Name: _____

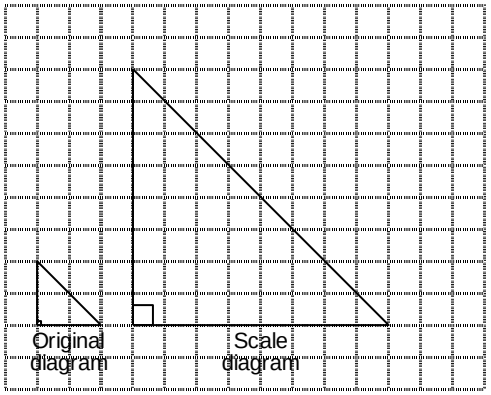
Date: _____

Review for Grade 9 Math Exam - Unit 7 - Similarity and Transformations

Multiple Choice

Identify the choice that best completes the statement or answers the question.

____ 1. Determine the scale factor for this scale diagram.

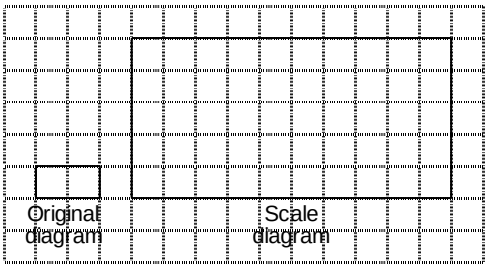


a. 32 b. 8 c. 4 d. $\frac{1}{4}$

____ 2. A rectangle has length 6 cm and width 4 cm.
The rectangle is to be enlarged by a scale factor of 8.
Calculate the length of the enlargement.

