Name: _____

TOPIC TEST 13

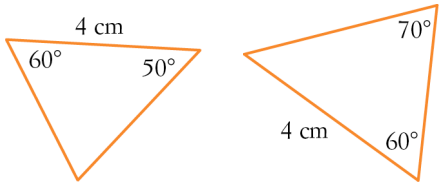
Congruent and similar figures

- Time allowed: 45 minutes
- Part A: 20 multiple-choice questions (40 marks)
- Part B: 14 free-response questions (60 marks)

Part A

20 multiple-choice questions
2 marks each: 40 marks
Circle the correct answer.

1 Which congruence test proves that these two triangles are congruent?



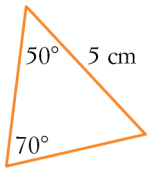
A AAS **B** RHS
C SSS **D** SAS

2 Which congruence test proves that these two triangles are congruent?

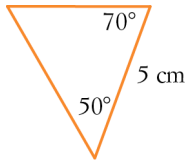
A SAS **B** SSS
C AAS **D** RHS

3 Of the triangles below, which two are congruent?

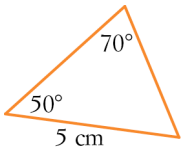
i



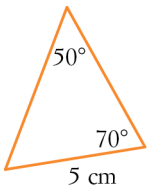
ii



iii

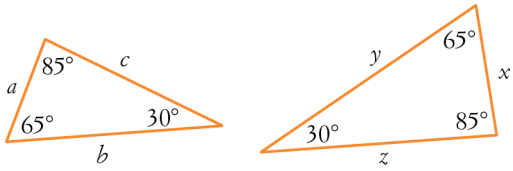


iv



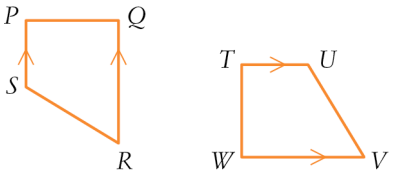
A i and ii **B** ii and iv
C ii and iii **D** i and iii

4 Which of the following equations about these two similar triangles is *false*?



A $\frac{a}{b} = \frac{x}{y}$ **B** $\frac{y}{b} = \frac{c}{z}$
C $\frac{a}{x} = \frac{b}{y}$ **D** $\frac{z}{x} = \frac{c}{a}$

5 *PQRS* and *TUVW* are similar trapeziums.



Which side in *PQRS* matches side *WV* in *TUVW*?

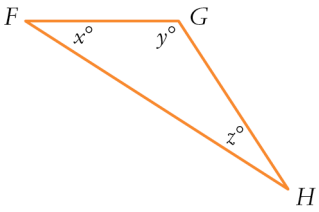
A *PS* **B** *PQ*
C *SR* **D** *QR*

6 Which angle in quadrilateral *TUVW* in question **5** matches $\angle P$ in *PQRS*?

A $\angle T$ **B** $\angle U$

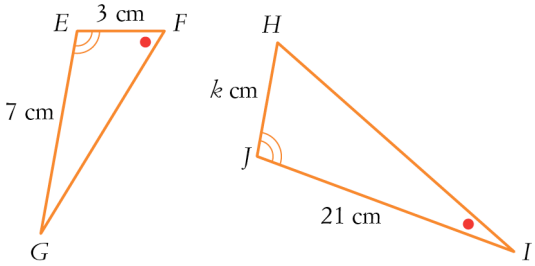
C $\angle V$ **D** $\angle W$

7 In ΔFGH, which is the included angle for sides *FG* and *HG*?



A $x°$ **B** $y°$ **C** $z°$

8 If $\Delta EFG \,|||\, \Delta HIJ$, find *k*.



A $k = 27$ **B** $k = 49$

C $k = 47$ **D** $k = 9$

9 What transformation(s) is being used on figure **F** below?

A translation only

B rotation only

C rotation and reflection

D translation and rotation

10 Which of the features described below are always equal in similar figures?

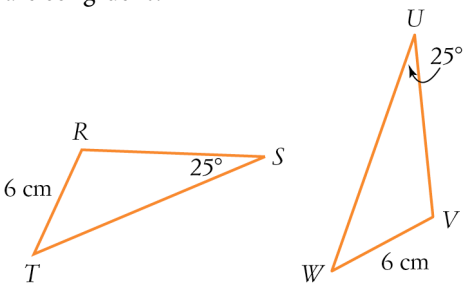
A matching sides

B matching angles

C matching diagonals

D areas

11 For the diagram below, what further piece of information would prove that ΔRST and ΔUVW are congruent?



A $\angle T = \angle W$ **B** $RS = UV$

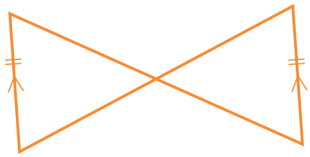
C $TS = UW$ **D** $\angle R = \angle W$

12 Which congruence test proves that these two triangles are congruent?

A SAS **B** RHS

C SSS **D** AAS

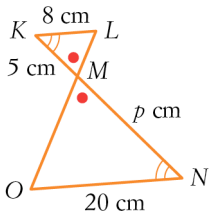
13 Which congruence test proves that these two triangles are congruent?



