Name: _____

<div style="border:1px solid">

Maths Genie Stage 10

Test B

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Instructions

- Use **black** ink or ball-point pen.
- Answer all questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**
- **Calculators may be used.**

Information

- The marks for each question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

1 Write down the exact value of cos (0°)

$$1$$

(Total for Question 1 is 1 mark)

2 Write down the exact value of sin (60)

$$\frac{\sqrt{3}}{2}$$

(Total for Question 2 is 1 mark)

3 3 tins of beans and 4 tins of tomatoes costs £2.44
5 tins of beans costs £1.60

Work out how much one tin of tomatoes costs.

$1.60 \div 5 = 0.32$

$3 \times 0.32 = 0.96$

$2.44 - 0.96 = 1.48$

$1.48 \div 4 = 0.37$

£0.37

(Total for Question 3 is 2 marks)

4 In a company the ratio of men to women is 3:4
40% of the women are under the age of 30.

What fraction of all the people in the company are women under the age of 30?
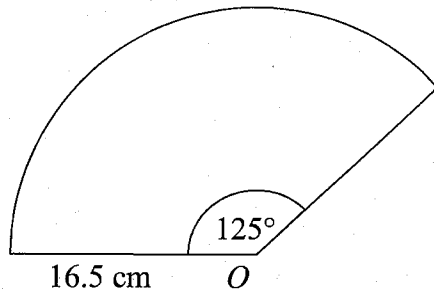
$\frac{4}{7}$ women

40% of $\frac{4}{7}$

$\frac{2}{5} \times \frac{4}{7} = \frac{8}{35}$

$\frac{8}{35}$

(Total for Question 4 is 3 marks)

5 The diagram shows a sector, centre O.
The radius of the circle is 16.5 cm.
The angle of the sector is 125°.

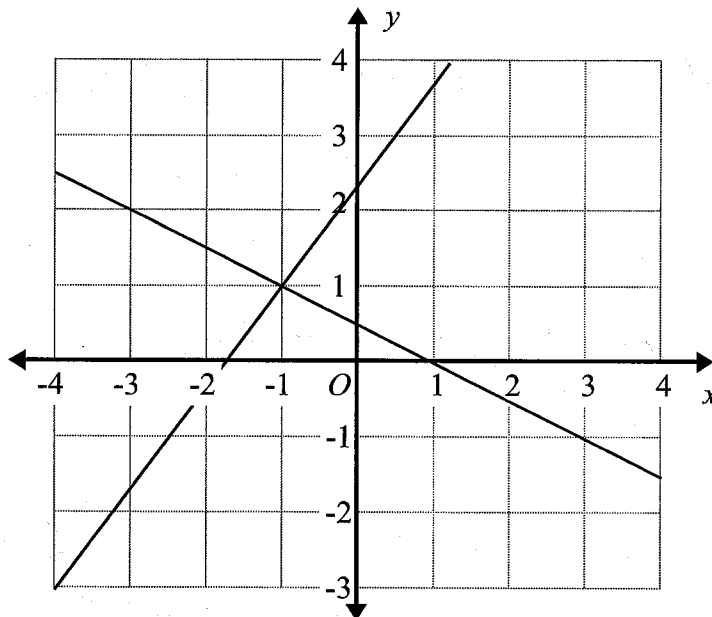16.5 cm O

Calculate the area of the sector.
Give your answer correct to 3 significant figures.

$$\frac{125}{360} \times \pi (16.5)^2 = 297 \ cm^2$$

                                           297   cm^2

(Total for Question 5 is 3 marks)

6 The graphs of the straight lines with equations $3y = 4x + 7$ and $x + 2y = 1$ have been drawn on the grid.

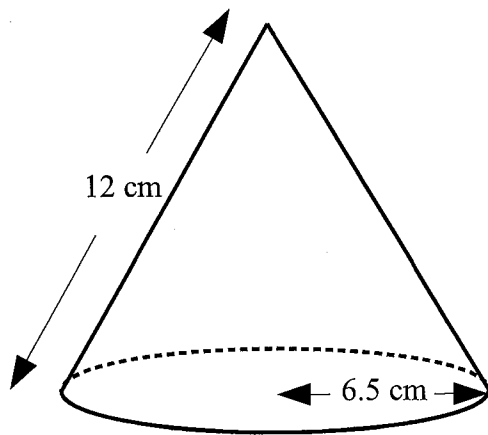Use the graphs to solve the simultaneous equations $3y = 4x + 7$
                                                          $x + 2y = 1$
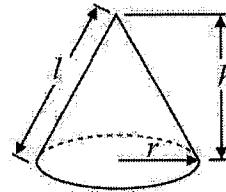
$$x = -1 \qquad y = 1$$

(Total for Question 6 is 2 marks)

7   The diagram shows a solid cone.

$$\text{Volume of cone} = \frac{1}{3}\pi r^2 h$$

$$\text{Curved surface area of cone} = \pi rl$$

12 cm

6.5 cm

The slanted height of the cone is 12 cm.
The base of the cone has a radius of 6.5 cm.

