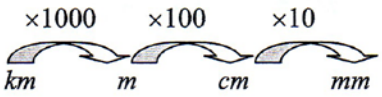
Math 9
Chapter 7 Review

Name:
Period:

You will need to know that: $scale = \frac{drawing\ size}{actual\ size}$



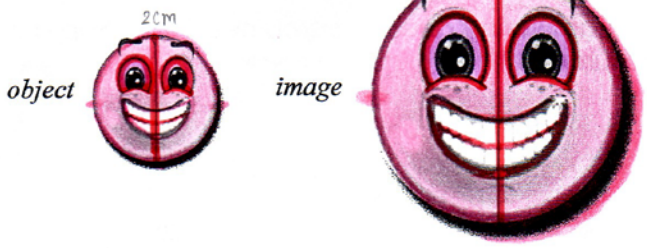
Section 7.1 – Scale Factors, Enlargements, and Reductions

Scale Factor: the number used to either enlarge or reduce an object

Enlargement: an increase in the dimensions of an object, the constant will be greater than 1

What is the scale factor?

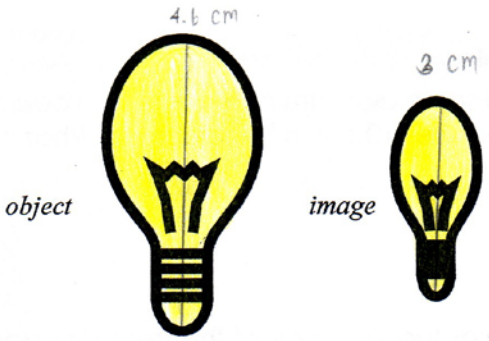
Scale = $\frac{4\ cm}{2\ cm}$ = 2 or 200 %.



Reduction: a decrease in the dimensions of an object, the constant will be less than 1

What is the scale factor?

Scale = $\frac{3\ cm}{4.6\ cm}$ = 0.65 or 65%



1. Use the grid provided to draw an enlargement of the letter using a scale factor of 6.

Scale = $\frac{6}{1}$ | Scale = $\frac{6}{1}$

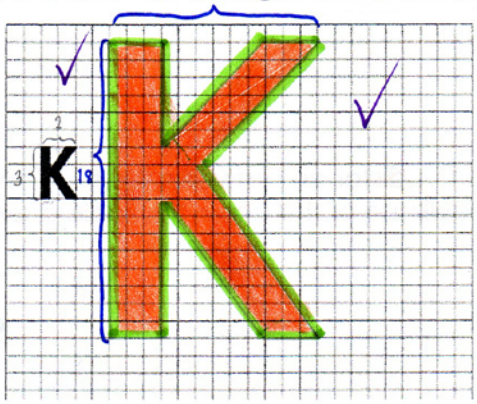
$\frac{6}{1} = \frac{n}{3}$ | $\frac{6}{1} = \frac{n}{2}$

$18 = n$ | $12 = n$

Scale = $\frac{6}{1}$ | Scale = $\frac{6}{1}$

$\frac{6}{1} = \frac{n}{0.5}$ | $\frac{6}{1} = \frac{n}{1.5}$

$3 = n$. | $9 = n$



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2. Write as a scale by converting to the same units: 1mm to 20 cm

$\frac{1\text{ mm}}{20\text{ cm}} = \frac{1\text{ mm}}{200\text{ mm}}$

3. A calculator is 10 cm long. The length of the calculator on a poster advertisement is 32 cm. What is the scale used to create the poster?

Scale = $\frac{\text{drawing size}}{\text{actual size}}$ $= \frac{32\text{ cm}}{10\text{ cm}}$ ∴ Scale : 3.2 or 320%

Section 7.2 – Maps and Scales

When answering questions, you need to set-up a proportion then solve for the unknown measurement.

4. Solve for each unknown:

(a) $\frac{w}{6} = \frac{12}{36}$ $w = 2$ (b) $\frac{20}{n} = \frac{3}{7}$ $n = 47$ (c) $\frac{12}{21} = \frac{p}{14}$ $P = 8$

ถ้าไม่มีหน่วย เมื่อมีหน่วยเหมือนอย่าง 10 cm /// ทั้งหมดกลายเป็น cm หมดครับ ✓ no unit เป็นอะไรก็ได้

5. The scale diagram of a basketball court uses a scale of 1:280. The length of the court measures 10 cm in the diagram. What is the actual length of the court, in metres?