A RHS **B** SSS

C AAS **D** SAS

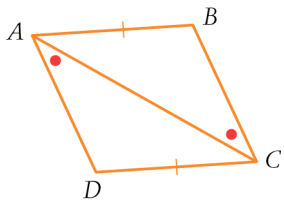
14 If $\Delta KLM \,|||\, \Delta MNO$, find *p*.



A $p = 11$ **B** $p = 12.5$

C $p = 50$ **D** $p = 17$

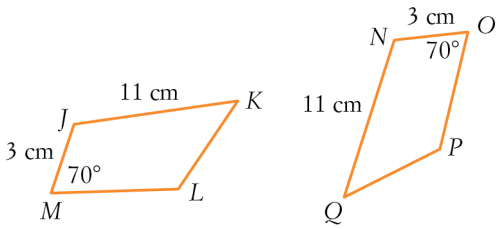
15 If $\Delta ABC \equiv \Delta ADC$, which angle matches with $\angle BAC$?



A $\angle ABC$ **B** $\angle ADC$

C $\angle ACD$ **D** $\angle BCA$

16 *JKLM* and *NOPQ* are congruent quadrilaterals. Which angle in *JKLM* matches with $\angle P$?



A $\angle J$ **B** $\angle K$

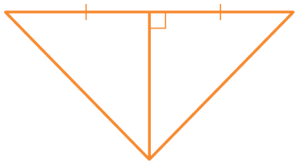
C $\angle L$ **D** $\angle M$

17 Which side in quadrilateral *NOPQ* in question **16** matches with *KL* in *JKLM*?

A *NO* **B** *OP*

C *QP* **D** *NQ*

18 Which congruence test proves that these two triangles are congruent?



A SSS **B** SAS

C AAS **D** RHS

19 Which of the following statements is *false*?

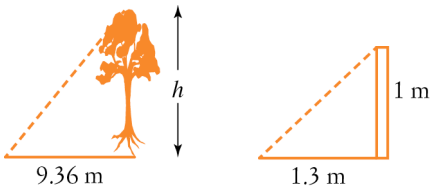
A All circles are similar.

B All rectangles are similar.

C All squares are similar.

D All equilateral triangles are similar.

20 A tree casts a shadow of 9.36 m when a stick 1 metre long casts a shadow of 1.3 m. Find the height, *h*, of the tree.



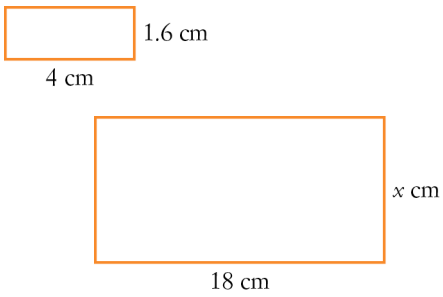
A 9.33 m **B** 7.2 m

C 8.06 m **D** 8.3 m

Part B

14 free-response questions
60 marks
Show your working where appropriate.

21 (6 marks) These two rectangles are similar (but not drawn to scale).



a What is the scale factor?

_____

b Find the value of *x*.

_____

_____

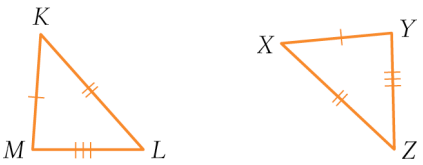
c How many times larger is the area of the big rectangle than the area of the small rectangle?

_____

_____

_____

22 (6 marks)



a Which congruence test proves that $\Delta KLM \equiv \Delta XYZ$? _____

b Which angle in ΔXYZ matches with $\angle L$?

_____

c Which side in ΔXYZ matches with LM?

_____

23 (4 marks) The scale on a tourist map of central Sydney is 2 cm = 500 m.

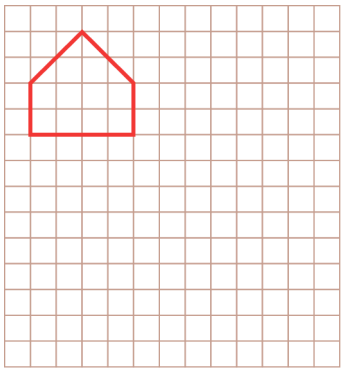
a Express the map's scale as a simplified ratio.

_____

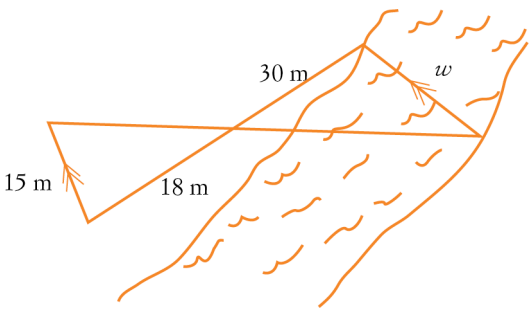
b If the scaled distance from Central Station to the Powerhouse Museum is 3.2 cm, what is the actual distance?

