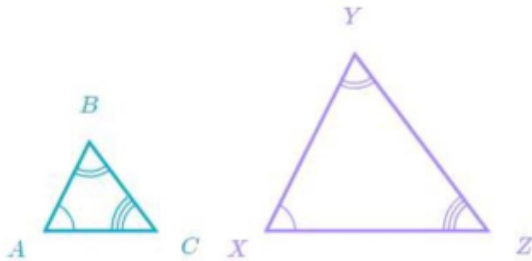
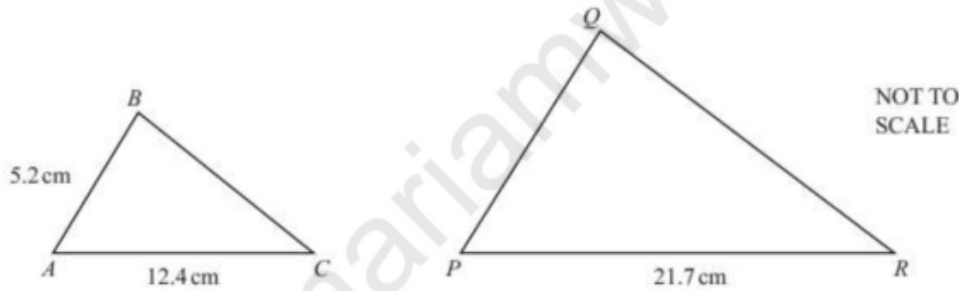


Similar triangles have the same shape, but not necessarily the same size. In the figure below, triangles ABC and XYZ are similar, but not congruent; they have the same angle measures, but not the same side lengths.



Note: If two objects are congruent, then they are also similar.

1. Triangle ABC is similar to triangle PQR [2]
Find PQ [2]



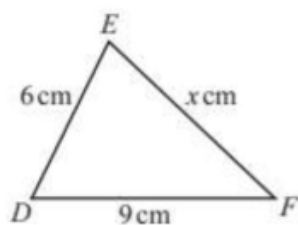
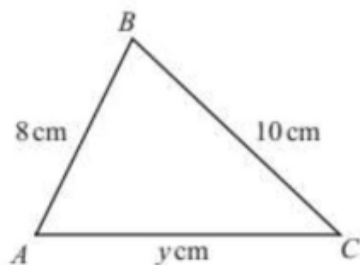
[Q1 to Q12]



2. Triangle ABC is similar to triangle DEF.

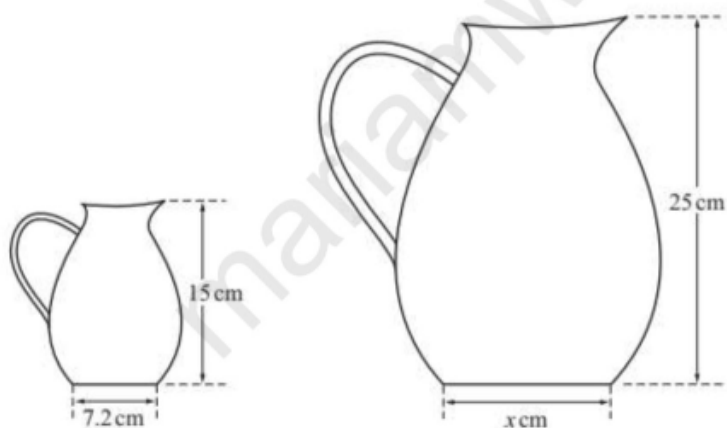
Calculate the value of

(a) x , [2] (b) y . [2]



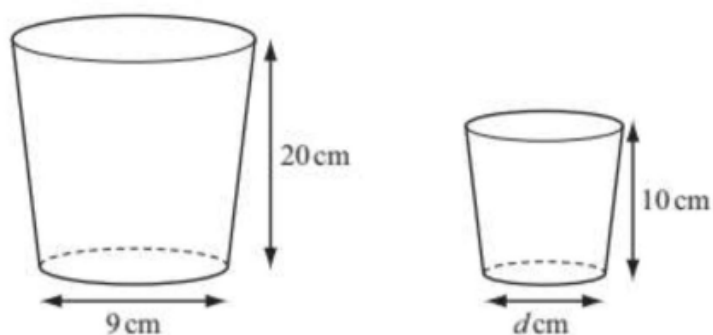
3. The diagram shows two jugs that are mathematically similar.

