

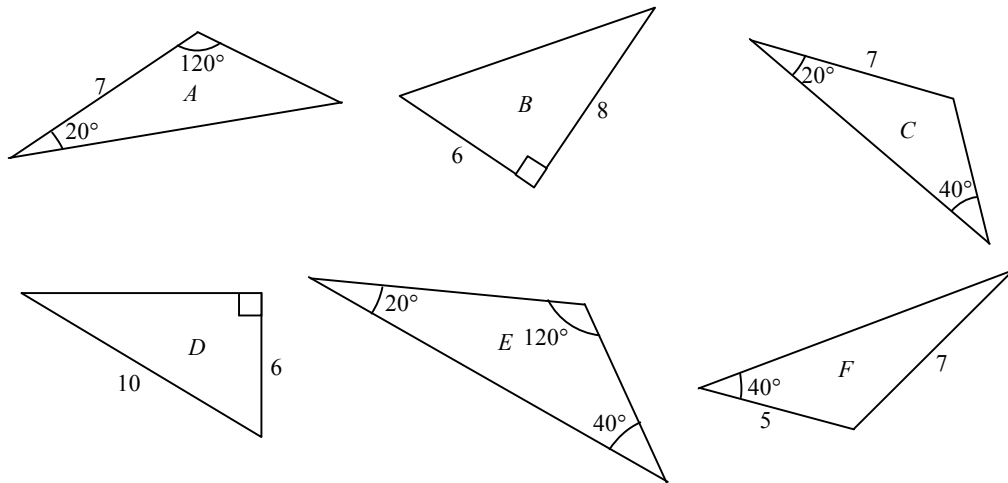
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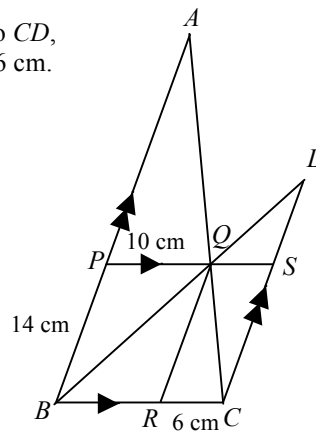
# Congruency and Similarity

## Worksheet 1

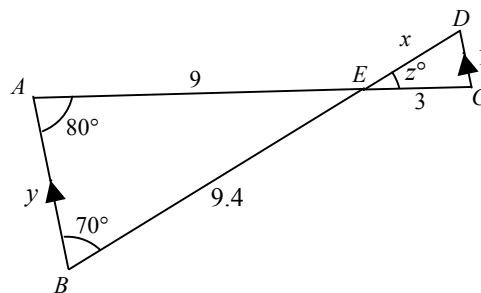
1. For the following triangles, identify two pairs of congruent triangles, stating the reasons for your answer.



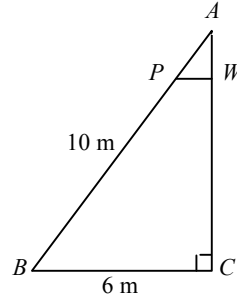
2. In the diagram,  $BPQR$  is a parallelogram.  $AB$  is parallel to  $CD$ ,  $PS$  is parallel to  $BC$ .  $BP = 14$  cm,  $PQ = 10$  cm and  $RC = 6$  cm.
- Show that  $\triangle QCS$  is similar to  $\triangle QAP$ .
  - Show that  $\triangle QDS$  is similar to  $\triangle QBP$ .
  - Calculate
    - the length of  $AP$ ,
    - the length of  $CD$ .



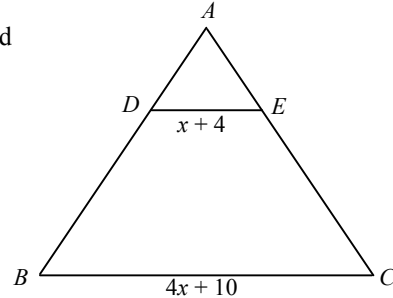
3. In the figure below,  $AEC$  and  $BED$  are straight lines and  $AB$  is parallel to  $CD$ . By using two similar triangles, find the values of  $x$ ,  $y$  and  $z^\circ$ .