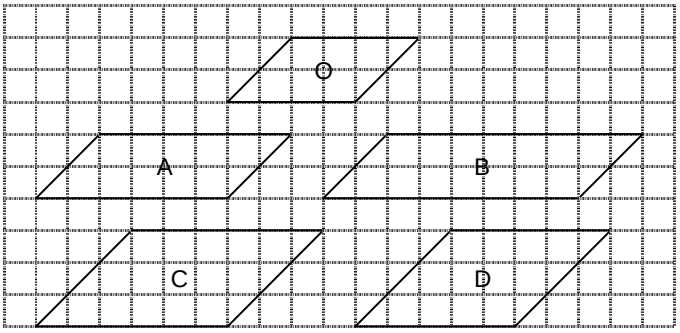
a. 80 cm b. 48 cm c. 32 cm d. 14 cm

____ 3. Determine the scale factor for this scale diagram.



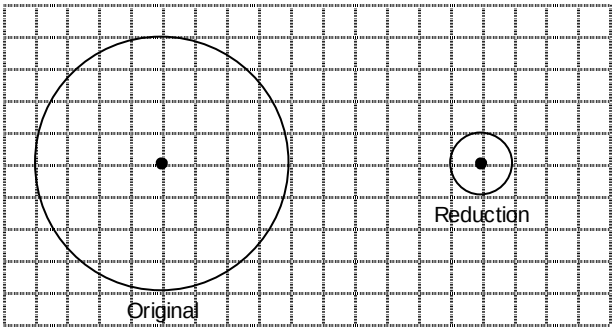
a. 10 b. $\frac{1}{5}$ c. 5 d. 15

____ 4. Which of parallelograms A, B, C, and D are scale diagrams of parallelogram O?



a. Parallelogram D b. Parallelogram C c. Parallelogram B d. Parallelogram A

____ 5. Determine the scale factor for this reduction.

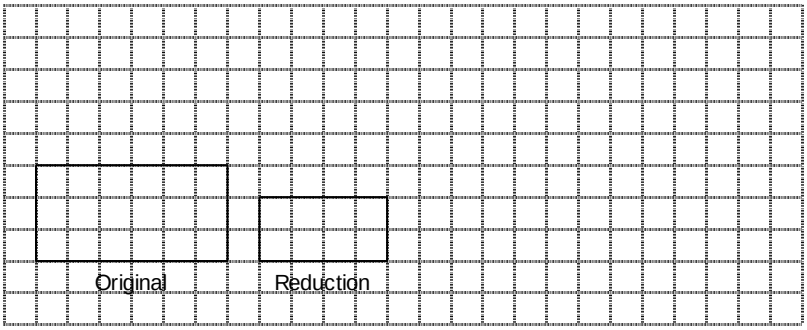


a. 8 b. 4 c. $\frac{1}{4}$ d. $\frac{1}{8}$

____ 6. A wheel has diameter 65 cm.
Determine the diameter on a scale diagram if the scale factor is 0.06.

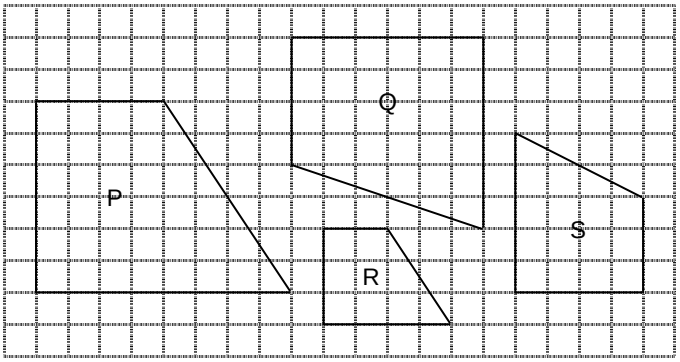
a. 71 cm b. 3.9 cm c. 108 cm d. 39 cm

____ 7. Determine the scale factor for this reduction.



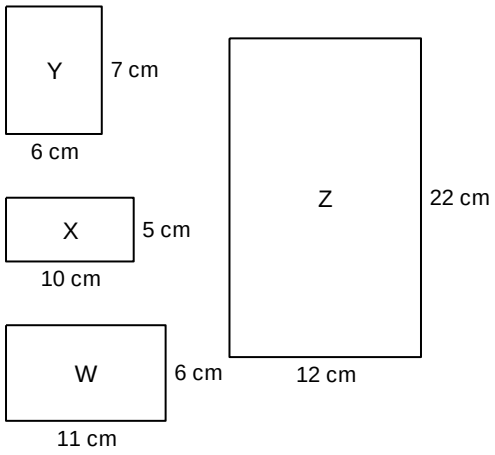
a. $\frac{3}{4}$ b. $\frac{3}{2}$ c. $\frac{1}{2}$ d. $\frac{2}{3}$

____ 8. Identify similar quadrilaterals.



a. P and Q b. P and R c. R and S d. Q and S

____ 9. Identify similar rectangles.

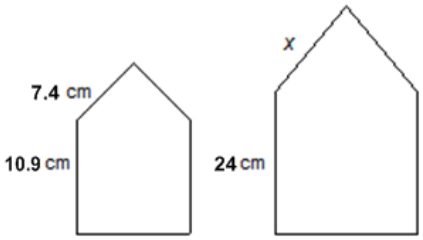


a. Y and Z b. X and Z c. Y and W d. W and Z

____ 10. Calculate the value of *r* in this proportion: $\frac{r}{26} = \frac{52}{208}$

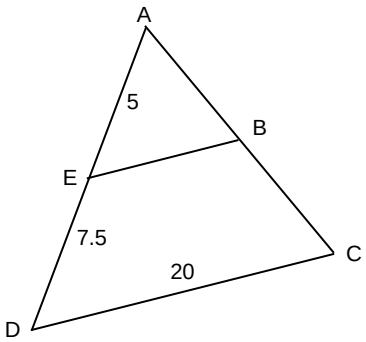
a. 6 b. 104 c. 416 d. 6.5

____ 11. These two pentagons are similar. Determine the value of x.



a. 13.1 cm b. 20.5 cm c. 16.29 cm d. 18 cm

____ 12. Determine the length of EB in this pair of similar triangles.

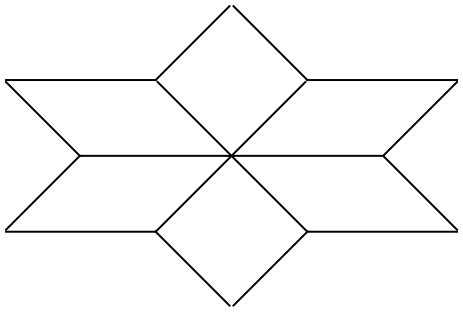


a. 13.3 b. 10 c. 8 d. 5

____ 13. When the shadow of a flagpole is 33.6 m long, a 1.8-m fencepost casts a shadow 2.8 m long. How tall is the flagpole?

