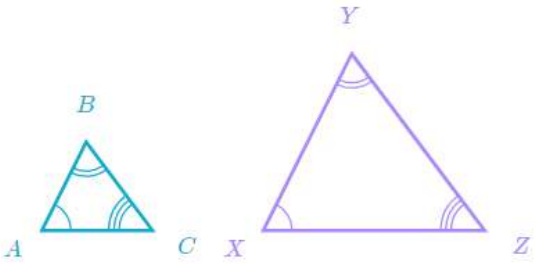
Similar triangles have the same shape, but not necessarily the same size. In the figure below, triangles ABC and XYZ are similar, but not congruent; they have the same angle measures, but not the same side lengths.

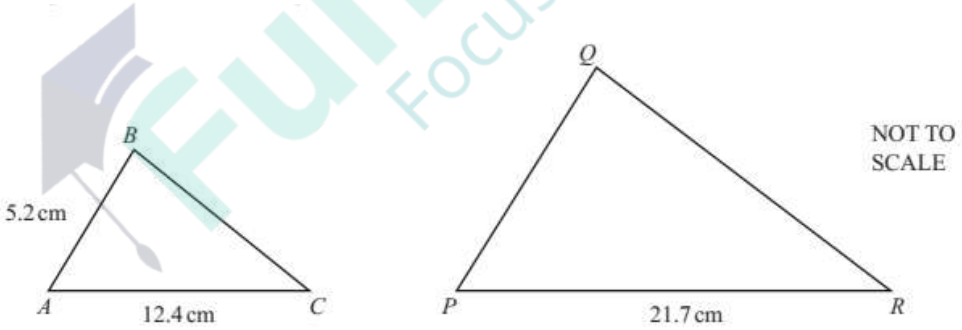


Note: If two objects are congruent, then they are also similar.



[Q1 to Q12]

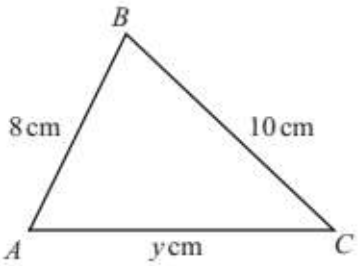
1. Triangle ABC is similar to triangle PQR [2]
   Find PQ [2]

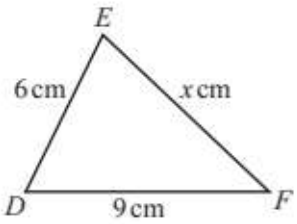


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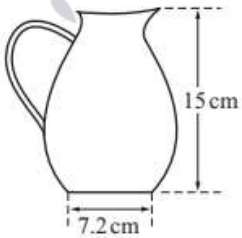


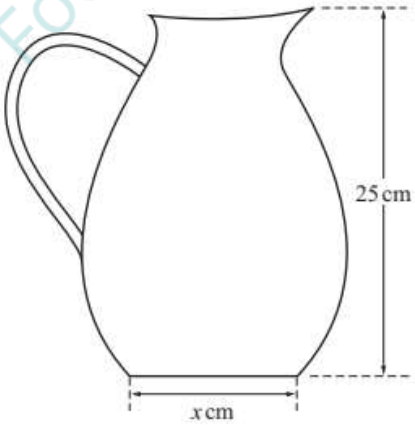
2. Triangle ABC is similar to triangle DEF.
   Calculate the value of
   (a) x, [2] (b) y. [2]





