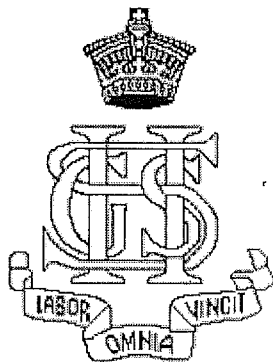


# Sydney Girls High School



## MATHEMATICS

### YEAR 8

## Yearly Examination 2006

**Time Allowed:** 75 minutes

**Total Marks:** 100

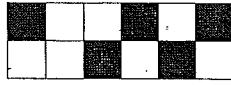
*Instructions:*

- ▶ Attempt ALL questions
- ▶ There are 5 (FIVE) questions, each worth 20 marks
- ▶ Board-approved calculators may be used in all parts of the test
- ▶ Start each question on a new page.
- ▶ Diagrams are NOT to scale.

**Question 1:**

**(20 marks)**

- a) Find the ratio of the shaded part to unshaded part in the diagram below:

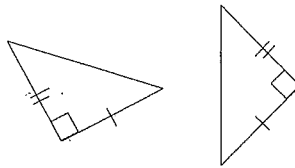


1

- b) Susan types 55 words per minute. How many words can she type in 20 minutes?

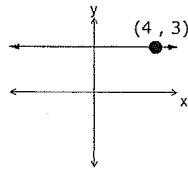
1

- c) State which congruence test would be used in proving that the triangles below are congruent:



1

- d) Write down the equation of the line below:



1

- e) For the following scores: 7, 6, 4, 6, 2 find the:

i. mode

1

ii. range

1

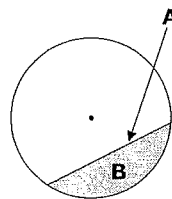
iii. median

1

- f) How many axes of symmetry are there in a rectangle?

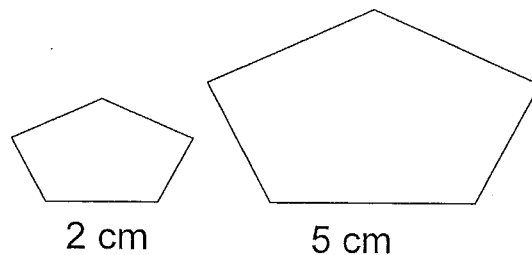
1

- g) Name the parts of the circle marked A and B:



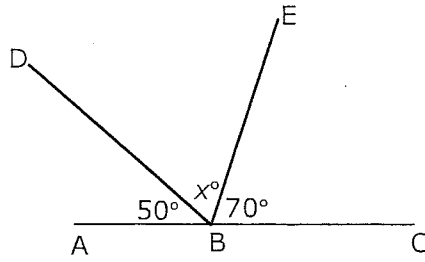
2

- h) Write down the enlargement factor:



1

i) Find  $x$  (no reasoning required):



1

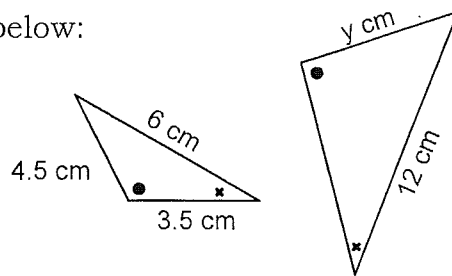
j) Expand  $3x(2x - 1)$

1

k) A model aeroplane is to be built to a scale where 1 cm represents 1.5 m. What would the real wingspan be, in metres, if the wingspan of the model is 25 cm?

1

l) Find the value of the pronumeral,  $y$ , in the pair of similar triangles below:

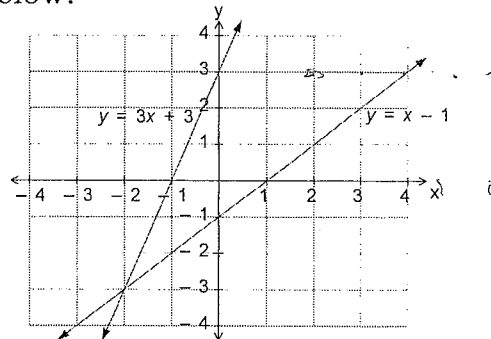


1

m) Find the supplementary angle of  $80^\circ$ ?