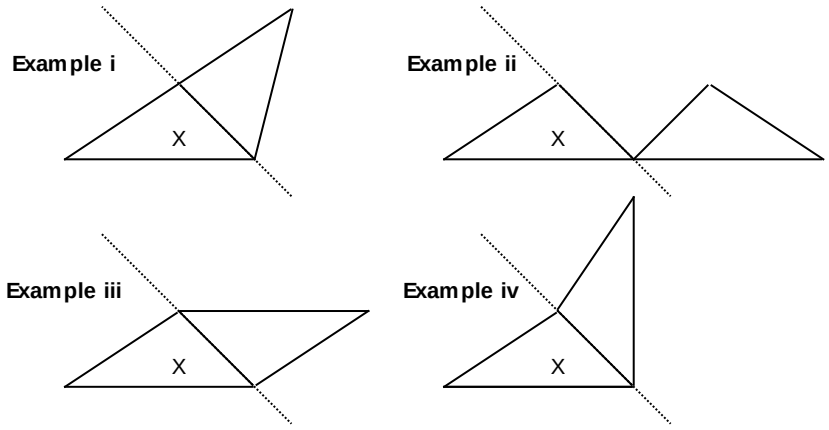
a. 52.3 m b. 21.6 m c. 21.6 m d. 12.6 m

____ 14. How many lines of symmetry does this tessellation have?



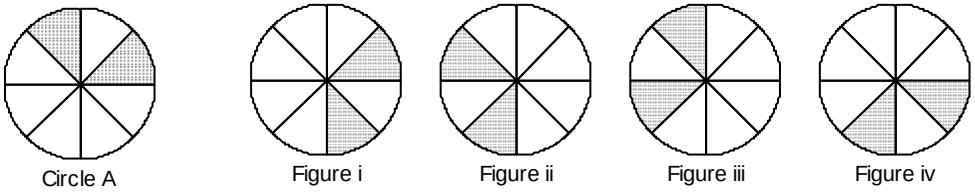
a. 6 b. 2 c. 4 d. 1

____ 15. Which example shows a reflection of triangle X in the dotted line?



a. Example iii
b. Example i
c. Example ii
d. Example iv

____ 16. Which figure shows the rotation image of circle A after a 135° counterclockwise rotation about its centre?



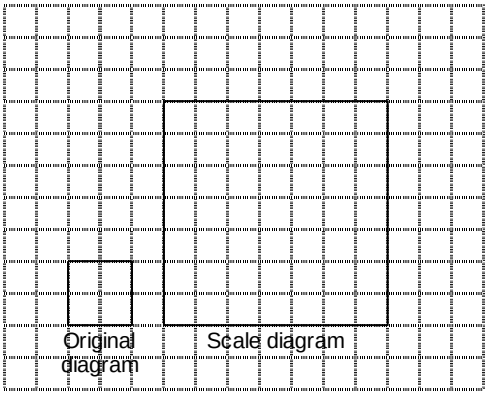
a. Figure iv b. Figure i c. Figure iii d. Figure ii

____ 17. Describe the rotational symmetry and line symmetry of this parallelogram.

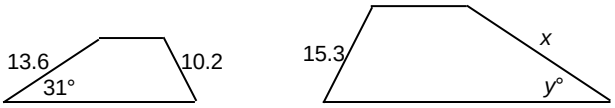
a. Rotational symmetry of order 2 about the centre; no line symmetry
b. Rotational symmetry of order 2 about the centre; 1 line of symmetry through the centre
c. Rotational symmetry of order 1 about the centre; 1 line of symmetry through the centre
d. No rotational symmetry; no line symmetry

Short Answer

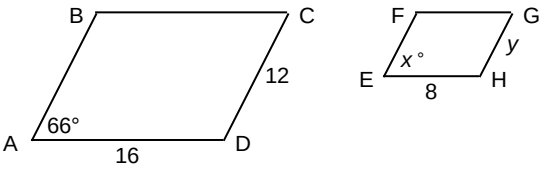
18. Determine the scale factor for this scale drawing.