Scale = $\frac{\text{draw}}{\text{act}}$ $\frac{1}{280} = \frac{10\text{ cm}}{n}$ $\frac{n}{280} = 10\text{ cm}$

$n = 10 \times 280\text{ cm}$

$n = 2800\text{ cm}$ or 28 metres

* 6. The actual distance of the Trans Canada Highway is 7871 km. What is the distance, to the nearest tenth of a centimetre on a map with a scale of 1 : 60 km?

$\frac{1}{60\text{ km}} = \frac{n}{7871\text{ km}}$ $\frac{7871\text{ km} = n}{60\text{ km}}$

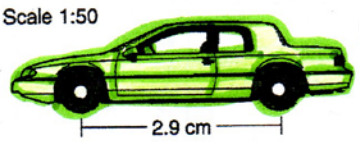
$n = 131.18$ cm

** 7. The wheelbase of a car is the distance between the front and back axles. Determine the actual wheelbase of the car in this scale drawing.

Scale = $\frac{1}{50}$ $\frac{1}{50} = \frac{2.9\text{ cm}}{n}$ $\frac{n}{50} = 2.9\text{ cm}$

$n = 2.9\text{ cm} \times 50$

$n = 145$ cm



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8. Complete the chart.

	Scale of diagram	Measure on diagram	Measure on object
(a)	1:1000	0.15 cm	150 cm
(b)	10:1	3.5 cm	0.35 cm

a) $\frac{1}{1000} = \frac{n}{150}$

$\frac{150}{1000} = n$

$0.15 = n$

b) $\frac{10}{1} = \frac{3.5\text{ cm}}{n}$

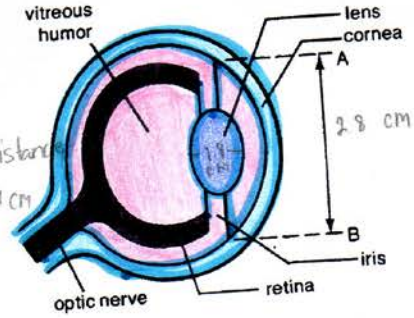
$n\frac{10}{1} = 3.5\text{ cm}$

$n = 3.5 \times \frac{1}{10}$

$n = 0.35\text{ cm}$

9. The eye of a fish is shown.

Scale 20:1



(a) Calculate the actual distance of AB.

Scale : $\frac{20}{1}$

$\frac{20}{1} = \frac{2.8\text{ cm}}{n}$

$n\frac{20}{1} = 2.8\text{ cm}$

$n = 2.8\text{ cm} \times \frac{1}{20}$

$n = 0.14\text{ cm}$

∴ the actual distance of AB is 0.14 cm

(b) Calculate the actual width of the lens.

Scale : $\frac{20}{1}$

$\frac{20}{1} = \frac{1.8\text{ cm}}{n}$

$n\frac{20}{1} = 1.8\text{ cm}$

$n = 1.8 \times \frac{1}{20}$

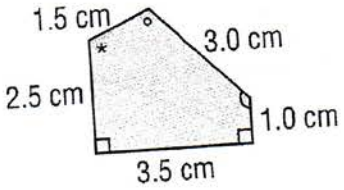
$n = 0.09\text{ cm}$

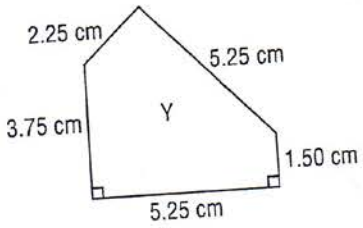
∴ the actual width of the lens = 0.09 cm

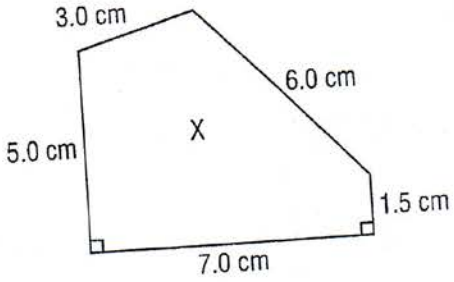
B Sections 7.3 and 7.4 – Similar Polygons and Similar Triangles

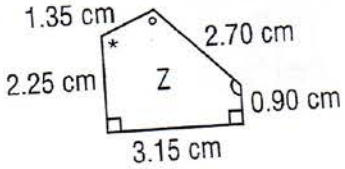
Similar polygons have the same shape, but different sizes. This is true of similar triangles.