_____

24 (3 marks) Enlarge this figure by a factor of 1.5.



25 (5 marks) Glen used similar triangles to find w, the width of this river.



a Which similarity test proves that the two triangles are similar: SSS, SAS, AA or RHS?

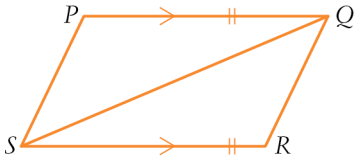
_____

b Find the length of w.

_____

_____

26 (12 marks) In the quadrilateral $PQRS$, $PQ = SR$ and $PQ \parallel SR$.



a Name the pair of equal alternate angles in the diagram and mark them.

_____

b Which congruence test can be used to prove that $\Delta PQS \equiv \Delta RSQ$?

_____

c Which side of ΔRSQ is equal to PS?

_____

d Which angle of ΔRSQ is equal to $\angle PSQ$?

_____

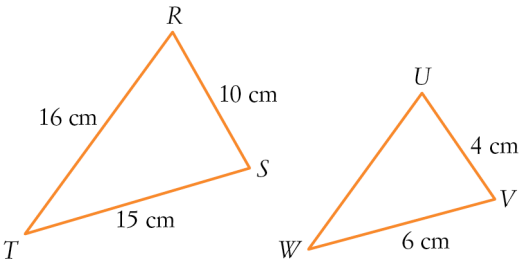
e Which angle of ΔRSQ is equal to $\angle P$?

_____

f What type of quadrilateral is $PQRS$?

_____

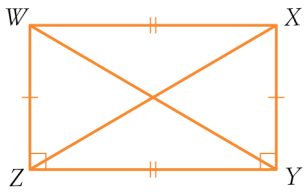
27 (4 marks) ΔRST is reduced to make ΔUVW.



a What is the scale factor? _____

b What is the length of UW? _____

28 (6 marks) $WXYZ$ is a rectangle.



a Which congruence test proves that $\Delta WYZ \equiv \Delta XZY$? _____

b List all three pairs of matching sides.

_____

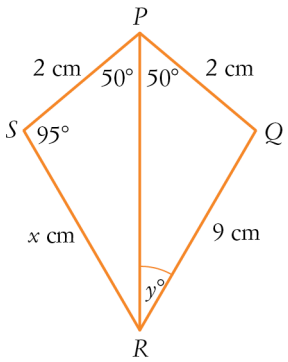
_____

c What does this prove about the diagonals of a rectangle?

_____

_____

29 (9 marks)



a Which congruence test proves that $\Delta PSR \equiv \Delta PQR$? _____

b List all three pairs of matching angles in ΔPSR and ΔPQR.

_____

_____

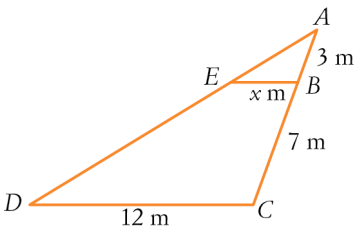
c Find the values of x and y.

_____

_____

_____

30 (5 marks)



a In this diagram, $EB \parallel DC$. Why is it true that $\angle ABE = \angle ACD$?

_____

_____

b If ΔABE and ΔACD are similar, find x.

_____

_____

This is the end of the test.
Use the back of the page for extra working space.

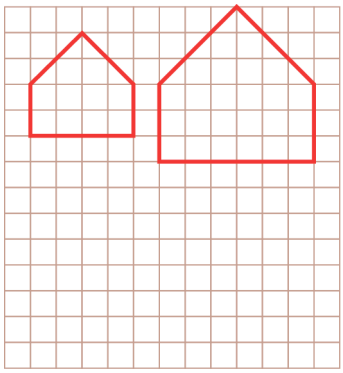
Answers

1 A	**2** A	**3** D	**4** B	**5** D
6 A	**7** B	**8** B	**9** C	**10** B
11 A, D	**12** B	**13** C	**14** B	**15** C
16 C	**17** C	**18** B	**19** B	**20** B

21 **a** 4.5 **b** 7.2 **c** 20.25

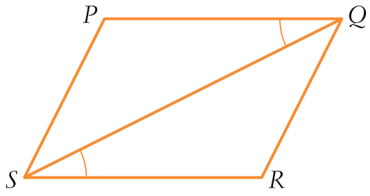
22 **a** SSS **b** $\angle Z$ **c** YZ

23 **a** 1 : 25 000 **b** 800 m



25 **a** AA **b** 25 m

26 **a** $\angle PQS = \angle RSQ$



b SAS **c** QR **d** $\angle RQS$

e $\angle R$ **f** parallelogram

27 **a** $\frac{2}{5}$ **b** 6.4 cm

28 **a** SAS **b** $YZ = YZ$; $WZ = XY$; $XZ = WY$ **c** They are equal

29 **a** SAS **b** $\angle S = \angle Q$; $\angle SRP = \angle QRP$; $\angle SPR = \angle QPR$ **c** $x = 9$; $y = 35$

30 **a** corresponding angles on parallel lines **b** $x = 3.6$