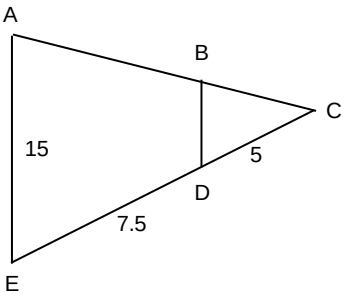
19. These quadrilaterals are similar. Determine the values of x and $y°$.



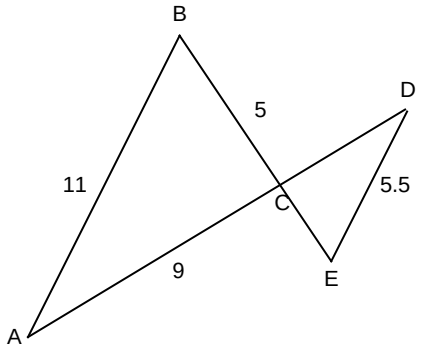
20. These parallelograms are similar. Determine the values of $x°$ and y.



21. Determine the length of BD in these similar triangles.

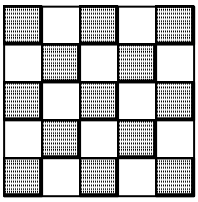


22. Determine the lengths of CD and CE in these similar triangles.

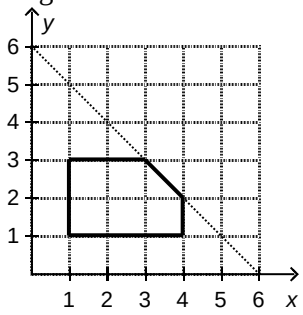


23. When the shadow of an electrical tower is 11.7 m long, a 4.5-m lamp post casts a shadow 6.5 m long. How tall is the electrical tower?

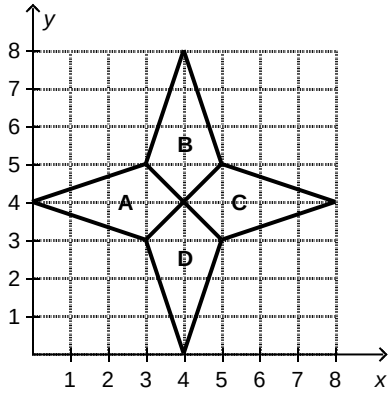
24. Draw the lines of symmetry in this tessellation.



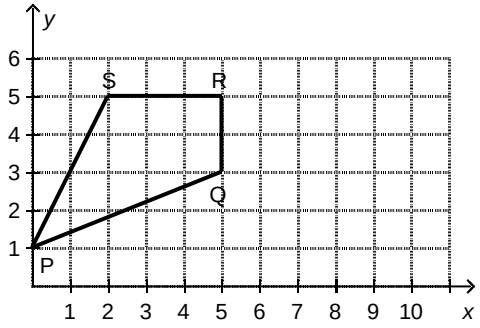
25. This polygon is one-half of a shape. Use the dotted line as a line of symmetry to complete the shape by drawing its other half.



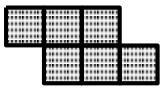
26. This design was created by reflecting quadrilateral A to create quadrilaterals B, C, and D. Describe the reflections.



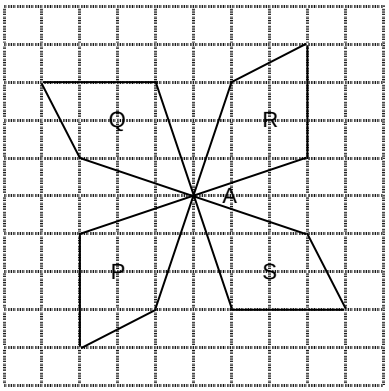
27. This polygon is one-half of a shape. Use a vertical line through 5 on the *x*-axis as a line of symmetry to complete the shape by drawing its other half. Write the coordinates of the larger shape formed by PQRS and its image.