10. Which pentagon is similar to the shaded pentagon? Justify your answer.









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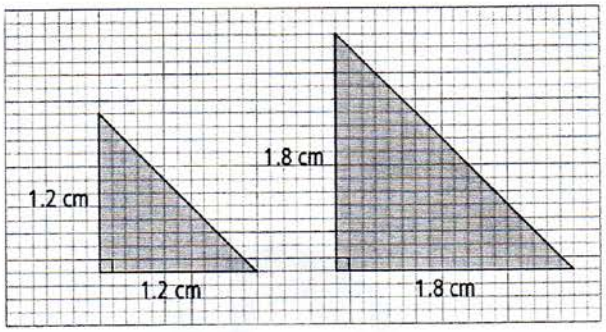
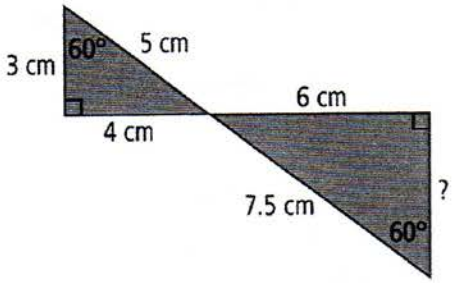
11. Two triangles are pictured below. Determine if the triangles are similar. Explain your answer.



the triangles are similar because

$\frac{1.2\text{ cm}}{1.8\text{ cm}} = 0.6^{\circ} = \frac{1.2\text{ cm}}{18.\text{ cm}}$

12. The two triangles shown below are similar. The missing side length is



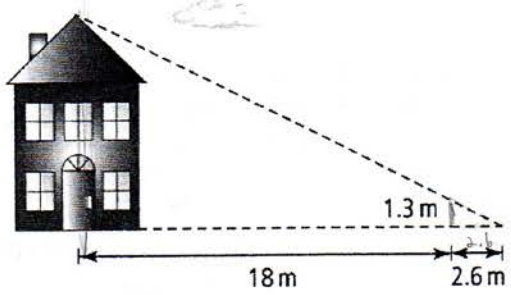
$\frac{6\text{ cm}}{4\text{ cm}} = \frac{x}{3\text{ cm}}$

$\frac{3 \times 6}{4} = x$

$x = 4.5$

∴ the missing side length is 4.5 cm

13. An observer stands 18 m from the door of a house, and 2.6 m from the street. The observer is 1.3 m tall. Calculate the height of the house.



$\frac{20.6\text{ m}}{2.6\text{ m}} = \frac{x}{1.3\text{ m}}$

$\frac{1.3 \times 20.6}{2.6} = x$

$x = 10.3$

∴ the height of the house = 10.3 m

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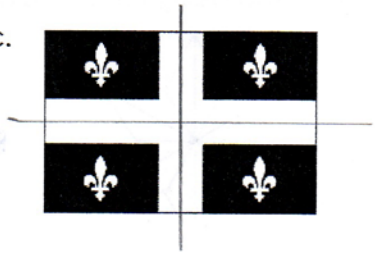
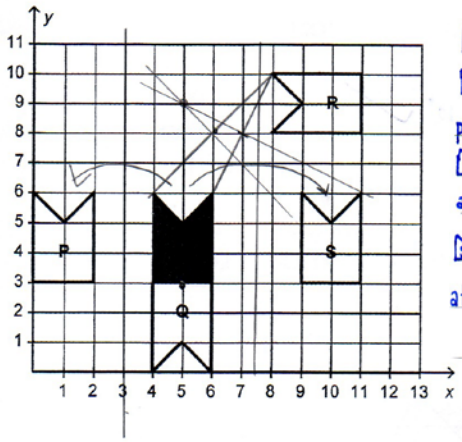
Section 7.5 – Reflections and Line Symmetry

14. Identify the type of symmetry shown in the flag of Québec.



horizontal and vertical line symmetries

15. Identify the pentagons that are related to the black pentagon by a line of reflection. Describe the position of each line of symmetry.



R is related to the black pentagon by rotation at the point (5, 9) 90° cw

S is related to the black pentagon by reflection over the horizontal line passing through the y axis at y = 3

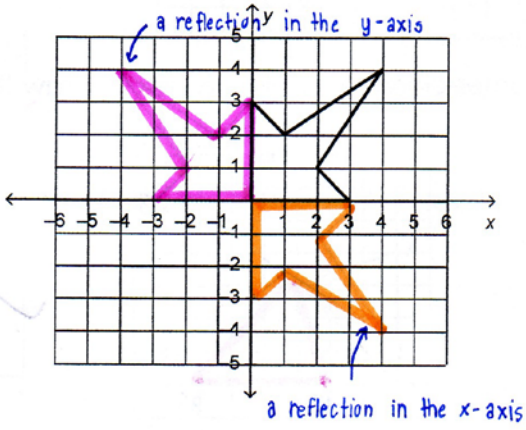
P is a reflection of Q over the vertical line passing through x axis at x = 3