Find the value of x . [2]





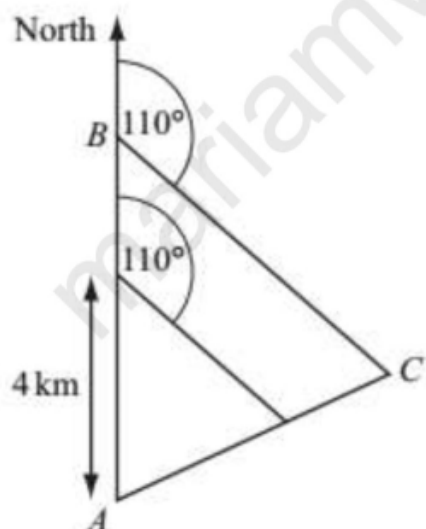
4. The diagrams show two mathematically similar containers.



The larger container has a base with diameter 9 cm and a height 20 cm.

The smaller container has a base with diameter d cm and a height 10 cm. Find the value of d . [1]

5. The route for the sponsored walk in winter is triangular.



Senior students start at A, walk North to B, then walk on a bearing 110° to C. They then return to A.

$$AB = BC = 6\text{KM}$$

Junior students follow a similar path but they only walk 4 km North from A, then 4 km on a bearing 110° before returning to A.

Senior students walk a total of 18.9 km.

Calculate the distance walked by junior students. [3]

0580/41/M/J/11 1(b) (ii)



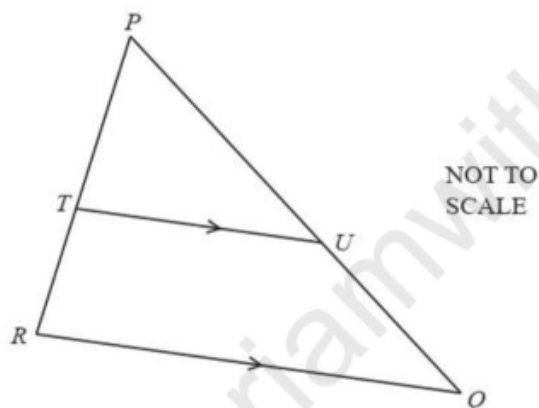
6. PQR is a triangle.

T is a point on PR and U is a point on PQ.

RQ is parallel to TU.

(i) Explain why triangle PQR is similar to triangle PUT.

Give a reason for each statement you make. [3]

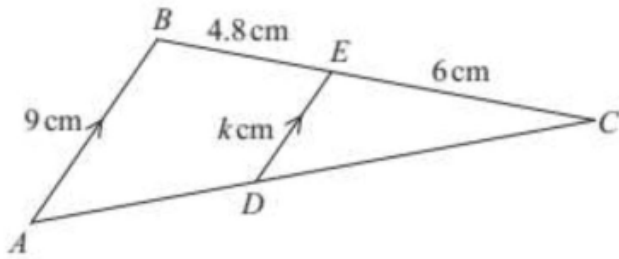


(ii) $PT : TR = 4 : 3$

Find the ratio $PU : PQ$. [1]

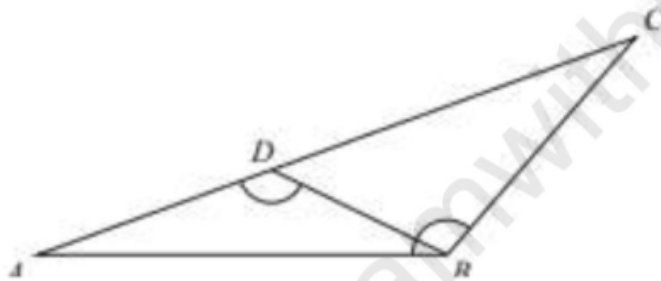


7. Triangles CBA and CED are similar.
AB is parallel to DE.



AB = 9cm, BE = 4.8cm, EC = 6cm and ED = k cm.
Work out the value of k. [2]

8. In the diagram, D is on AC so that angle ADB = angle ABC.



(i) Show that angle ABD is equal to angle ACB. [2]

(ii) Complete the statement.

