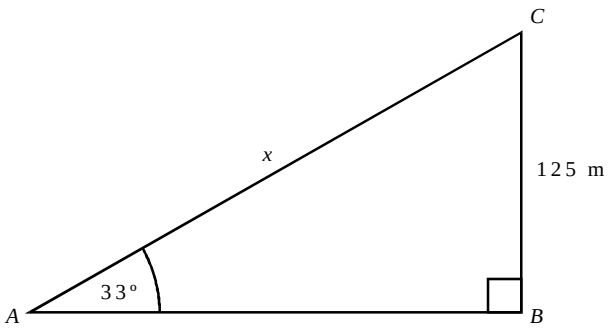
Verulam School

Mixed SSM 2

57 min
46 marks

1. *ABC* is a right-angled triangle.
BC = 125 m.
Angle *CAB* = 33°.



Not drawn accurately

Find the length of *AC* (marked *x* in the diagram).
Give your answer to an appropriate degree of accuracy.

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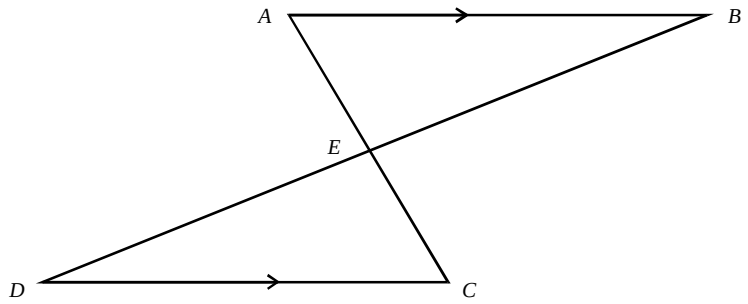
Answer ..... m

(Total 4 marks)

2. In the diagram, the lines *AC* and *BD* intersect at *E*.

AB and *DC* are parallel and *AB* = *DC*.



Prove that triangles *ABE* and *CDE* are congruent.

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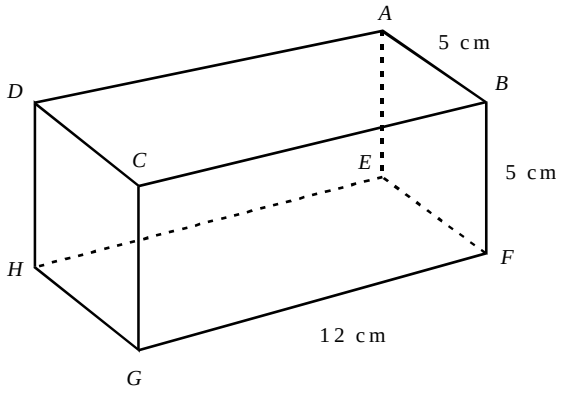
(Total 4 marks)

3. *ABCDEFGH* is a cuboid with sides of 5 cm, 5 cm and l2 cm as shown.



Not to scale

Calculate angle *DFH*.

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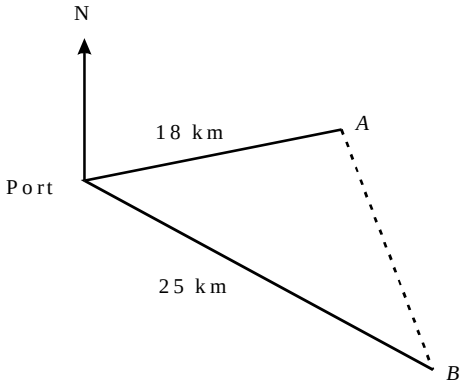
Answer ..... degrees

(Total 5 marks)

4. Two ships, *A* and *B*, leave port at 13 00 hours.
Ship *A* travels at a constant speed of 18 km per hour on a bearing of 070°.
Ship *B* travels at a constant speed of 25 km per hour on a bearing of 152°.



Not drawn accurately

Calculate the distance between *A* and *B* at 14 00 hours.