1

n) Give the coordinates of the point of intersection for the pair of lines below:

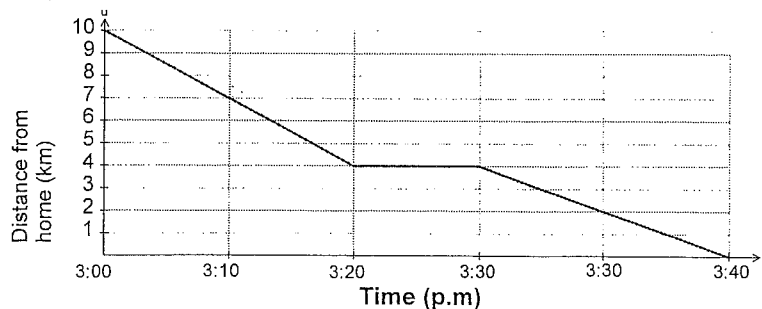


1

o) Write down the coordinates of the point 4 units to the left of  $(6, 3)$ .

1

p) Ellen cycles home from school.



i. How far has she travelled in the first ten minutes?

1

ii. How long is her rest break?

1

**Question 2:****(20 marks)**

a) At a certain motor registry, the ratio of people who pass to those who fail their driving test is 3 : 7. If 51 people passed their first driving test last month, how many people failed? **2**

b) Find the value of  $x$ :  $35 : 8 = x : 15$  **2**

c) Simplify the ratios: **2**

i. 2 cm : 6 mm

ii.  $4\frac{1}{2} : 5$  **2**

d) The ratio of chickens to geese on a farm is 3 : 4, while the ratio of geese to ducks is 2 : 5. What is the ratio of chickens to ducks? **3**

e) An athlete runs 400 m in 50 s. What is her speed in km/h? **2**

f) A car uses 12 L of petrol to travel 183 km.  
i. What is the rate of fuel consumption? (in km/L) **2**  
ii. If the tank holds 44L when full, how far would the car travel on a full tank? **1**

g) For the equation  $2x + y = 6$ :  
i. copy and complete the table of values below **2**

$x$	-1	0	1
$y$			

ii. draw the graph of  $2x + y = 6$  on a number plane. **2**

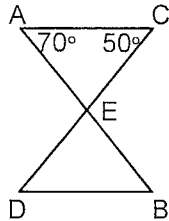
**Question 3:**

**(20 marks)**

a) Using a pair of compasses and a ruler:

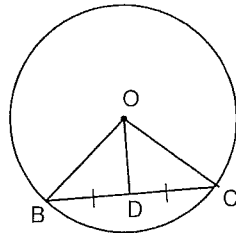
- i. construct  $\triangle ABC$ , where base  $BC = 7$  cm,  $\angle CBA = 60^\circ$  and  $BA = 8$  cm 3

b) In the diagram below,  $AB$  and  $CD$  bisect each other at  $E$ .

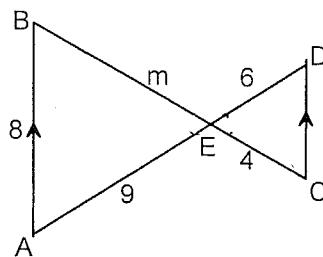


- i. Copy the diagram and include all known information about it. 1
- ii. Prove that  $\triangle AEC \equiv \triangle BED$ . 3
- iii. Hence find the size of  $\angle D$ , giving reasons. 2

c)  $O$  is the centre of the circle. Prove  $\triangle OBD$  and  $\triangle OCD$  are congruent.