Triangles ABD and ACB are [1]

(iii) AB = 12 cm, BC = 11cm and AC = 16 cm.

Calculate the length of BD. [2]



9. The lines AB and CDE are parallel.

AD and CB intersect at X .

$AB = 9\text{ cm}$, $CD = 6\text{ cm}$ and $DX = 3\text{ cm}$.

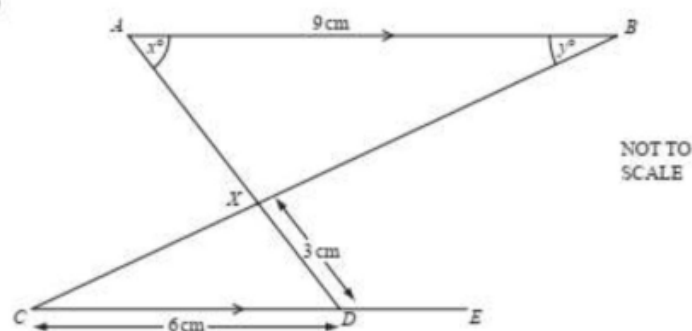
(i) Complete the following statement.

Triangle ABX is _____ to triangle DCX . [1]

(ii) Calculate the length of AX . [2]

(iii) ~~The area of triangle DCX is 6 cm^2 .~~

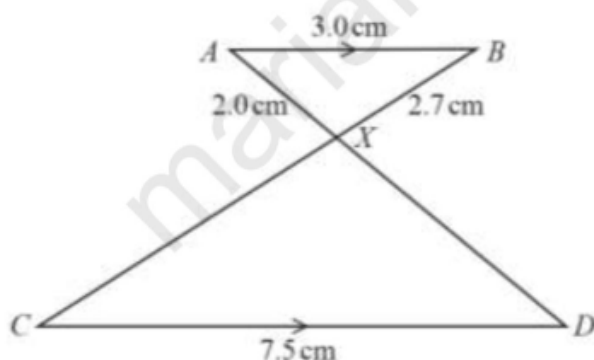
~~Calculate the area of triangle ABX .~~ [2]



(iv) Angle $BAX = x^\circ$ and angle $ABX = y^\circ$.

Find angle AXB and angle XDE in terms of x and/or y . [2]

10. In the diagram, AB and CD are parallel.



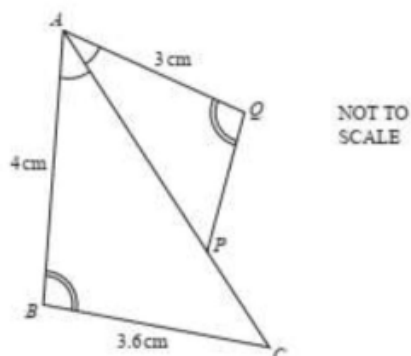
The lines CB and AD intersect at X . $AB = 3.0\text{ cm}$,

$AX = 2.0\text{ cm}$, $BX = 2.7\text{ cm}$ and $CD = 7.5\text{ cm}$.

Find the length of BC . [3]

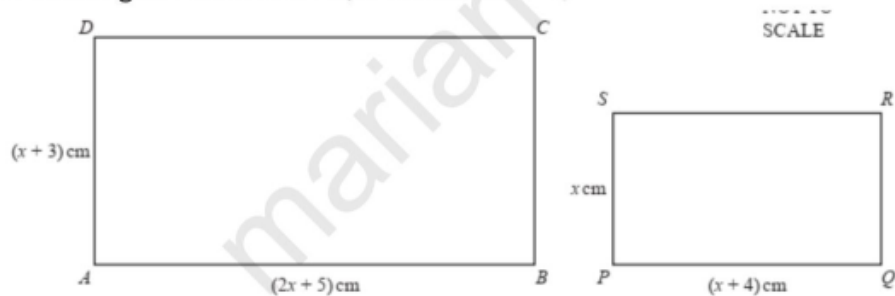


11. The diagram shows two triangles ACB and APQ.
Angle PAQ = angle BAC and angle AQP = angle ABC.
AB = 4 cm, BC = 3.6 cm and AQ = 3 cm.



