



### Year 10 5.3 Term One Examination

Time allowed 55 minutes

Name: .....

Teacher: (Please Circle)

10 5.3.1 (Ms Kellahan)

10 5.3.2 (Ms Wilson/Mrs Young)

10 5.3.3 (Mr Cheng)

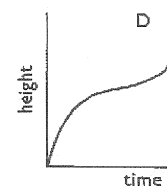
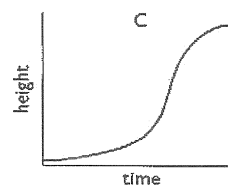
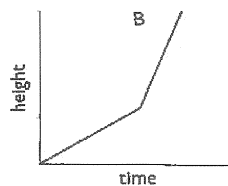
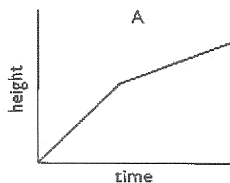
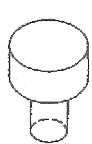
10 5.3.4 (Mrs Lego)

- Marks may be deducted for careless or badly arranged work
- Only calculators approved by the Board of Studies may be used
- All answers are to be completed in blue or black pen except graphs and diagrams
- No lending or borrowing

	Non-linear relationships	Surface Area & Volume	Data	Total
	/21	/17	10	/48
Extension	/2	/2	1	/5
	/23	/19	11	/53

### Graphs and Non-linear Relationships (23 marks)

1



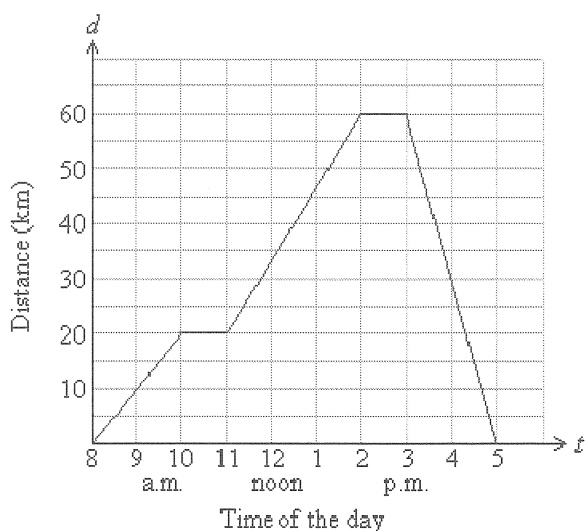
1

A funnel was closed at the base with a stopper, then filled with water at a constant rate.  
Which graph best shows the change in depth against time?

Answer \_\_\_\_\_

2

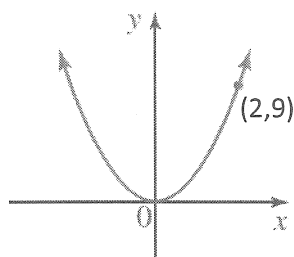
The following graph gives the distance of a cyclist from his home.



- a What was the total distance travelled by the cyclist? 1
- b For how long did the cyclist stop? 1
- c Between what hours was the cyclist travelling the fastest? 1
- d What was the speed travelled by the cyclist between 11am and 2pm? 1

3. The curve below is a parabola with equation of the form  $y = ax^2$ , where  $a$  is a constant. Find the value of  $a$  if the point  $(2,9)$  lies on the parabola. Hence determine its equation.

2



4. Match each of these equations with one of the graphs below.

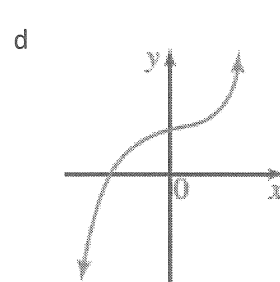
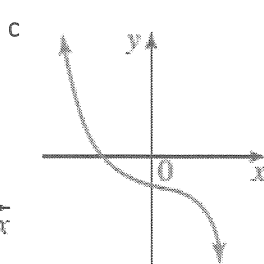
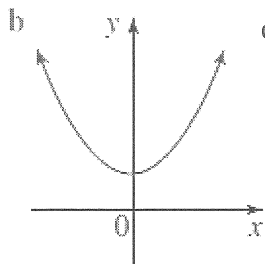
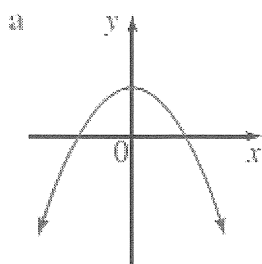
2

$$y = x^2 + 3$$

$$y = -x^3 - 2$$

$$y = 3 - x^2$$

$$y = x^3 + 2$$



5. a Complete the table of values and graph the parabola,  $y = x^2 + 5x + 6$   
Number and label your axes. Label your graph.

2

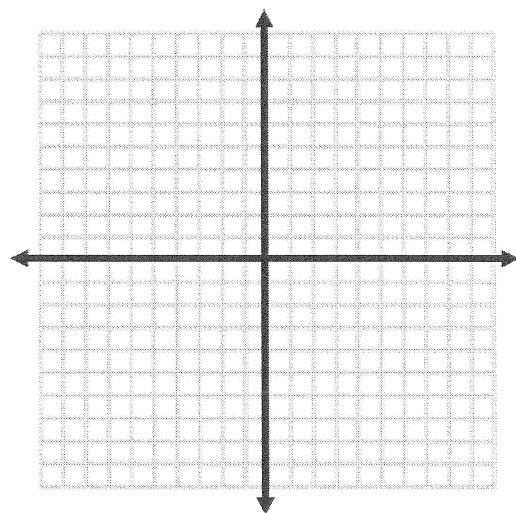
x	-5	-4	-3	-2.5	-2	-1	0
y							

b What are the x intercepts?

c What is the y intercept?

d What is the axis of symmetry?