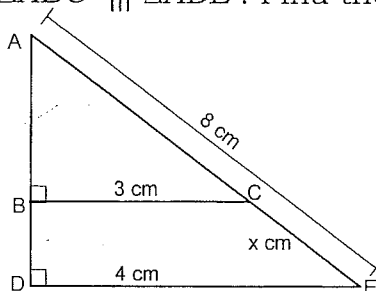


d)



- i. Prove that  $\triangle ABE$  and  $\triangle CDE$  are similar. 3
- ii. Find the value of  $m$ . 2

e) In the diagram  $\triangle ABC \parallel \triangle ADE$ . Find the value of  $x$ .

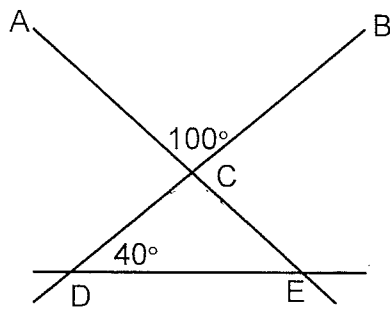


3

**Question 4:** (20 marks)

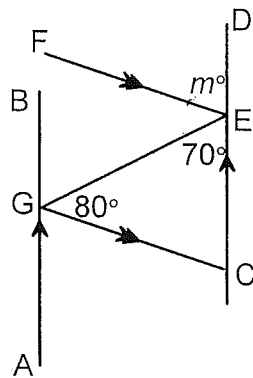
a) In the diagram below,  $\angle ACB = 100^\circ$  and  $\angle CDE = 40^\circ$ .

Prove, giving reasons that  $\triangle DCE$  is isosceles.



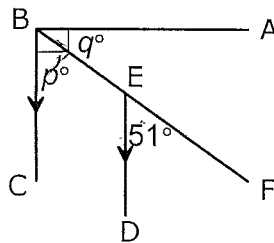
4

b) Find the value of  $m$ , giving reasons:



4

c) Find the value of  $p$  and  $q$ , giving reasons

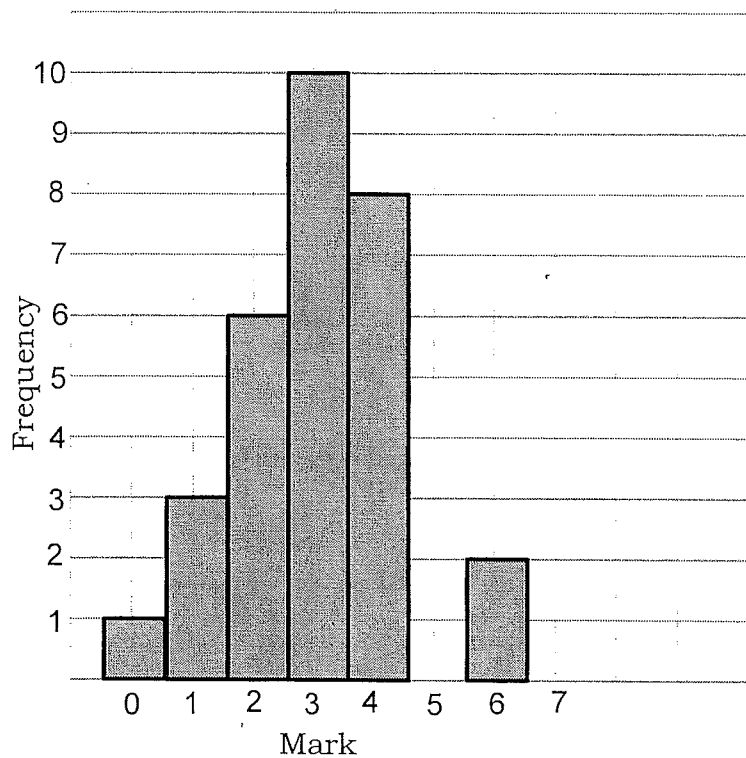


4

QUESTION 4 CONTINUES ON THE NEXT PAGE...

