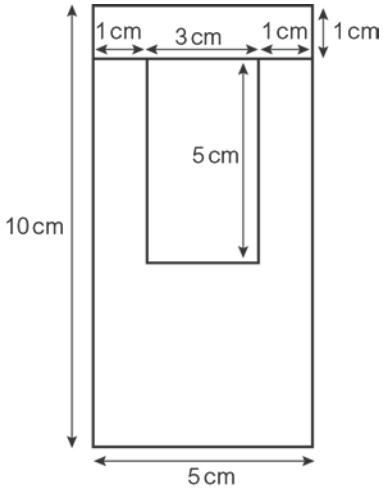
b Yes (AAA)

Unit 9 Answers

9 Strengthen

Maps and scales

1



2 **a** 2 cm

b 6 cm

c 20 cm

d 40 cm

e 20 cm

3 **a** 20 m

b 4 m

c 4 m by 8 m

4 **a** 100 cm

b 200 cm

c 460 cm

d 840 cm

5 **a** 1.4 km

b 1.5 km

c 2.15 km

6 **a** 1 : 100

b 1 : 20

c 1 : 100

d 1 : 300

e 1 : 100 000

Bearings

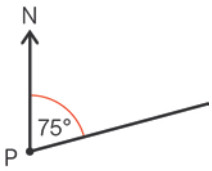
1 **a** 048°

b 075°

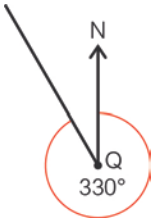
c 170°

d 240°

2



3



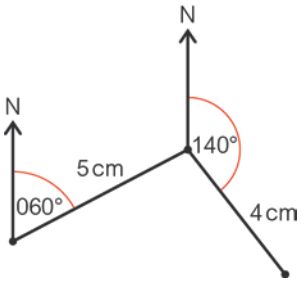
4 a 285°

b 000°

c 075°

d 105°

5 a, b



5 c i 14 km

ii 320°

Congruence and similarity

1 B

2 b i congruent ASA

ii similar AAA

iii congruent SAS

3 a

P	Q
5	10
12	x
13	y

b 2

c $x = 24$, $y = 26$

4 6

5 a = 16 cm

b = 3 cm

c = 9 cm

d = 6 cm

6 C and E

7 a i Alternate angles

ii Alternate angles

iii Vertically opposite angles

b They are similar

c x = 4 cm, y = 10 cm

8 a BC and DE are parallel because both are at right angles to AE

b Angle ABC = angle ADE because triangles ABC and ADE are similar (AAA)

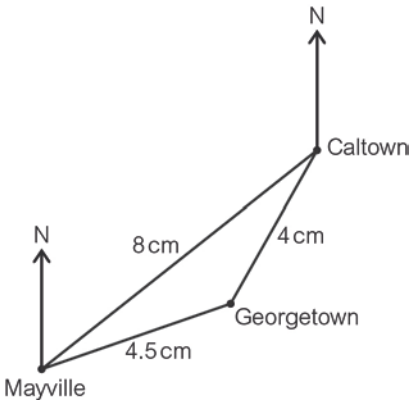
c 2

d 20 cm

Unit 9 Answers

9 Extend

1 a, **b**



c 4.5 km

2 a 1: 50 000

b 1 : 500 000

c 3 : 200 000

3 a i 135 km

ii 75 km

iii 145 km

b 3 hours 40 minutes

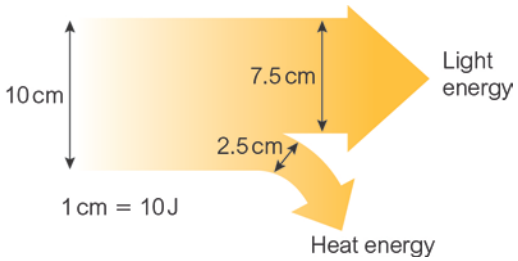
c Roads aren't straight, so the actual distance travelled will be greater.