R is a reflection of Q over the vertical line passing through x axis at x = 7.5

16. This polygon is part of a larger shape. Draw the image of the polygon after each reflection:

i) a reflection in the y-axis

ii) a reflection in the x-axis



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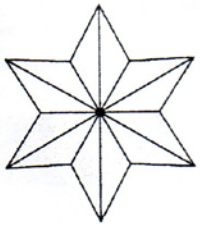
Section 7.6 – Rotations and Rotational Symmetry

17. The design shown is an example of rotation symmetry. What is the order of rotation?



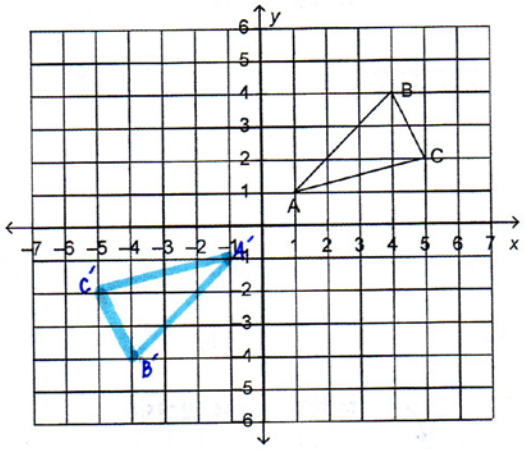
the order of rotation is 6 ✓

18. What is the angle of rotation in the figure?

the order of rotation is 6

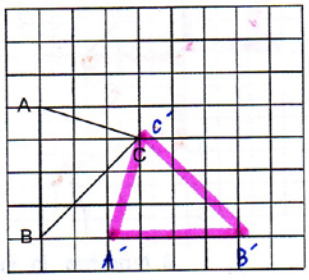
∴ the angle of rotation is $\frac{360°}{6} = 60°$ ✓

19. Rotate ΔABC 180° about the origin. Draw the rotation image. Label it properly.



✓

20. Rotate ΔABC 90° counter-clockwise about vertex C. Draw the rotation image.



✓

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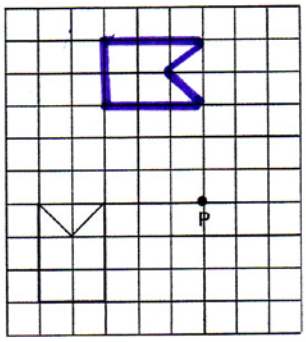
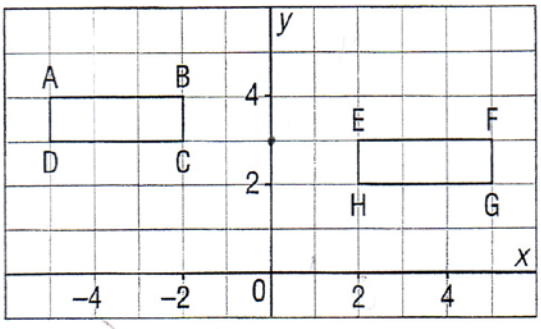
21. Draw the rotation image after rotating the shape 90° clockwise about P.



Section 7.7 – Identifying Transformations

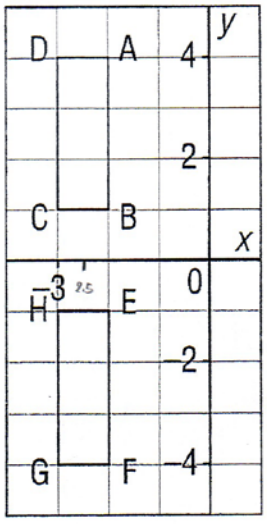
22. For each pair of rectangles ABCE and EFGH, determine whether they are related by line symmetry, rotational symmetry, both, or neither. Describe any lines of symmetry and identify any points of rotation.

(a)



(vertical + horizontal)
- they are related by line symmetry and rotational symmetry.
  (the order of rotation = 4, the angle of rotation = 90°)
- point of rotation = (0, 3)

(b)



(vertical + horizontal)
- they are related by line symmetry and rotational symmetry.
  (the order of rotation = 4, the angle of rotation = 90°)
- point of rotation = (−2.5, 0)
- and also they are related by a reflection (at y = 0, horizontal line)

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