- d) The following graph represents the results of a short spelling test given to a Year 8 class.

### *Spelling Test Results*



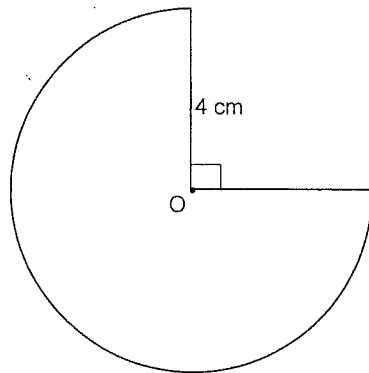
- i. What is the highest mark achieved by a student in the class? **1**
  - ii. If 6 students got only 5 questions wrong, how many students got full marks? **1**
  - iii. How many students scored 3 marks or more? **2**
- e) 100 people were surveyed and asked about their favourite TV show. Draw a sector graph for the data below (clearly label the size of each angle at the centre)

FAVOURITE TV SHOW	NO. OF PEOPLE
House	40
The OC	35
Grey's Anatomy	25

**4**

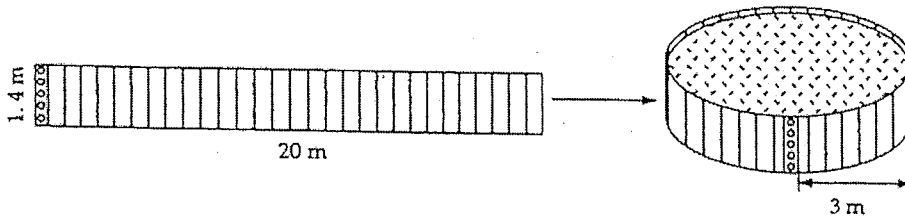
**Question 5: (20 marks)**

- a) Calculate the perimeter of the figure below, correct to 1 decimal place.



3

- b) The base of a swimming pool is a circle of radius 3 metres. The flexible metal sheet drawn below is used to form the wall of the pool.



- i. Find the volume of the pool, correct to the nearest cubic metre. 2
- ii. Before a party, the pool is filled with water. After the party, the depth has dropped to 98 centimetres. What percentage of the water is left in the pool? 2
- iii. When the circular wall was formed there was an overlap of the metal sheet. Calculate the length of overlap, correct to the nearest centimetre. 2
- c) Factorise  $4x^2 - 9y^2$ . 1
- d) Simplify  $(3a + 1)^2 - (a - 2)(a + 1)$  3

*QUESTION 5 CONTINUES ON THE NEXT PAGE...*



e) For the following scores:

$x$	$f$	$fx$
15	3	
16	4	
17	7	
18	5	
19	2	
	$\sum f =$	$\sum fx =$

- i. Copy and complete the frequency distribution table. **2**
- ii. Find the range. **1**
- iii. Find the mean, to 2 decimal places. **1**
- iv. Draw a frequency distribution histogram. **3**

*END OF TEST* ☺

# Sydney Girls High School



## MATHEMATICS

### YEAR 8

### Yearly Examination 2006

Time Allowed: 75 minutes

Total Marks: 100

**Instructions:**

- ▶ Attempt ALL questions
- ▶ There are 5 (FIVE) questions, each worth 20 marks
- ▶ Board-approved calculators may be used in all parts of the test
- ▶ Start each question on a new page.
- ▶ Diagrams are NOT to scale.