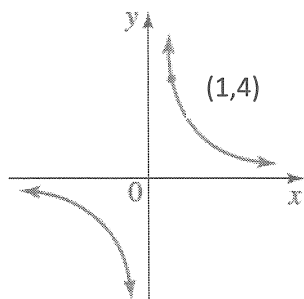
e What is the vertex?



4

6. Find the equation of the hyperbola and the equations of the asymptotes.

2



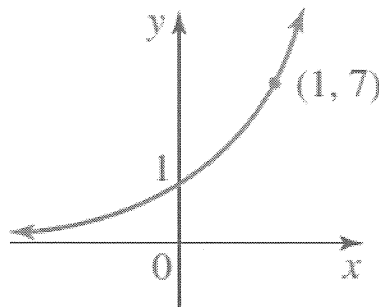
7. Select one description from the list to explain how each of these curves differs from  $y = x^4$  (concave down, moved to the left, moved to the right)

a.  $y = -x^4$  \_\_\_\_\_

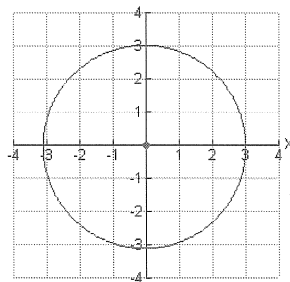
2

b.  $(x - 1)^4$  \_\_\_\_\_

8. This is the graph of  $y = 7^x$ . On the same number plane sketch  $y = 7^{-x}$ . 1



9. State the equation of the circle. 1

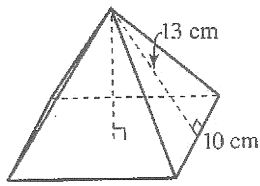


- \*10. Find the centre and the radius of the circle given in the equation: 2

$$x^2 + y^2 - 4x + 10y + 14 = 0$$

## Surface area and volume (19 marks)

1.

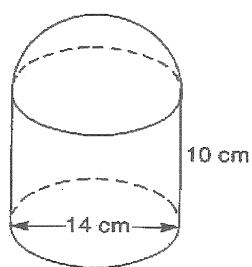


This is a square based pyramid.

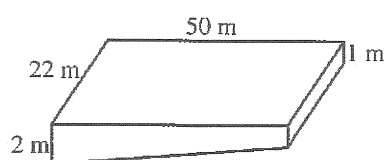
- a Find the perpendicular height of the pyramid. 1
- b Find the volume of the pyramid. 1
- c Using a ruler draw a net of this solid. 1
- d Find the surface area of the pyramid 2

2. Find the surface area correct to 2 decimal places.

3



3. Below is a diagram of an Olympic swimming pool.



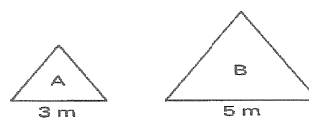
- a Find the volume of the pool in cubic metres.

2

- b Find the capacity of the pool in litres.

1

5. Two similar sails for yachts have bases 3m and 5m as shown.



a. Find the ratio of their areas.

1

b. Hence, find the area of the smaller sail, if the larger sail has an area of  $15\text{m}^2$ .

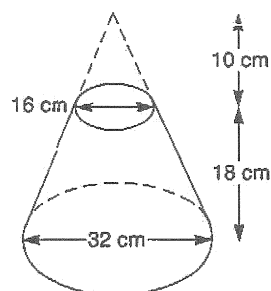
2

6. The surface areas of two spheres are in the ratio 1:8. Find the ratio of their volumes.

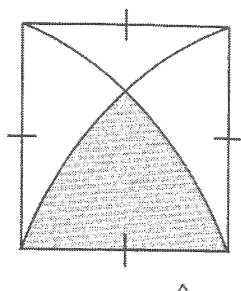
1

7. The shape of a lampshade is a truncated cone called a frustrum. Calculate the volume enclosed by the shade, correct to one decimal place.

2



\*8



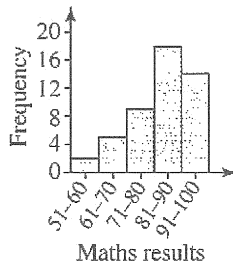
What fraction of the square does the shaded region represent?

2

## Investigating Data (11 marks)

- 1 The distribution on the left shows the results of a Maths Exam at a certain school. 1

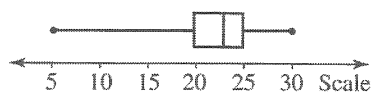
The data are:



- a positively skewed
- b bimodal
- c negatively skewed
- d symmetrical

Answer \_\_\_\_\_

- 2 Consider the box and whisker plot shown:



- a What is the range? 1

- b What is the interquartile range? 1

- 3 Which measure is always one of the scores in a set of data? Circle the answer. 1

mean                  median                  mode

- 4 Consider the results of 2 students in five tests

Sophie 75,80,70,72,78

William 50,95,90,80,55

- a Find the mean and standard deviation for each student: 4

Sophie

William

mean =

mean =

standard deviation =

standard deviation =

- b Which results are more consistent? Justify your answer. 2

- 5 Consider the scores 5,8,11,15. Give an example of a score that could be added that would increase the mean but lower the standard deviation. 1

-END OF TEST-