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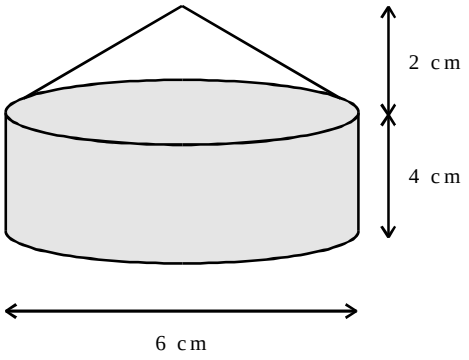
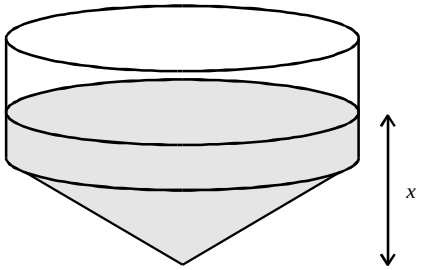
Answer ..... km

(Total 4 marks)

5. A thin-walled glass paperweight consists of a hollow cylinder with a hollow cone on top as shown.
The paperweight contains just enough sand to fill the cylinder.



The paperweight is now turned upside down.



Calculate the depth of the sand, (marked *x* in the diagram).

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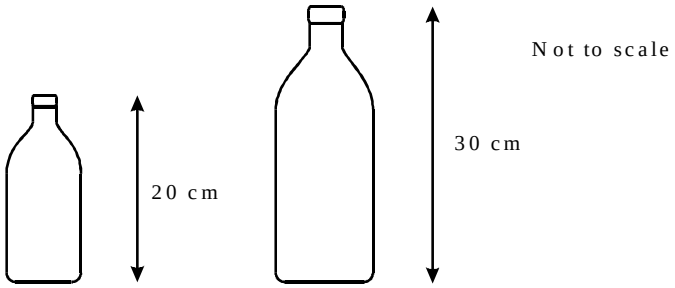
Answer ..... cm

(Total 5 marks)

6. Two similar bottles are shown below.
The smaller bottle is 20 cm tall and holds 480 ml of water.
The larger bottle is 30 cm tall.



How much water does the larger bottle hold?

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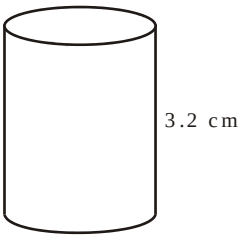
Answer .....

(Total 3 marks)

7. The diagram shows a cylinder.
The volume of the cylinder is 320π cm^3.
The height of the cylinder is 3.2 cm.



Calculate the radius of the base of the cylinder.

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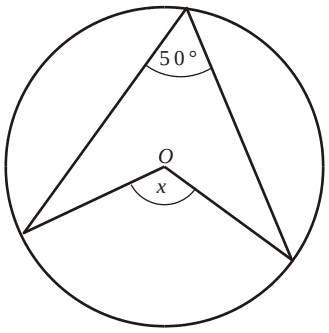
Answer ..... cm

(Total 3 marks)

8. (a) The diagram shows a circle with centre *O*.



Not drawn accurately

Work out the size of the angle marked *x*.

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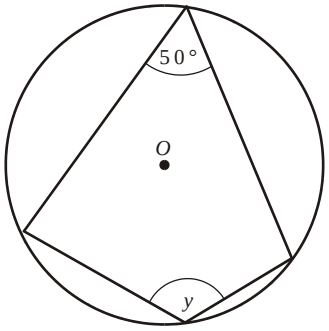
Answer ..... degrees

(1)

(b) The diagram shows a different circle with centre O.



Not drawn accurately

Work out the size of the angle marked y.