28. Describe the rotational symmetry and line symmetry of this diagram.

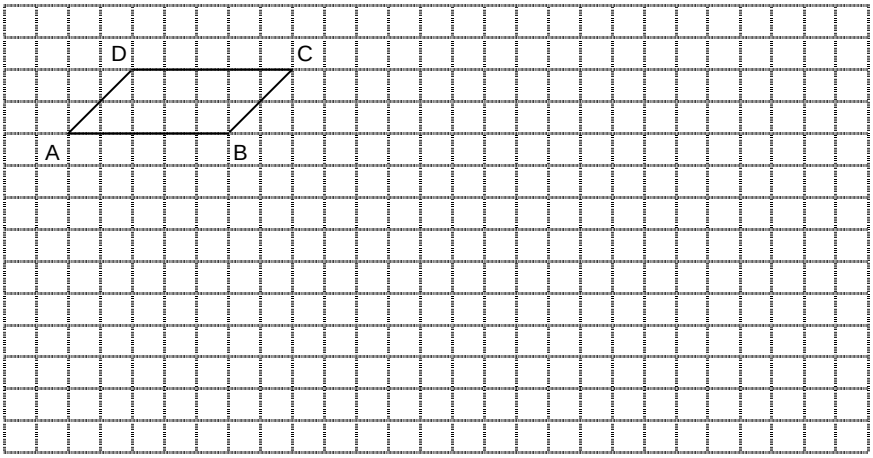


29. Quadrilateral P is rotated 90° clockwise about vertex A, then 270° counterclockwise about vertex A. Which quadrilateral shows the final position of quadrilateral P?

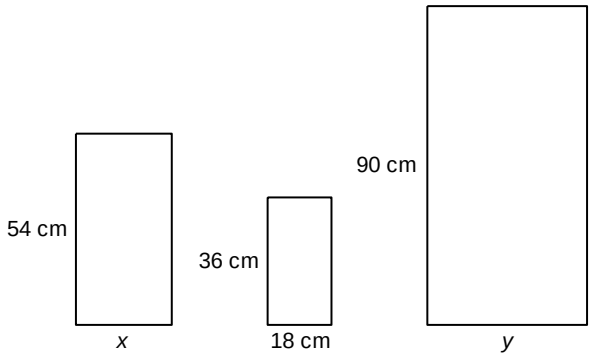


Problem

30. Draw a scale diagram of parallelogram ABCD with scale factor 3.



31. These three rectangles are similar.
    a) Determine the values of x and y.
    b) Griswald draws another similar rectangle with width 57.6 cm. What is its length?



Review for Grade 9 Math Exam - Unit 7 - Similarity and Transformations
Answer Section