3. The diagram shows two jugs that are mathematically similar.
   Find the value of x. [2]

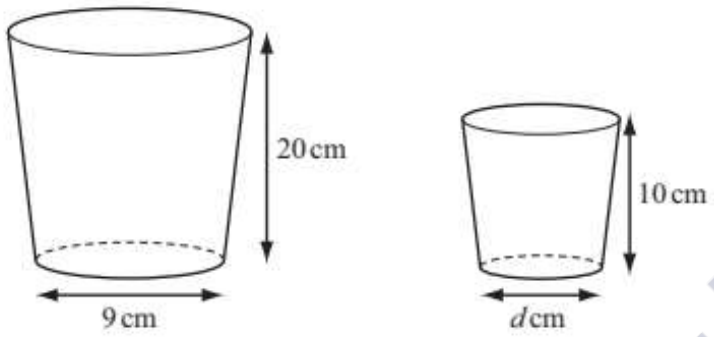




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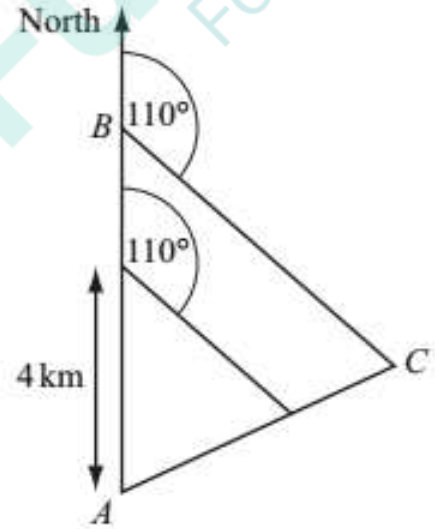


4. The diagrams show two mathematically similar containers.



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.

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AB = BC = 6KM

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)



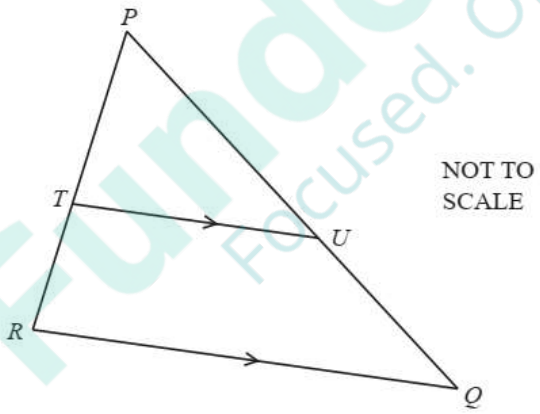
6. PQR is a triangle.

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]



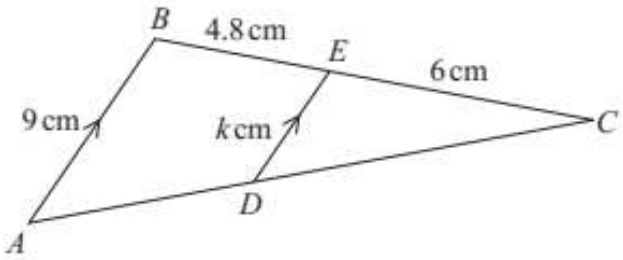
(ii) PT : TR = 4 : 3

Find the ratio PU : PQ. [1]

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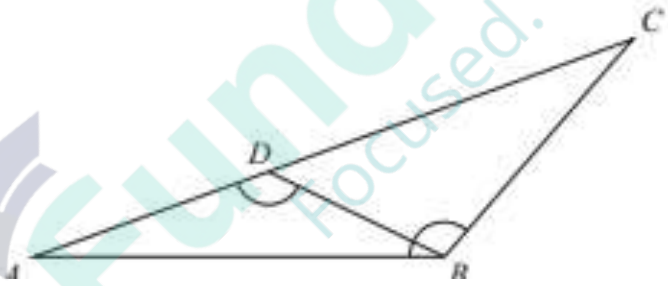


7. Triangles CBA and CED are similar.
   AB is parallel to DE.



   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.

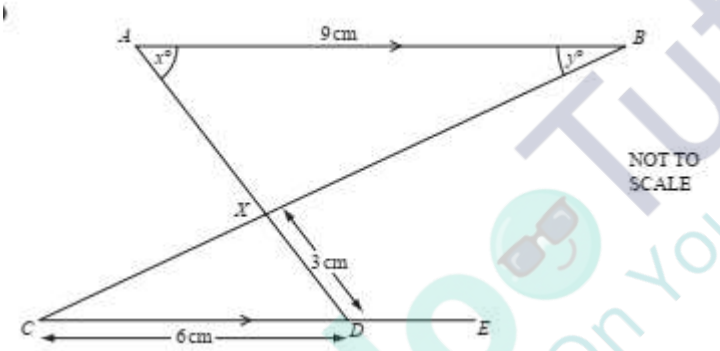


   (i) Show that angle ABD is equal to angle ACB. [2]
   (ii) Complete the statement.
   Triangles ABD and ACB are ..... . [1]
   (iii) AB = 12 cm, BC = 11cm and AC = 16 cm.
   Calculate the length of BD. [2]