**Question 1: (20 marks)**

a) Find the ratio of the shaded part to unshaded part in the diagram below:



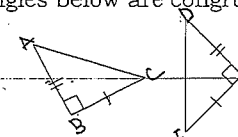
5:7 ✓

1

b) Susan types 55 words per minute. How many words can she type in 20 minutes? 1100 words ✓

1

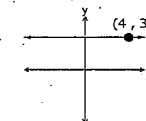
c) State which congruence test would be used in proving that the triangles below are congruent:



In  $\triangle ABC$  and  $\triangle DEF$   
 $\angle ABC = \angle DEF$  (Given)  
 $AC = DF$  (Given)  
 $BC = EF$  (Given)  
 $\therefore \triangle ABC \cong \triangle DEF$  (RHS)

1

d) Write down the equation of the line below:



$y = 3$  ✓

1

e) For the following scores: 7, 6, 4, 6, 2 find the:

- i. mode 6 ✓
- ii. range 5 ✓
- iii. median 6 ✓

1

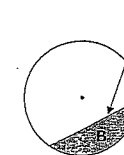
1

1

f) How many axes of symmetry are there in a rectangle? 2 ✓

1

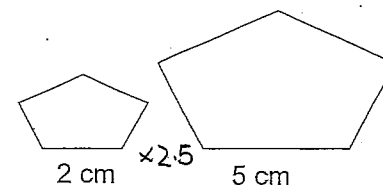
g) Name the parts of the circle marked A and B:



A minor segment ✓

2

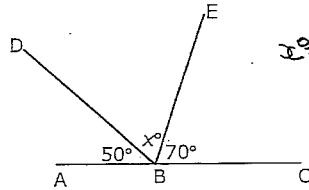
h) Write down the enlargement factor:



Has been enlarged 2.5 more times.

1

i) Find  $x$  (no reasoning required):



$$\begin{aligned} 2 \times 50^\circ + 70^\circ &= 180 \\ x + 120 &= 180 \\ \therefore x &= 60 \end{aligned}$$

1

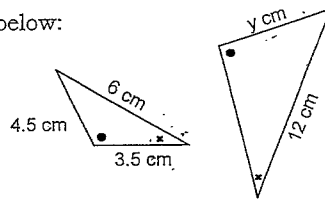
j) Expand  $3x(2x-1)$   $6x^2 - 3x$  ✓

1

k) A model aeroplane is to be built to a scale where 1 cm represents 1.5 m. What would the real wingspan be, in metres, if the wingspan of the model is 25 cm?  $37.5\text{m}$

1

l) Find the value of the pronumeral,  $y$ , in the pair of similar triangles below:



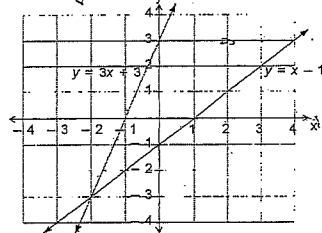
$$\begin{aligned} \frac{y}{4.5} &= \frac{12}{3.5} \\ 4.5y &= 54 \\ y &= 12 \end{aligned}$$

1

m) Find the supplementary angle of  $80^\circ$ ?  $180^\circ - 80^\circ = 100^\circ$  ✓

1

n) Give the coordinates of the point of intersection for the pair of lines below:  $(-2, -3)$  ✓

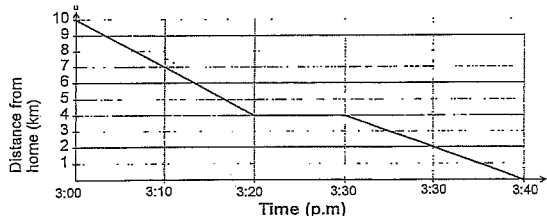


1

o) Write down the coordinates of the point 4 units to the left of  $(6, 3)$ .  $(2, 3)$  ✓

1

p) Ellen cycles home from school.



i. How far has she travelled in the first ten minutes?  $3\text{km}$  ✓

1

ii. How long is her rest break?  $10\text{min}$  ✓

1

**Question 2:** (20 marks)

a) At a certain motor registry, the ratio of people who pass to those who fail their driving test is 3 : 7. If 51 people passed their first driving test last month, how many people failed?  $119$  people failed ✓

2

b) Find the value of  $x$ :  $35 : 8 = x : 15$   
 $\frac{35}{8} = \frac{x}{15}$   
 $8x = 525$   
 $x = 65.625$  ✓