MULTIPLE CHOICE

1. ANS: C PTS: 1 DIF: Easy
   REF: 7.1 Scale Diagrams and Enlargements LOC: 9.SS4
   TOP: Shape and Space (Transformations) KEY: Procedural Knowledge
2. ANS: B PTS: 1 DIF: Easy
   REF: 7.1 Scale Diagrams and Enlargements LOC: 9.SS4
   TOP: Shape and Space (Transformations) KEY: Procedural Knowledge
3. ANS: C PTS: 1 DIF: Easy
   REF: 7.1 Scale Diagrams and Enlargements LOC: 9.SS4
   TOP: Shape and Space (Transformations) KEY: Procedural Knowledge
4. ANS: B PTS: 1 DIF: Moderate
   REF: 7.1 Scale Diagrams and Enlargements LOC: 9.SS4
   TOP: Shape and Space (Transformations) KEY: Procedural Knowledge
5. ANS: C PTS: 1 DIF: Easy REF: 7.2 Scale Diagrams and Reductions
   LOC: 9.SS4 TOP: Shape and Space (Transformations)
   KEY: Procedural Knowledge
6. ANS: B PTS: 1 DIF: Easy REF: 7.2 Scale Diagrams and Reductions
   LOC: 9.SS4 TOP: Shape and Space (Transformations)
   KEY: Procedural Knowledge
7. ANS: D PTS: 1 DIF: Easy REF: 7.2 Scale Diagrams and Reductions
   LOC: 9.SS4 TOP: Shape and Space (Transformations)
   KEY: Procedural Knowledge
8. ANS: B PTS: 1 DIF: Easy REF: 7.3 Similar Polygons
   LOC: 9.SS3 TOP: Shape and Space (3-D Objects and 2-D Shapes)
   KEY: Procedural Knowledge
9. ANS: D PTS: 1 DIF: Easy REF: 7.3 Similar Polygons
   LOC: 9.SS3 TOP: Shape and Space (3-D Objects and 2-D Shapes)
   KEY: Procedural Knowledge
10. ANS: D PTS: 1 DIF: Easy REF: 7.3 Similar Polygons
    LOC: 9.SS3 TOP: Shape and Space (3-D Objects and 2-D Shapes)
    KEY: Procedural Knowledge
11. ANS: C PTS: 1 DIF: Moderate REF: 7.3 Similar Polygons
    LOC: 9.SS3 TOP: Shape and Space (3-D Objects and 2-D Shapes)
    KEY: Procedural Knowledge
12. ANS: C PTS: 1 DIF: Moderate REF: 7.4 Similar Triangles
    LOC: 9.SS3 TOP: Shape and Space (3-D Objects and 2-D Shapes)
    KEY: Procedural Knowledge
13. ANS: B PTS: 1 DIF: Moderate REF: 7.4 Similar Triangles
    LOC: 9.SS3 TOP: Shape and Space (3-D Objects and 2-D Shapes)
    KEY: Procedural Knowledge
14. ANS: B PTS: 1 DIF: Easy REF: 7.5 Reflections and Line Symmetry
    LOC: 9.SS5 TOP: Shape and Space (Transformations)
    KEY: Conceptual Understanding

15. ANS: D PTS: 1 DIF: Easy REF: 7.5 Reflections and Line Symmetry
LOC: 9.SS5 TOP: Shape and Space (Transformations)
KEY: Procedural Knowledge
16. ANS: D PTS: 1 DIF: Moderate
REF: 7.6 Rotations and Rotational Symmetry LOC: 9.SS5
TOP: Shape and Space (Transformations) KEY: Procedural Knowledge
17. ANS: A PTS: 1 DIF: Easy
REF: 7.7 Identifying Types of Symmetry on the Cartesian Plane
LOC: 9.SS5 TOP: Shape and Space (Transformations)
KEY: Procedural Knowledge

SHORT ANSWER

18. ANS:
The scale factor is 3.5.

PTS: 1 DIF: Moderate REF: 7.1 Scale Diagrams and Enlargements
LOC: 9.SS4 TOP: Shape and Space (Transformations)
KEY: Procedural Knowledge
19. ANS:
$x = 20.4$
$y° = 31°$

PTS: 1 DIF: Moderate REF: 7.3 Similar Polygons
LOC: 9.SS3 TOP: Shape and Space (3-D Objects and 2-D Shapes)
KEY: Conceptual Understanding | Procedural Knowledge
20. ANS:
$y = 6$
$x° = 66°$

PTS: 1 DIF: Moderate REF: 7.3 Similar Polygons
LOC: 9.SS3 TOP: Shape and Space (3-D Objects and 2-D Shapes)
KEY: Conceptual Understanding | Procedural Knowledge
21. ANS:
BD = 6

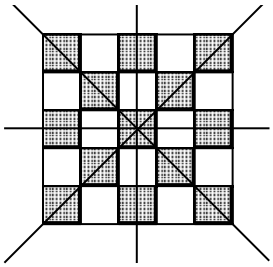
PTS: 1 DIF: Moderate REF: 7.4 Similar Triangles
LOC: 9.SS3 TOP: Shape and Space (3-D Objects and 2-D Shapes)
KEY: Procedural Knowledge
22. ANS:
CD = 4.5
CE = 2.5

PTS: 1 DIF: Moderate REF: 7.4 Similar Triangles
LOC: 9.SS3 TOP: Shape and Space (3-D Objects and 2-D Shapes)
KEY: Procedural Knowledge

