Carlingford High School

Mathematics

Year 10 5.3 Term 2 Examination

2019

Time allowed: 50 minutes

Name: SOLUTIONS **Class: 10MAT3__**

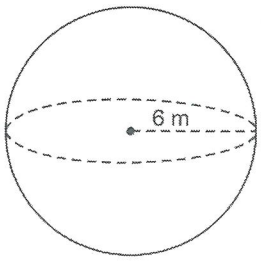
Please circle your teacher:	~~**Mrs Blakeley**~~ Virmani	**Mrs Wilson/ Mrs Young**	**Ms Bennett/ Mrs Lobejko**
	Q 1-5	6-11	12-14

Instructions:

- Use blue or black pen
- Pencil may be used for graphs or diagrams only
- Board approved calculators may be used
- No lending or borrowing
- Show all necessary working out in the space provided
- Marks may be deducted for untidy setting out

Topic	**Surface area & volume**	**Data**	**Total**	
Mark	**/25**	**/25**	**/50**	**%**

1. Calculate the **exact** surface area of the following hemisphere. **2**



$SA = 4\pi r^2$

$= 4 \times \pi \times 6^2$

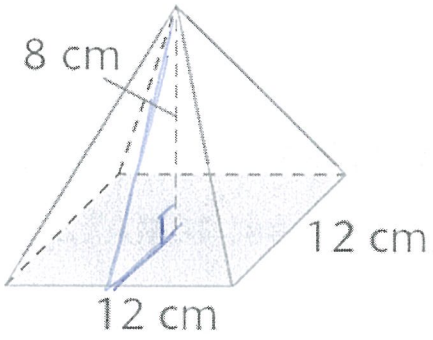
$= 144\pi \text{ u}^2$

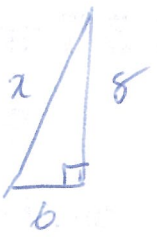
(*) Accept hemisphere answer.

$(72\pi \text{ u}^2) + \pi \times 6^2$

$= 108\pi$

2. Find the surface area of the following square pyramid, with a perpendicular height of 8cm. Give your answer to 1d.p. **3**





$x = \sqrt{8^2 + 6^2}$

$= 10$

$SA = 4 \times \frac{1}{2} \times 12 \times 10$

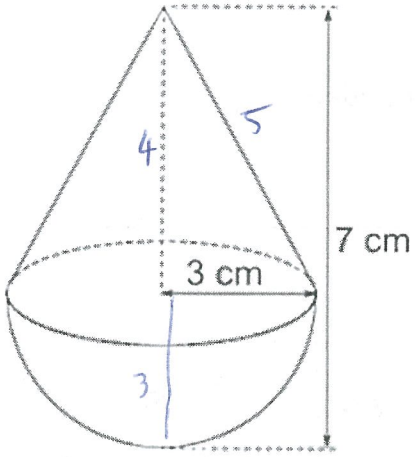
$+ 12 \times 12$

$= 240 + 144$

$= 384.0 \text{ cm}^2$

(Don't deduct marks for 384 cm²)

3. Calculate the surface area of the following composite shape, correct to 2 decimal places. **3**



$SA = \pi \times r \times l + \frac{1}{2} \times 4\pi r^2$

$= \pi \times 3 \times 5 + \frac{1}{2} \times 4 \times \pi \times 3^2$

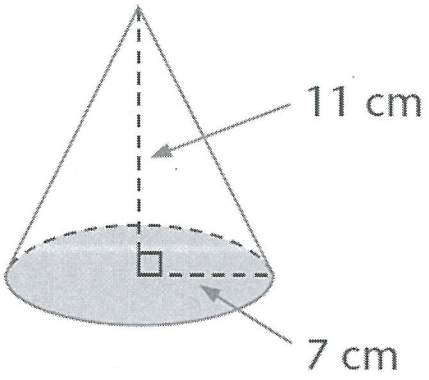
$= 15\pi + 18\pi$

$= 33\pi$

$= 103.67 \text{ cm}^2 \text{ (2dp)}$

4. Calculate the volume of the following solids, correct to the nearest cm^3.

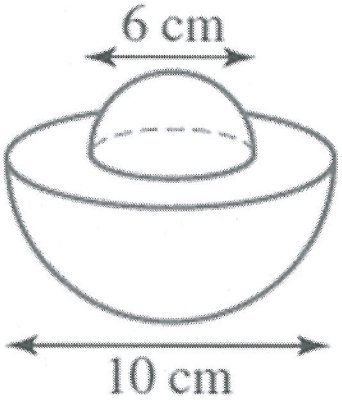
a) **2**



$V = \frac{1}{3} \times \pi \times 7^2 \times 11$

$= 564 \cdot cm^3$ (Nearest cm^3)