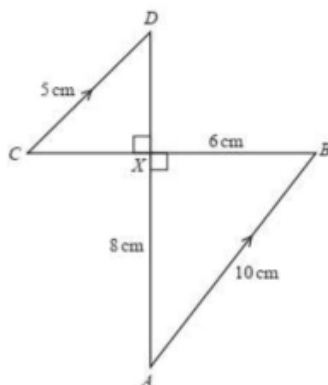
- (i) Complete the following statement.
Triangle ACB isto triangle APQ. [1]
(ii) Calculate the length of PQ. [2]
(iii) The area of triangle ACB is 5.6 cm^2 .
Calculate the area of triangle APQ. [2]

12. The rectangles ABCD and PQRS are similar



Show that this value of x satisfies the equation $x^2 - 2x - 12 = 0$. [3]

13. In the diagram, AB and CD are parallel.



[Q13 - 17]

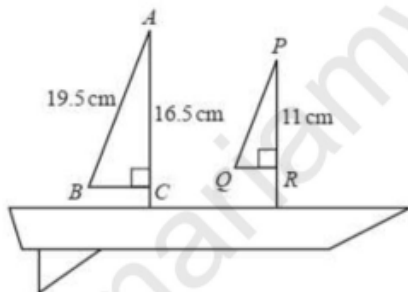
AD and BC intersect at right angles at the point X.

AB = 10 cm, CD = 5 cm, AX = 8 cm and BX = 6 cm.

(i) Use similar triangles to calculate DX. [2]

(ii) Calculate angle XAB. [2]

14. The diagram shows a toy boat.



AC = 16.5 cm, AB = 19.5 cm and PR = 11 cm.

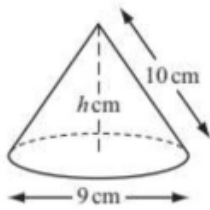
Triangles ABC and PQR are **similar**.

(i) Calculate PQ [2]

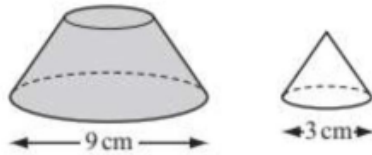
(ii) Calculate BC [3]

(iii) Calculate angle ABC [2]

15. A solid cone has diameter 9 cm, slant height 10 cm and vertical height h cm.



- (a) (i) Calculate the curved surface area of the cone. [2]
(ii) Calculate the value of h , the vertical height of the cone. [3]
- (b) Sasha cuts off the top of the cone, making a smaller cone with diameter 3 cm. This cone is similar to the original cone.



Calculate the vertical height of this small cone. [2]



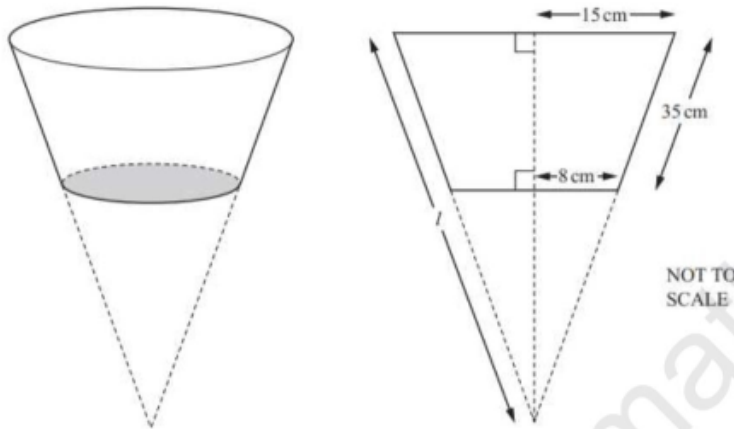
16. The diagram shows a plant pot.