2

c) Simplify the ratios:

i.  $2\text{ cm} : 6\text{ mm}$   $\frac{20\text{mm}}{6\text{mm}} = \frac{10}{3}$  ✓

2

ii.  $4\frac{9}{2} : 5$   $9 : 10$  ✓

2

d) The ratio of chickens to geese on a farm is 3 : 4, while the ratio of geese to ducks is 2 : 5. What is the ratio of chickens to ducks?  $3 : 4 : 10$  ✓

3

e) An athlete runs 400 m in 50 s. What is her speed in km/h?  $28.8\text{ km/h}$  ✓

2

f) A car uses 12 L of petrol to travel 183 km.

i. What is the rate of fuel consumption? (in km/L)  $15.25\text{ km/L}$  ✓

2

ii. If the tank holds 44L when full, how far would the car travel on a full tank?  $671\text{ km}$  ✓

1

g) For the equation  $2x + y = 6$

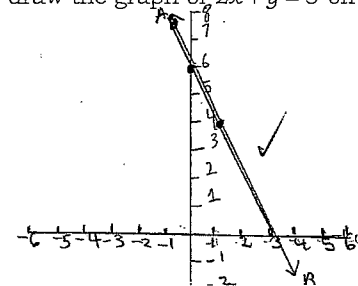
i. copy and complete the table of values below

2

$x$	-1	0	1
$y$	8	6	4

ii. draw the graph of  $2x + y = 6$  on a number plane.

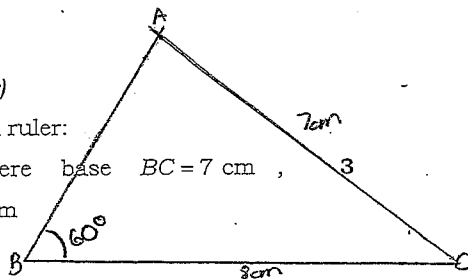
2



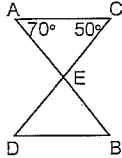
**Question 3: (20 marks)**

a) Using a pair of compasses and a ruler:

i. Construct  $\triangle ABC$ , where base  $BC = 7$  cm,  $\angle CBA = 60^\circ$  and  $BA = 8$  cm.



b) In the diagram below,  $AB$  and  $CD$  bisect each other at  $E$ .



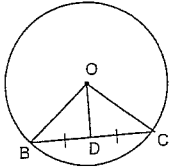
i. Copy the diagram and include all known information about it. 1

ii. Prove that  $\triangle AEC \cong \triangle BED$ . 3

iii. Hence find the size of  $\angle D$ , giving reasons. 2

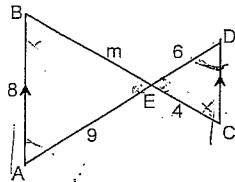
*Handwritten notes:*  
 ii) In  $\triangle AEC$  and  $\triangle BED$   
 $AE = BE$  (Given)  $\rightarrow \angle AEC = \angle BED$  (Vert. Opp.  $\angle$ s)  
 $\angle CAE = \angle DBE$  (Given)  $\rightarrow$   
 $\therefore \triangle AEC \cong \triangle BED$  (SAS)  
 $\angle CAE = \angle DBE = 50^\circ$  (Corresponding angles of a triangle)  
 $\angle DBE = \angle CAE$  (Marking  $\angle$ s congruent)

c)  $O$  is the centre of the circle. Prove  $\triangle OBD$  and  $\triangle OCD$  are congruent.