Work out the total surface area of the cone.
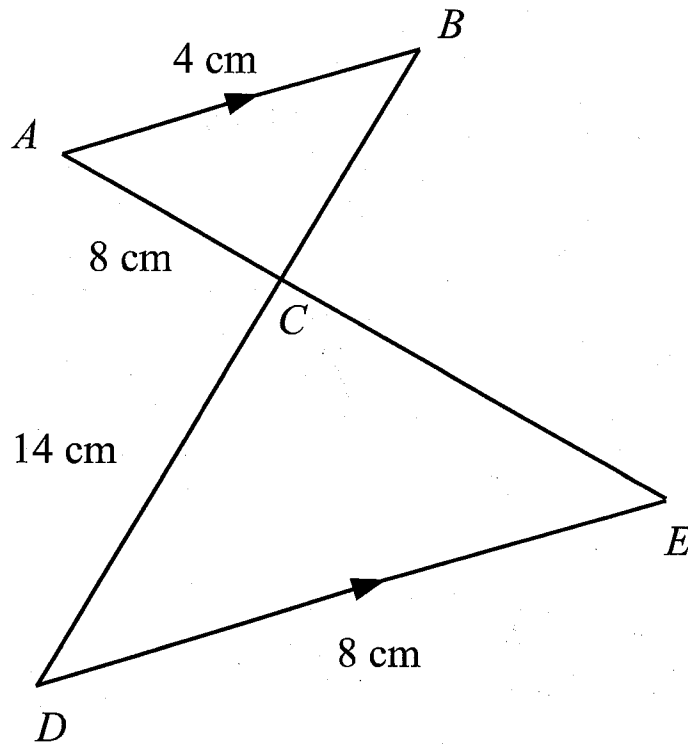Give your correct to 3 significant figures.

Area of circle $= \pi (6.5)^2$

$= 132.73$ cm^2

Curved s.a $= \pi (6.5)(12)$

$= 245.04$ cm^2

$132.73 + 245.04 = 378$ cm^2

___378___ cm^2

(Total for Question 7 is 4 marks)

8

B

4 cm

A

8 cm

C

14 cm

E

8 cm

D

AB is parallel to *DE*.
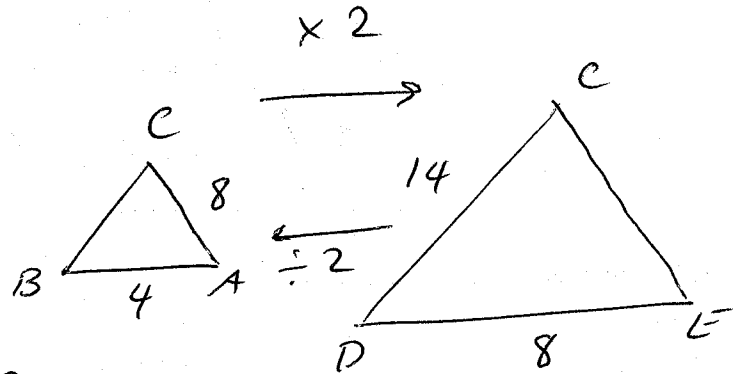*ACE* and *BCD* are straight lines.
AB = 4 cm,
AC = 8 cm,
CD = 14 cm,
DE = 8 cm.

(a)   Calculate the length of *CE*.

$$Scale\ factor = \frac{8}{4} = 2$$
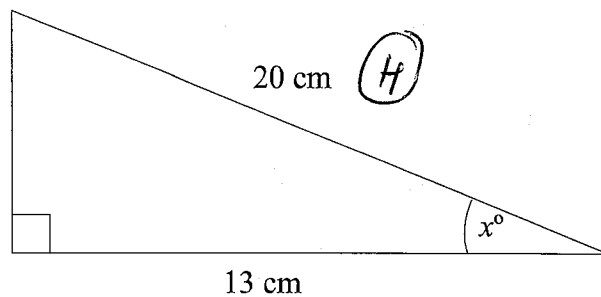
$$8 \times 2 = 16$$

_____16_____ cm

(2)

(b)   Calculate the length of *BC*.

$$14 \div 2 = 7$$

_____7_____ cm

(2)

(Total for Question 8 is 4 marks)

9

20 cm Ⓗ

13 cm

Ⓐ

Work out the value of x.

$$\cos x = \frac{A}{H}$$

$$\cos x = \frac{13}{20}$$

$$x = \cos^{-1}\left(\frac{13}{20}\right)$$

$$= 49.5° \ (1dp)$$

$49.5°$

(Total for Question 9 is 2 marks)

10 Solve the simultaneous equations

$$3x + 2y = 9 \qquad \times 2$$
$$5x + 4y = 14$$

$$6x + 4y = 18$$
$$5x + 4y = 14$$

$$x = 4$$

$$3(4) + 2y = 9$$
$$12 + 2y = 9$$
$$2y = -3$$
$$y = -\frac{3}{2}$$

$x = \ \underline{4}$

$y = \ \underline{-3/2}$

(Total for Question 10 is 3 marks)