

Name: \_\_\_\_\_

# Maths Genie Stage 10

## Test D

### 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

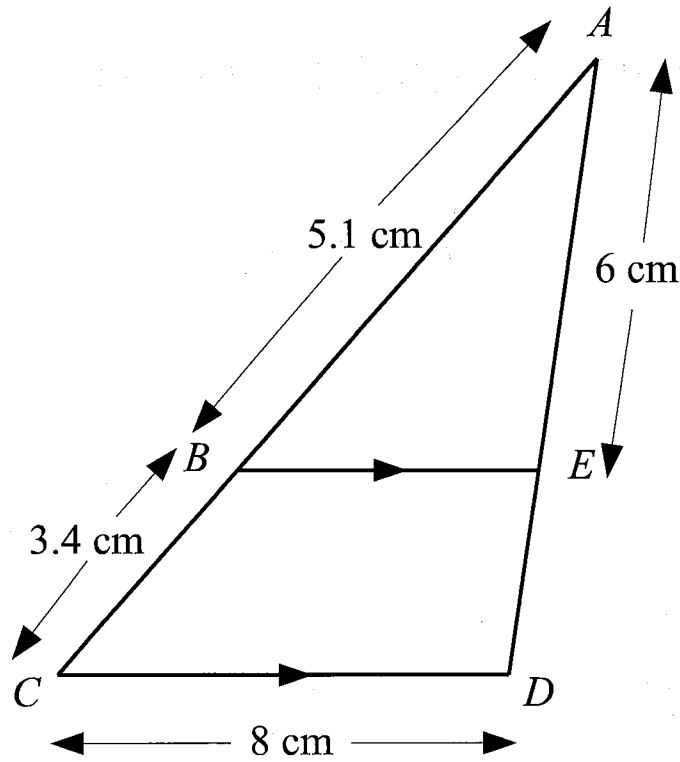
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

1 Write down the exact value of  $\cos(60^\circ)$

$$\frac{1}{2}$$

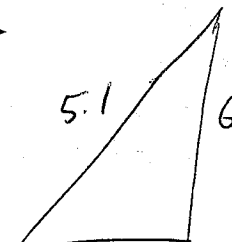
(Total for Question 1 is 1 mark)

2

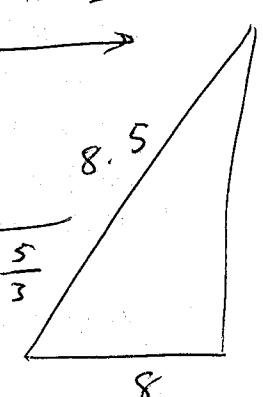


$$S.F. = \frac{8.5}{5.1} = \frac{5}{3}$$

$$\times \frac{5}{3}$$



$$\div \frac{5}{3}$$



$BE$  is parallel to  $CD$ .

$AB = 5.1$  cm,  $BC = 3.4$  cm,  $CD = 8$  cm,  $AE = 6$  cm.

(a) Calculate the length of  $ED$ .

$$AD = 6 \times \frac{5}{3} = 10 \text{ cm}$$

$$10 - 6 = 4$$

..... 4 ..... cm  
(2)

(b) Calculate the length of  $BE$ .

$$8 \div \frac{5}{3} = 4.8$$

..... 4.8 ..... cm  
(2)

(Total for Question 2 is 4 marks)

3 Andy and Bruce share some sweets in the ratio 7:3

Andy gets  $A$  sweets

Bruce gets  $B$  sweets

10 PARTS

$\times 9$

Carla and David share the same amount of sweets as Andy and Bruce.

They share their sweets in the ratio 5:4.

9 PARTS

$\times 10$

Carla gets  $C$  sweets

David gets  $D$  sweets

Find  $A:B:C:D$

$A : B$

$C : D$

$63 : 27$

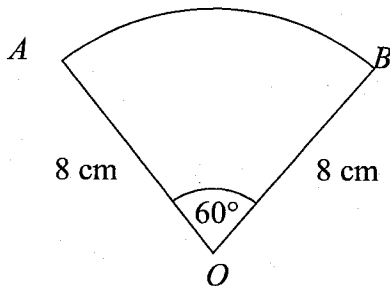
$50 : 40$

$63 : 27 : 50 : 40$

(Total for Question 3 is 3 marks)

4 AOB is a sector of a circle, centre  $O$  and radius 8 cm.

The angle of the sector is  $60^\circ$ .



Find the length of the arc  $AB$ .

Give your answer in terms of  $\pi$ .

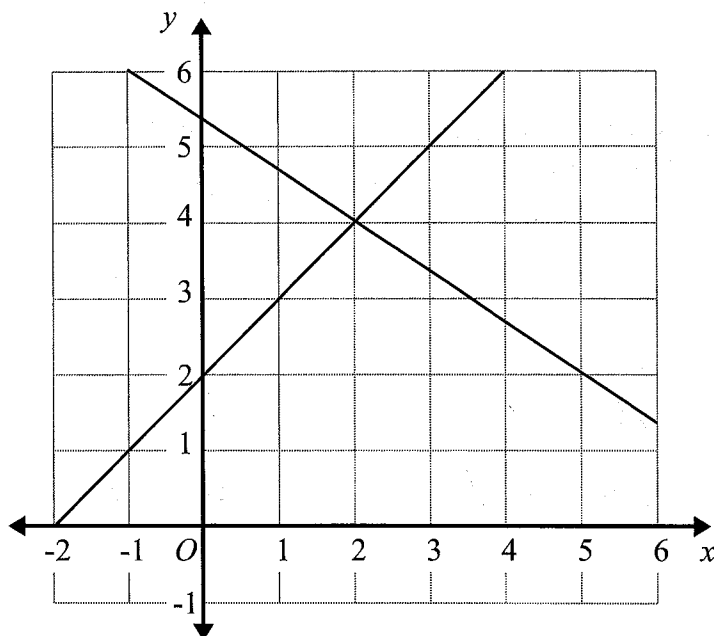
$$\frac{60}{360} \times 2\pi(8) = \frac{8}{3}\pi$$

$\frac{8}{3}\pi$

cm

(Total for Question 4 is 2 marks)

- 5 The graphs of the straight lines with equations  $y = x + 2$  and  $2x + 3y = 16$  have been drawn on the grid.