b) **3**



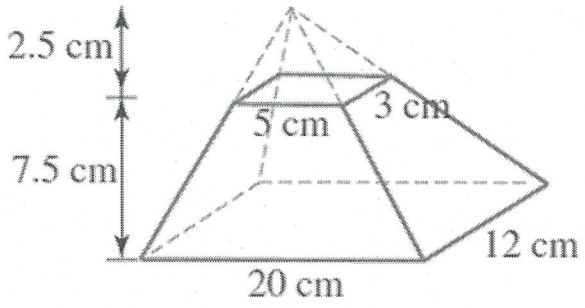
$V = \frac{1}{2} \times \frac{4}{3} \times \pi \times 3^3$

$+ \frac{1}{2} \times \frac{4}{3} \times \pi \times 5^3$

$= \frac{2}{3} \pi (3^3 + 5^3)$

$= 318 \, cm^3$ (Nearest cm^3)

5. A rectangular pyramid has its top removed as shown. Find the volume of the remaining solid, correct to 1d.p. **3**

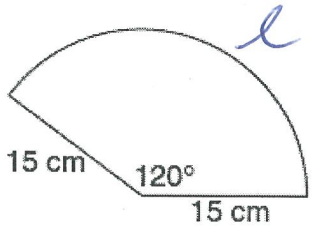


$V = \frac{1}{3} \times 20 \times 12 \times 10 -$

$\frac{1}{3} \times 5 \times 3 \times 2.5$

$= 787.5 \, cm^3$

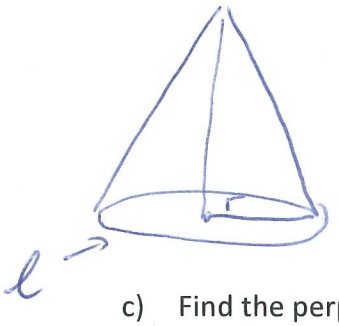
6. A cone is to be formed by joining the radii of the sector shown. In the cone that is formed.



a) Find the slant height **1**

15 cm

b) Show that the radius of the cone is 5cm **2**

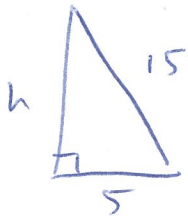


$l = \frac{120}{360} \times \pi \times 30 = 10\pi$

and $10\pi = 2 \times \pi \times r$

$r = \frac{10\pi}{2\pi} = 5$ cm

c) Find the perpendicular height **2**



$h = \sqrt{15^2 - 5^2}$

$= 14.1$ cm (1 dp)

or $\sqrt{200}$

or $10\sqrt{2}$ cm

7. Two similar pyramids have surface areas of 81cm^2 and 100cm^2. Find the ratio of their:

a) matching side lengths **1**

81 : 100 SA

9 : 10 sides

b) Volumes **1**

$9^3 : 10^3$

729 : 1000

8. The matching sides of two similar kites are in the ratio 10: 16. Find the area of the smaller kite if the larger kite has an area of 14.4m^2. **2**

Sm. larg

Side ratio. 10:16

larger $A = 14.4$

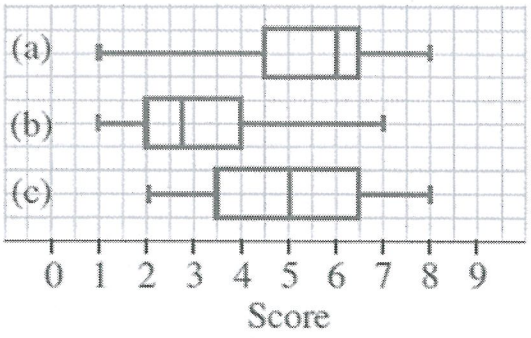
side $= \sqrt{14.4}$

$\frac{10}{16} \times \sqrt{14.4} : \sqrt{14.4}$

$2.37 : \sqrt{14.4}$

So Area of smaller $= 2.37^2 = 5.625\text{ u}^2$

9. Describe the shape of the distribution represented by each of these box-and-whisker plots. **3**



a) Negative skew

b) Positive skew

c) Symmetrical.