*Handwritten notes:*  
 In  $\triangle OBD$  and  $\triangle OCD$   
 $BD = CD$  (Given)  
 $OB = OC$  (Radii)  
 $OD = OD$  (Common)  
 $\therefore \triangle OBD \cong \triangle OCD$  (SSS)

d)

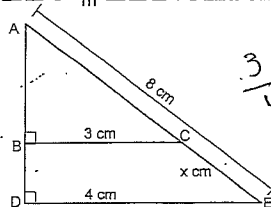


*Handwritten notes:*  
 $\frac{9}{6} = \frac{m}{4}$   
 $6m = 36$   
 $m = 6$

*Not done!* i. Prove that  $\triangle ABE$  and  $\triangle CDE$  are similar. 3

ii. Find the value of  $m$ . 2

e) In the diagram  $\triangle ABC \parallel \triangle ADE$ . Find the value of  $x$ .



*Handwritten notes:*  
 $\frac{3}{4} = \frac{x}{8}$   
 $4x = 24$   
 $x = 6$

$\frac{8-x}{8} = \frac{3}{4}$

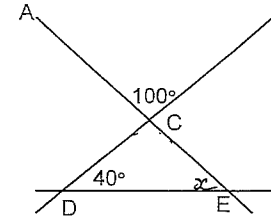
*Try again!*

3

**Question 4: (20 marks)**

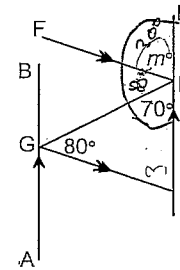
a) In the diagram below,  $\angle ACB = 100^\circ$  and  $\angle CDE = 40^\circ$ .

Prove, giving reasons that  $\triangle DCE$  is isosceles.



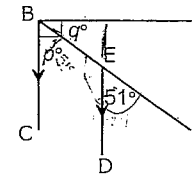
*Handwritten notes:*  
 $\angle ACD = 100^\circ$  ( $\because$  vert. opp.)  
 $100^\circ + 40^\circ + x = 180^\circ$  ( $\because$  angle sum of tri.)  
 $140^\circ + x = 180^\circ$   
 $x = 40^\circ$   
 $\therefore \triangle DCE$  is isosceles as proven above both of the base angles are equal.

b) Find the value of  $m$ , giving reasons:



*Handwritten notes:*  
 $\angle BEG = 80^\circ$  ( $\because$  Alternate to  $\angle GEC$ )  
 $80^\circ + 70^\circ + m = 180^\circ$  ( $\because$  straight line)  
 $150^\circ + m = 180^\circ$   
 $m = 30^\circ$

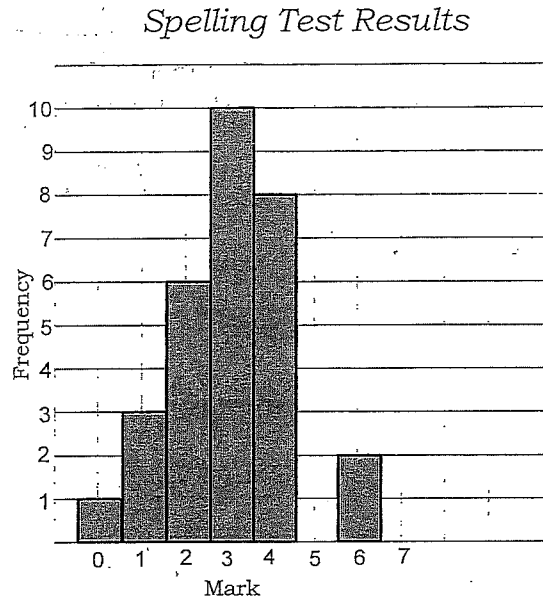
c) Find the value of  $p$  and  $q$ , giving reasons



*Handwritten notes:*  
 $p = 51^\circ$  ( $\because$  corresponding to  $\angle DEF$ )  
 $51^\circ + 10^\circ = 90^\circ$  ( $\because$  right angle)  
 $q = 39^\circ$

QUESTION 4 CONTINUES ON THE NEXT PAGE...

d) The following graph represents the results of a short spelling test given to a Year 8 class.