Use the graphs to solve the simultaneous equations

$$\begin{aligned} y &= x + 2 \\ 2x + 3y &= 16 \end{aligned}$$

$$x = 2 \quad y = 4$$

(Total for Question 5 is 2 marks)

- 6 Solve the simultaneous equations

$$\begin{aligned} 3x - 4y &= 24 && \times 7 \\ 7x + 2y &= 39 && \times 3 \end{aligned}$$

$$\begin{aligned} 21x - 28y &= 168 \\ \underline{21x + 6y} &= \underline{117} \end{aligned}$$

$$-34y = 51$$

$$y = -\frac{3}{2}$$

$$3x - 4\left(-\frac{3}{2}\right) = 24$$

$$3x + 6 = 24$$

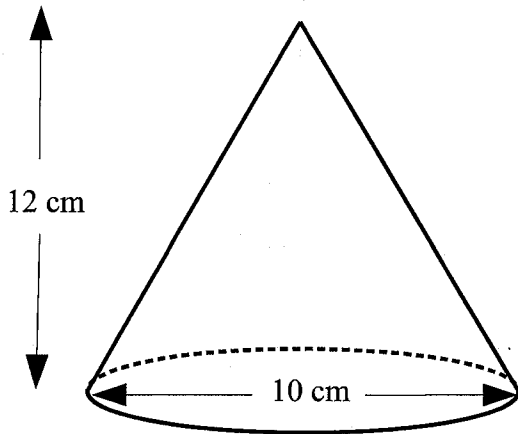
$$3x = 18$$

$$x = 6$$

$$x = 6, \quad y = -\frac{3}{2}$$

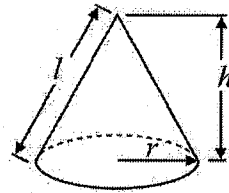
(Total for Question 6 is 3 marks)

7 The diagram shows a solid cone.



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

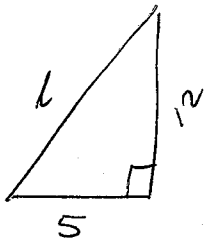
$$\text{Curved surface area of cone} = \pi r l$$



The height of the cone is 12 cm.  
The base of the cone has a diameter of 10 cm.  $r = 5$

Work out the total surface area of the cone.  
Give your answer in terms of  $\pi$ .

$$\begin{aligned} \text{Area of circle} &= \pi (5)^2 \\ &= \underline{\underline{25\pi}} \end{aligned}$$



$$\begin{aligned} 5^2 + 12^2 &= l^2 \\ 169 &= l^2 \\ l &= \sqrt{169} \\ &= 13 \end{aligned}$$

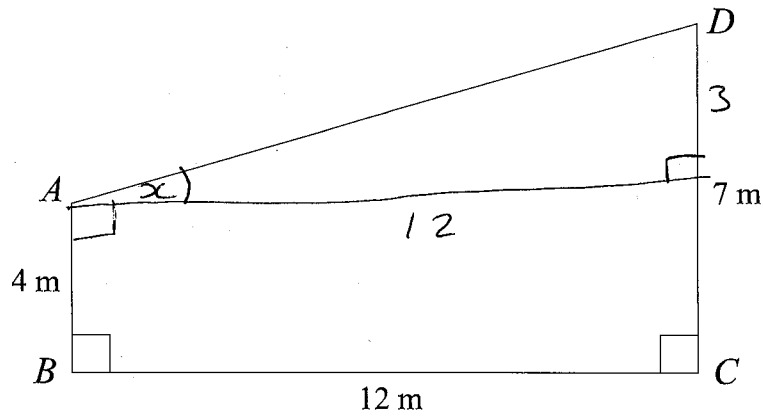
$$\begin{aligned} \text{Curved s.a} &= \pi (5)(13) \\ &= \underline{\underline{65\pi}} \end{aligned}$$

$$25\pi + 65\pi$$

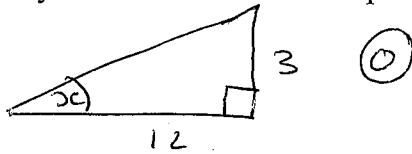
$$\underline{\underline{90\pi \text{ cm}^2}}$$

(Total for Question 7 is 5 marks)

8



Work out the size of angle  $BAD$ .  
Give your answer to 1 decimal place.



$$\tan x = \frac{3}{12}$$

$$x = \tan^{-1}\left(\frac{3}{12}\right)$$

$$= 14.0^\circ$$

$$90 + 14.0 = \underline{\underline{104.0^\circ}}$$

$$\dots\dots\dots 104.0^\circ$$

(Total for Question 8 is 3 marks)

9 It takes 3 builders 8 days to complete a job.

Work out how many days it would take 4 builders to complete the same job.

$$3 \times 8 = 24 \text{ days of work}$$

$$\frac{24}{4} = 6 \text{ days}$$

6

(Total for Question 9 is 2 marks)