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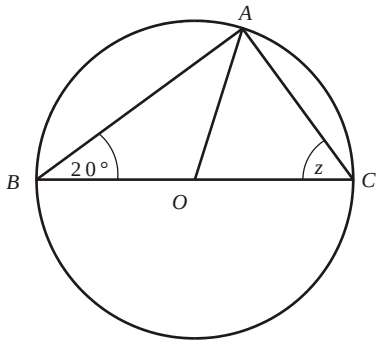
Answer ..... degrees

(1)

(c) A, B and C are points on the circumference of a circle with centre O.
BOC is a straight line.
Angle $ABC = 20°$



Not drawn accurately

Work out the size of the angle marked z.
Explain your answer.

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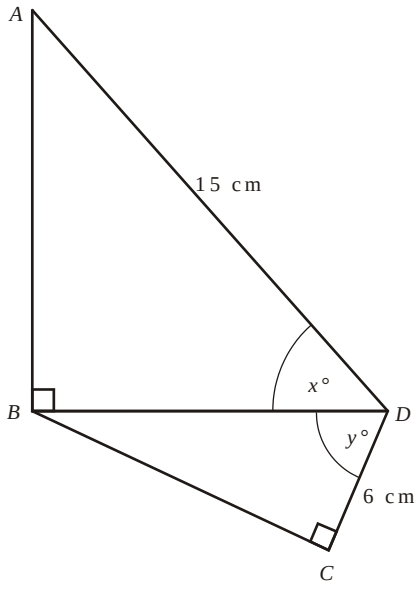
Answer ..... degrees

(2)

(Total 4 marks)

9. The diagram shows two right-angled triangles.
AD = 15 cm.
CD = 6 cm.



Not to scale

(a) Given that $\cos x° = \frac{2}{3}$, calculate the length *BD*.

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Answer *BD* = ...

(2)

(b) Find the value of $\sin y°$.

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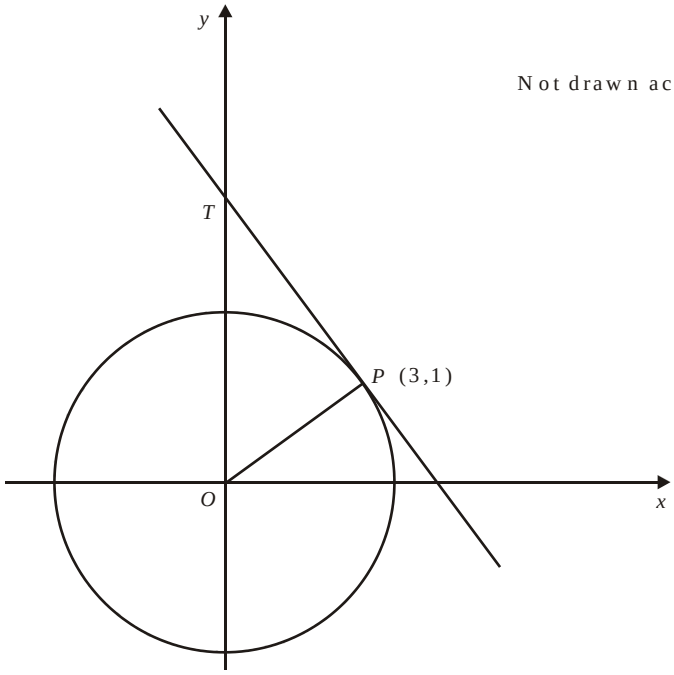
Answer $\sin y°$ = ...

(3)

(Total 5 marks)

10. The diagram shows a circle, centre O, passing through the point P (3,1).



(a) (i) Find the exact length of OP.

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Answer .....

(2)

(ii) Hence, or otherwise, write down the equation of the circle.

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Answer .....

(1)

(b) PT is the tangent to the circle at P.

(i) Write down the size of angle OPT.

Answer ..... degrees

(1)

(ii) Write down the gradient of OP.

Answer .....

(1)

(iii) Write down the gradient of *PT*.

Answer .....

(1)

(iv) Hence, or otherwise, find the equation of the tangent *PT*.

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Answer .....

(3)

(Total 9 marks)