10. Gerard scored 66 on a Maths test in which the class mean was 78. His mark was 2 standard deviations below the mean. What was the standard deviation? **1**

$\frac{78-66}{2} = 6$

$\sigma x = 6$

11. Given the following data:

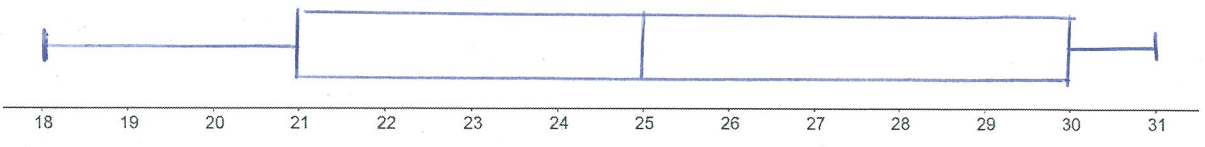
18 20 | 22 23 (25) 29 30 | 30 31

21 30

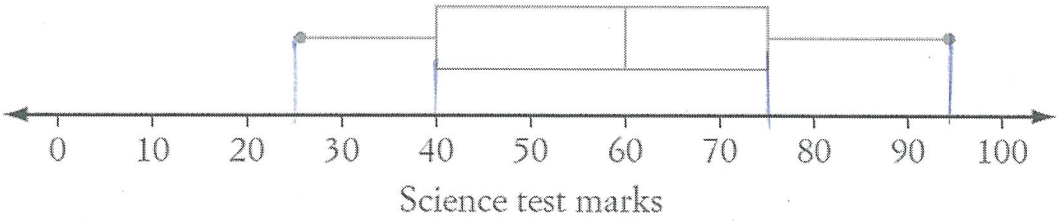
a) Find the five-number summary **2**

18 21 25 30 31

b) Construct a box and whisker plot **2**



12. The boxplot represent the results of 80 students in a Science test.



a) Find the range of the test results **1**

(*) allow 1-2 marks variation

94 - 25 = 69

b) Find the median test score **1**

60

c) What is the interquartile range? **1**

74 - 40 = 34

or 75 - 40 = 35

d) How many students has a test mark between: **2**

i) 25 and 75?

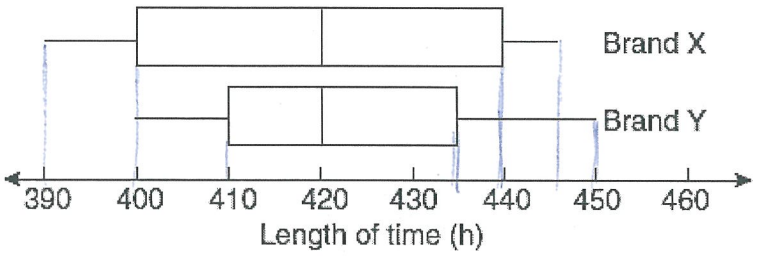
75 % of 80 = 60 students

ii) 40 and 60? 25 % of 80 = 20 students

e) What percentage of students scored more than 75? **1**

25 %

13. A researcher tested two different brands of batteries to see how long they lasted. Her results are shown in the parallel box-and-whisker plot below. **3**



① judgement
② Refers to measures of spread
③ uses actual values

Use the box-and-whisker plot to compare the performance of Brand X and Brand Y.

while both brands had a median of 420 Brand Y was more consistent with a smaller IQR of 25 rather than brand X's IQR of 40. while Brand X's range of 55 was only slightly higher than Y's 50, Brand Y had a positive skew, meaning overall better results

14. Stuart and Greg play 9 holes of golf. Their scores are listed in the table below.

Hole	1	2	3	4	5	6	7	8	9	Total
Stuart	4	7	5	2	4	7	3	6	7	45
Greg	3	5	4	2	3	7	3	5	14	46

2 3 3 3 4 5 5 7 14

a) Complete the following table: 6 **4**

	Stuart	Greg
Mean	5	5.1
Standard deviation	1.76	3.4
Range	7 5	12
Interquartile range	3.5	6 - 3 = 3

b) Which golfer was more consistent? Explain with reference to the calculations in part a. **2**

Stuart - lower standard deviation of 1.76 vs Greg's 3.4

c) i) Greg scored 14 on the 9th hole. What statistical term might be given to this score? **2**

outlier

ii) Which measure of spread was not affected by the score of 14?

median.

End of Exam - Please check your work.