It is made by removing a small cone from a larger cone and adding a circular base.

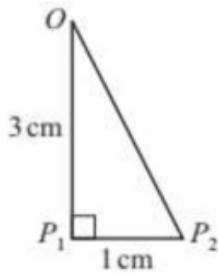
This is This is the the cross section of the plant pot.

(i) Find l . [3]

(ii) Calculate the total surface area of the outside of the plant pot. [3]



17. Sidney draws the triangle OP_1P_2 .



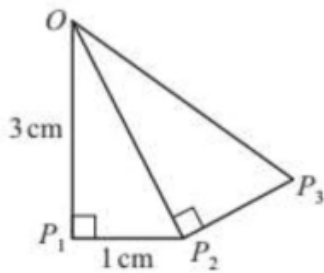
$OP_1 = 3\text{ cm}$ and $P_1P_2 = 1\text{ cm}$.

Angle $OP_1P_2 = 90^\circ$.

(a) Show that $OP_2 = \sqrt{10}\text{ cm}$ [1]

(b) Sidney now draws the lines P_2P_3 and OP_3 .

Triangle OP_2P_3 is mathematically similar to triangle OP_1P_2 .



(i) Write down the length of P_2P_3 in the

form $\frac{\sqrt{a}}{b}$ where a and b are integers [1]

(ii) Calculate the length of OP_3

giving your answer in the form c/d

where c and d are integers. [2]

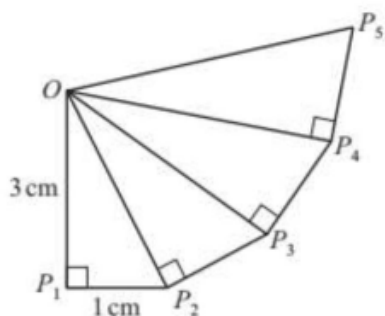
(c) Sidney continues to add

mathematically similar triangles

to his drawing.



Find the length of OP_5 . [2]



(d) (i) Show that angle $P_1OP_2 = 18.4^\circ$, correct to 1 decimal place.

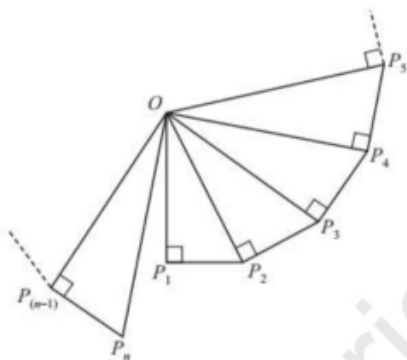
[2]

(ii) Write down the size of angle P_2OP_3 . [1]

(iii) The last triangle Sidney can draw without covering his

first triangle is triangle $OP_{(n-1)}P_n$.

Calculate the value of n . [3]



Answers

1. 9.1	10. 9.45
2. (a)7.5 (b)12	11. (a) (i) Similar (ii) 2.7 (iii) 3.15
3. 12	12. $\frac{2x+5}{x+4} = \frac{x+3}{x}$
4. (a)4.5	13. (a) 4 (b) 36.9
5. 12.6	14. (a) (i) 13 (ii) 10.4 (iii) 57.8
6. (i) Angle PTU = angle PRQ corresponding , Angle PUT = angle PQR corresponding , Angle RPQ is common oe hence Corresponding angles are equal oe (ii)4:7	15. (a) (i) 141 (ii) 8.93 (b) 2.98
7. 5	16. (i) 75 (ii) 2730
8. (a) (i) Angle A is common to both triangles oe ADB = ABC Third angle of triangles equal oe (ii) Similar (iii) 8.25	17. (a) $3^2 + 1^2$ (b)(i) $\sqrt{10}/3$ (ii)10/3 (c)3.70 (d)(i) $\tan^{-1}(1/3)$ (ii)18.4 (iii)20
9. (a) (i) Similar (ii) 4.5 (iii) 13.5 (iv) $180 - x - y$ oe $180 - x$ oe	