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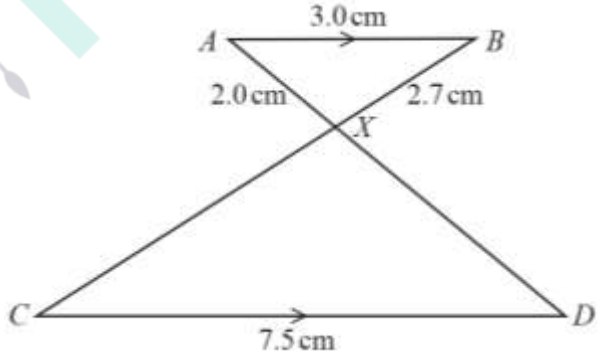


9. The lines AB and CDE are parallel.
   AD and CB intersect at X.
   AB = 9 cm, CD = 6 cm and DX = 3 cm.
   (i) Complete the following statement.
   Triangle ABX is _____ to triangle DCX. [1]
   (ii) Calculate the length of AX. [2]
   (iii) ~~The area of triangle DCX is 6 cm^2.~~
   ~~Calculate the area of triangle ABX. [2]~~



   (iv) Angle BAX = x° and angle ABX = y°.
   Find angle AXB and angle XDE in terms of x and/or y. [2]

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

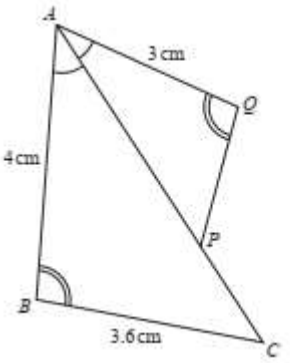


   The lines CB and AD intersect at X. $AB = 3.0$ cm,
   $AX = 2.0$ cm, $BX = 2.7$ cm and $CD = 7.5$ cm.
   Find the length of BC. [3]

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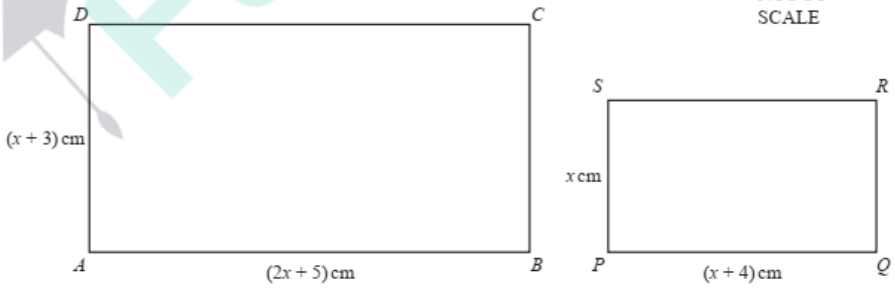
11. The diagram shows two triangles ACB and APQ.
Angle PAQ = angle BAC and angle AQP = angle ABC.
AB = 4 cm, BC = 3.6 cm and AQ = 3 cm.



NOT TO SCALE

(i) Complete the following statement.
Triangle ACB is ……..to 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

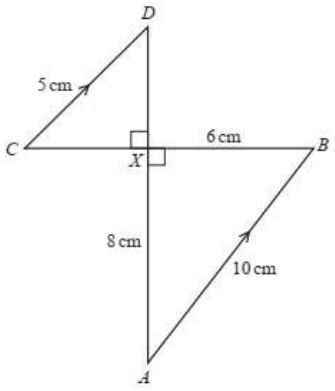


SCALE

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

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



[Q13 - 17]

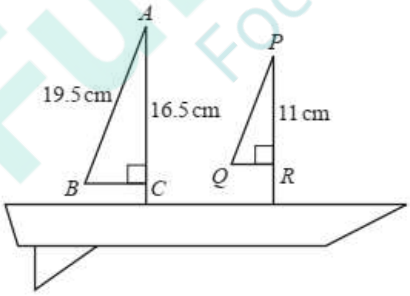
AD and BC intersect at right angles at the point X.

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

(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**.