23. ANS:
8.1 m

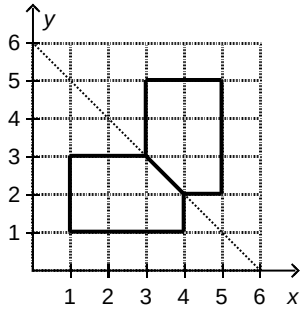
PTS: 1 DIF: Moderate REF: 7.4 Similar Triangles
LOC: 9.SS3 TOP: Shape and Space (3-D Objects and 2-D Shapes)
KEY: Procedural Knowledge

24. ANS:



PTS: 1 DIF: Easy REF: 7.5 Reflections and Line Symmetry
LOC: 9.SS5 TOP: Shape and Space (Transformations)
KEY: Conceptual Understanding

25. ANS:

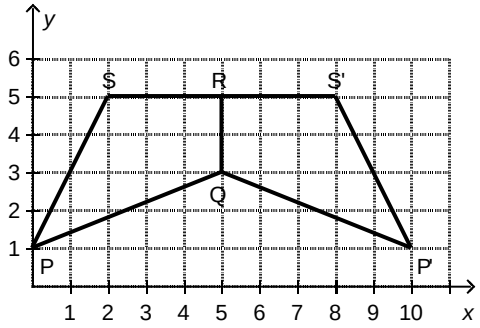


PTS: 1 DIF: Easy REF: 7.5 Reflections and Line Symmetry
LOC: 9.SS5 TOP: Shape and Space (Transformations)
KEY: Procedural Knowledge

26. ANS:
Quadrilateral B is the reflection image of quadrilateral A in the oblique line through (0, 8) and (8, 0).
Quadrilateral C is the reflection image of quadrilateral A in the vertical line through 4 on the *x*-axis.
Quadrilateral D is the reflection image of quadrilateral A in the oblique line through (0, 0) and (8, 8).

PTS: 1 DIF: Moderate REF: 7.5 Reflections and Line Symmetry
LOC: 9.SS5 TOP: Shape and Space (Transformations)
KEY: Conceptual Understanding | Communication

27. ANS:



The shape PSS'P'Q has coordinates: P(0,1), S(2,5), S'(8, 5), P'(10, 1), Q(5, 3)

PTS: 1 DIF: Moderate REF: 7.5 Reflections and Line Symmetry
LOC: 9.SS5 TOP: Shape and Space (Transformations)
KEY: Procedural Knowledge

28. ANS:
Rotational symmetry of order 2 about the centre; no line symmetry

PTS: 1 DIF: Easy REF: 7.7 Identifying Types of Symmetry on the Cartesian Plane
LOC: 9.SS5 TOP: Shape and Space (Transformations)
KEY: Procedural Knowledge

29. ANS:
R

PTS: 1 DIF: Moderate REF: 7.6 Rotations and Rotational Symmetry
LOC: 9.SS5 TOP: Shape and Space (Transformations)
KEY: Procedural Knowledge

PROBLEM

30. ANS:

PTS: 1 DIF: Moderate REF: 7.1 Scale Diagrams and Enlargements
LOC: 9.SS4 TOP: Shape and Space (Transformations)
KEY: Procedural Knowledge

31. ANS:

a)

Solve for x.

$$\frac{x}{18} = \frac{54}{36}$$

$$18 \times \frac{x}{18} = 18 \times \frac{54}{36}$$

$$x = \frac{18 \times 54}{36}$$

$$x = 27$$

So, $x = 27$ cm.

Solve for y.

$$\frac{y}{18} = \frac{90}{36}$$

$$18 \times \frac{y}{18} = 18 \times \frac{90}{36}$$

$$y = \frac{18 \times 90}{36}$$

$$y = 45$$

So, $y = 45$ cm.

b) Let z represent the length.

$$\frac{z}{36} = \frac{57.6}{18}$$

$$36 \times \frac{z}{36} = 36 \times \frac{57.6}{18}$$

$$z = \frac{36 \times 57.6}{18}$$

$$z = 115.2$$

The length is 115.2 cm.

PTS: 1 DIF: Moderate REF: 7.3 Similar Polygons
LOC: 9.SS3 TOP: Shape and Space (3-D Objects and 2-D Shapes)
KEY: Problem-Solving Skills | Procedural Knowledge