- i. What is the highest mark achieved by a student in the class? **6** ✓ 1
- ii. If 6 students got only 5 questions wrong, how many students got full marks? **0** ✓ 1
- iii. How many students scored 3 marks or more? **20** ✓ 2

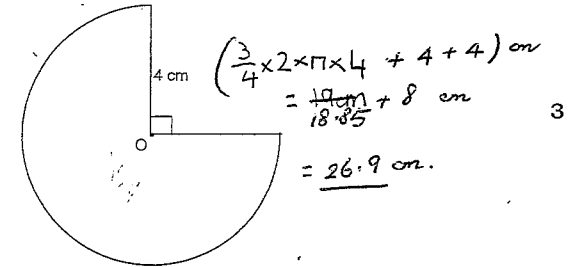
e) 100 people were surveyed and asked about their favourite TV show. Draw a sector graph for the data below (clearly label the size of each angle at the centre)

FAVOURITE TV SHOW	NO. OF PEOPLE	
House	40	total = 100 ✓ 40% = 144° ✓
The OC	35	35% = 126° ✓
Grey's Anatomy	25	25% = 90° ✓

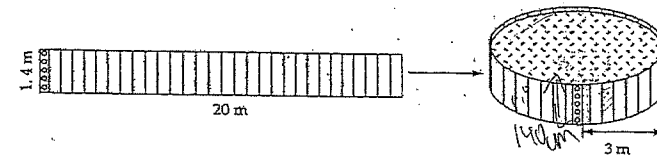
The sector graph is below the space where it says "End of case"

**Question 5: (20 marks)**

a) Calculate the perimeter of the figure below, correct to 1 decimal place.



b) The base of a swimming pool is a circle of radius 3 metres. The flexible metal sheet drawn below is used to form the wall of the pool.



- i. Find the volume of the pool, correct to the nearest cubic metre.  $39.6 \text{ m}^3 = 40 \text{ m}^3$  (to nearest cu. m) 2
- ii. Before a party, the pool is filled with water. After the party, the depth has dropped to 98 centimetres. What percentage of the water is left in the pool? **70%** ✓ 2
- iii. When the circular wall was formed there was an overlap of the metal sheet. Calculate the length of overlap, correct to the nearest centimetre. **115 cm** (to nearest cm) 2

- c) Factorise  $4x^2 - 9y^2$ .  $(2x)^2 - (3y)^2 = (2x+3y)(2x-3y)$  1
- d) Simplify  $(3a+1)^2 - (a-2)(a+1)$ .  $9a^2 + 6a + 1 - (a^2 - a - 2) = 8a^2 + 7a + 3$  3

QUESTION 5 CONTINUES ON THE NEXT PAGE...

$$(3a+1)(3a+1) - (a(a+1) - 2(a+1))$$

$$= 9a^2 + 6a + 1 - (a^2 + a - 2a - 2)$$

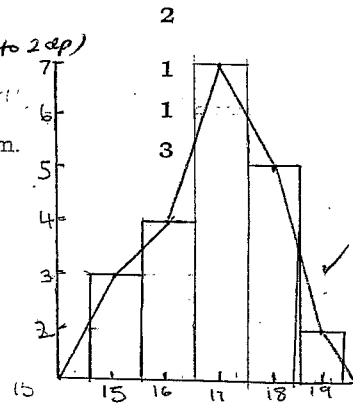
$$= 9a^2 + 6a + 1 - a^2 - a + 2a + 2$$

$$= 8a^2 + 7a + 3$$

e) For the following scores:

$x$	$f$	$fx$
15	3	45 ✓
16	4	64 ✓
17	7	119 ✓
18	5	90 ✓
19	2	38 ✓
$\Sigma f = 21$ ✓		$\Sigma fx = 356$ ✓

- Copy and complete the frequency distribution table.
- Find the range. 4 ✓      16.95 (to 2 dp)
- Find the mean, to 2 decimal places. 16.95 ✓
- Draw a frequency distribution histogram.



END OF TEST ©