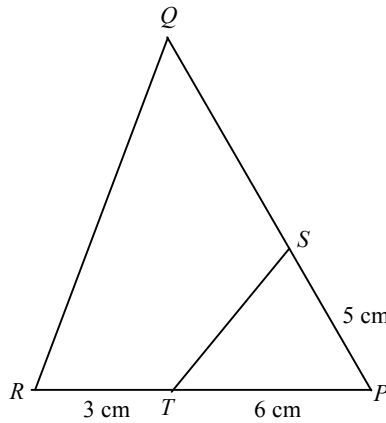
4. A fireman places a 10-metre ladder  $AB$  against a wall  $AC$ . The foot of the ladder is 6 m away from the wall. He needs to climb four fifths of the ladder to reach  $P$ , which is of the same height above ground as a window  $W$ . Find  
 (a) the height of the window above the ground,  
 (b)  $WP$ , the distance between the firemen and the window when he reaches the window.



5. In triangle  $ABC$ ,  $D$  and  $E$  divides the line segments  $AB$  and  $AC$  respectively, in the ratio 1 : 2. Given that  $DE = x + 4$  and  $BC = 4x + 10$ , calculate the value of  $x$ . Hence, find the lengths  $BC$  and  $DE$ .

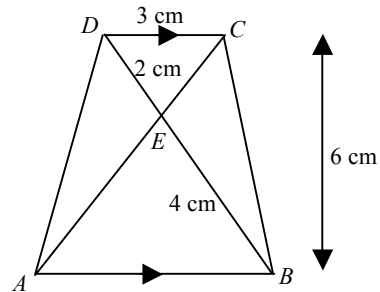


6. In the diagram,  $\angle PQR = \angle STP$ .  $RT = 3$  cm,  $TP = 6$  cm and  $SP = 5$  cm.



- (a) Identify a pair of similar triangles. Give reasons why they are similar.  
 (b) Calculate the length  $QP$ .  
 (c) Hence, or otherwise, find the ratio, area of  $\triangle QRP$  : area of  $\triangle TSP$ .

7. In the trapezium  $ABCD$ , the perpendicular distance between  $AB$  and  $CD$  is 6 cm and  $AB$  is parallel to  $CD$ .  $DE = 2$  cm,  $BE = 4$  cm and  $CD = 3$  cm.  
 (a) Find the length  $AB$ .  
 (b) Hence, or otherwise, find the area of the trapezium  $ABCD$ .



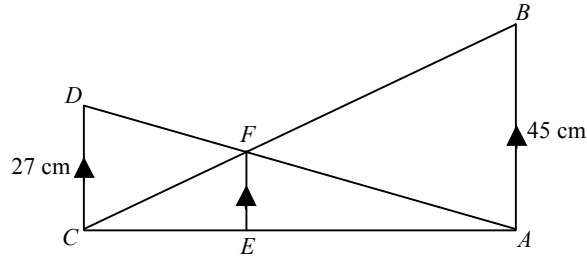
8. Two pieces of geometrically similar rocks,  $R_1$  and  $R_2$ , displace  $125 \text{ cm}^3$  and  $27 \text{ cm}^3$  of water respectively when each is submerged in a Eureka can of water. The length of one dimension of rock  $R_1$  is measured to be 10 cm.

(a) Calculate the length of the corresponding diagonal of rock  $R_2$ ,

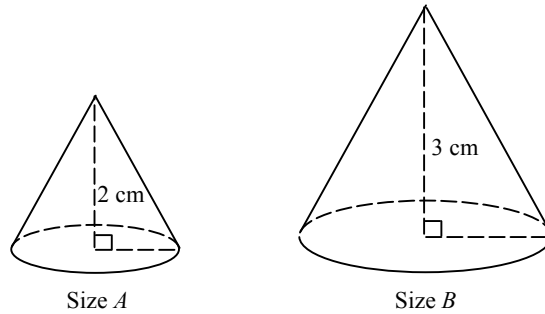
The two rocks are placed beside each other in the same orientation, and a photograph is taken.

(b) Calculate the ratio, surface area of  $R_1$  : surface area of  $R_2$  in the photograph.

- \*9. In the diagram,  $AB = 45 \text{ cm}$  and  $CD = 27 \text{ cm}$ .  $DFA$  and  $CFB$  are straight lines. Find the length  $EF$ .



- \*10. A manufacturer produces paperweights in two sizes. A paperweight of size  $A$  has a height of 2 cm, and a paperweight of size  $B$  has a height of 3 cm. The difference in the volumes of the two paperweights is  $\frac{19\pi}{9} \text{ m}^3$ .



- (a) Find
- (i) the volume of a paperweight of size  $A$ ,
  - (ii) the radius,  $r$ , of a paperweight of size  $A$ , correct to 1 decimal place.
- (b) The cost incurred in the production of the paperweights is proportional to the amount of material used. If it costs \$4 to make a paperweight of size  $A$ , calculate the cost of making a paperweight of size  $B$ .