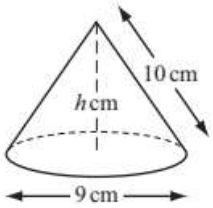
(i) Calculate PQ [2]

(ii) Calculate BC [3]

(iii) Calculate angle ABC [2]

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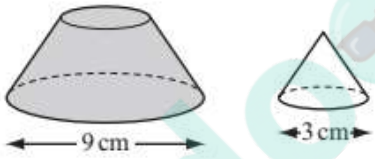
15. A solid cone has diameter 9 cm, slant height 10 cm and vertical height h cm.



(a) (i) Calculate the curved surface area of the cone. [2]

(ii) Calculate the value of h, the vertical height of the cone. [3]

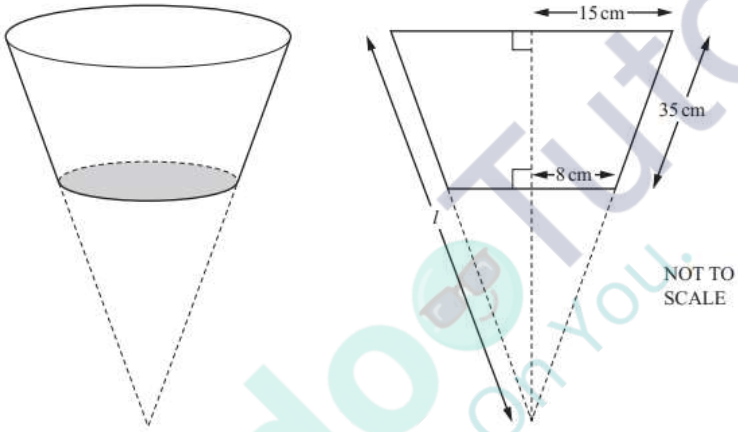
(b) Sasha cuts off the top of the cone, making a smaller cone with diameter 3 cm. This cone is similar to the original cone.



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

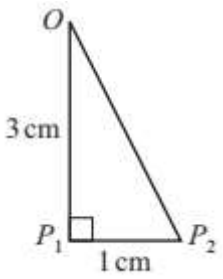
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16. The diagram shows a plant pot.
It is made by removing a small cone from a larger cone and adding a circular base.
This is This is the the cross section of the plant pot.
(i) Find l. [3]
(ii) Calculate the total surface area of the outside of the plant pot. [3]

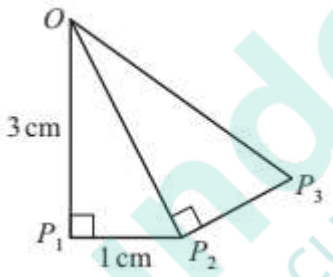


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17. Sidney draws the triangle OP_1P_2.



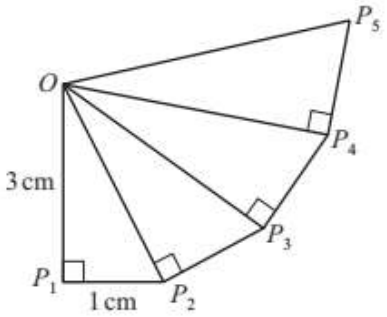
OP_1 = 3cm and P_1P_2 = 1cm.
Angle OP_1P_2 = 90°.
(a) Show that $OP_2 = \sqrt{10}$ cm [1]
(b) Sidney now draws the lines P_2 P_3 and OP_3.
Triangle OP_2P_3 is mathematically similar
to triangle OP_1P_2.



(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.

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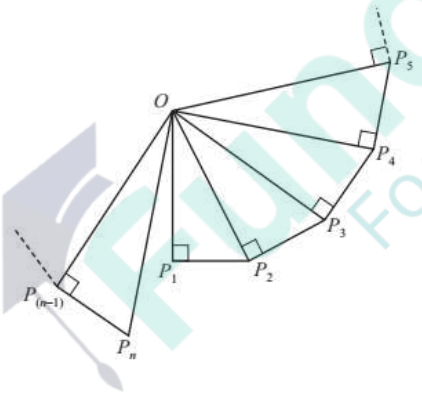
Find the length of OP_5. [2]



(d) (i) Show that angle $P_1OP_2 = 18.4°$, 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]



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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	

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