4 a i 40 J

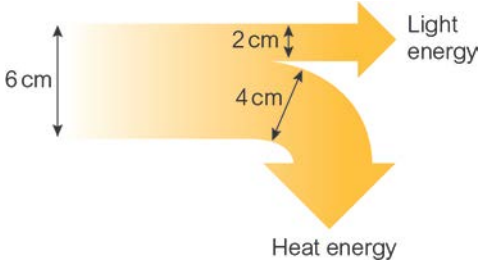
ii 30 J

iii 10 J

b i



ii



5 a 1 cm to 20 m

b 8000 m^2

c 600 m^2

d £40 500

6 a Students' own accurate scale drawing made using an appropriate scale.

b 40 m^2

c 160

d £800

7 a 105°

b 105°

c 35°

d All angles are the same and all sides are the same.

8 a 8 cm

b 4.5 cm

c 85°

d 5 cm

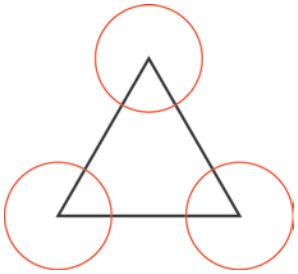
e 45°

9 a 5 cm

b 15 cm

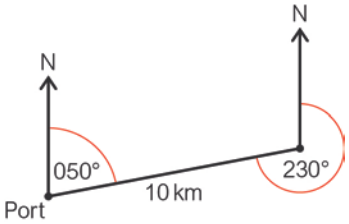
10 Memmingen

11a

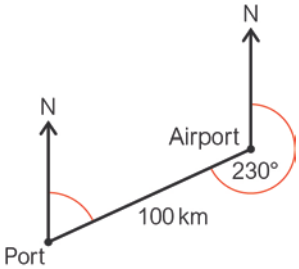


b No

12a Bearing back to port is 230°



b Bearing back to airport is 050°



13 x = 6 cm, y = 12.5 cm

14 Angle B = Angle D

Angle BAC = Angle ACD – alternate angles

Angle DAC = Angle BCA – alternate angles

Side AD = Side BC

AAA and a side the same – must be congruent

15 OC is a side of both triangles

Side OB = OA as both radii so triangle ABO is an isosceles triangle.

Angle OBC = Angle OAC

Angle BOC = Angle AOC

As all angles are the same and two pairs of sides are the same, must be congruent.

Unit 9 Answers

9 Unit test

1 a 095°

b 150°

c Kalimnos

2 a 100 m

b 250 m

c 12.5 m

3 a 3 cm

b 8 cm

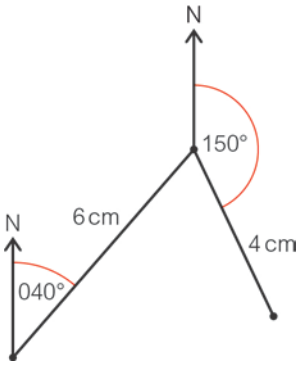
c 20 cm

d 0.2 cm

4 a 1000 m

b 325 m

5 a



b 29 km

c 260°

6 a = 80°, b = 6 cm, c = 8cm, d = 80°, e = 6 cm, f = 35°, g = 80°

b 6 cm side is between angles of 35° and 80° in A, B and C.

7 a a = 5 cm

b b = 12.8 cm

c c = 12.5 cm

8 a a = 7 cm

b b = 9 cm, c = 12 cm

c d = 15 cm, e = 24 cm, f = 21 cm

9 a Angle ACE is the same in both triangles

Angle BDC = Angle AEC – corresponding angles

Angle DBC = Angle EAC – corresponding angles

As the angles are the same the triangles are similar.

b $6\frac{2}{3}$

c 5

10 Triangle SXT and triangle VXU are congruent.

Angle SXT = Angle VXU – vertically opposite

Angle TSU = Angle SUV alternate angles

Angle STV = Angle TVU alternate angles

Side ST = VU

AAA and side equal, so must be congruent.

Triangle SXV and triangle TXU are congruent.

Angle SXV = Angle TXU – vertically opposite

Angle VSU = Angle SUT – alternate angles

Angle VTU = Angle SVT – alternate angles

Side SV = side TU

AAA and side equal so must be congruent.

Challenge

11 No, right-angled angles need only have one common angle.