Sydney Technical High School

Name: .....

Maths Class: .....

Year 10
Mathematics
Assessment 3
September, 2017

Time allowed: 70 minutes

General Instructions:

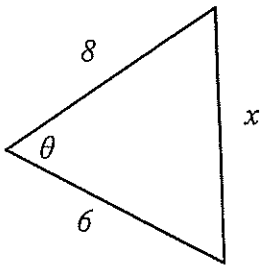
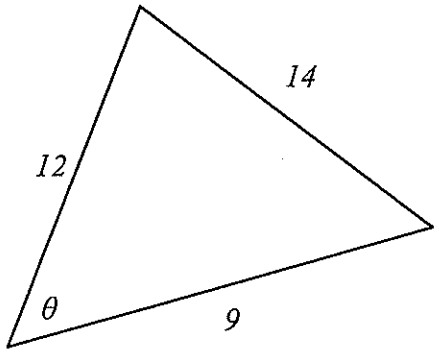
- Marks for each question are indicated on the question.
- Approved calculators may be used
- All necessary working should be shown
- Full marks may not be awarded for careless work or illegible writing
- Write using black or blue pen
- Write your answers in the space provided

MULTIPLE CHOICE	**/5**
Question 1	**/13**
Question 2	**/12**
Question 3	**/12**
Question 4	**/11**
Question 5	**/12**
TOTAL	**/65**

SECTION A

MULTIPLE CHOICE (5 Marks)

Choose the answer corresponding to the correct solution and fill in the appropriate circle on your multiple choice answer sheet attached at the rear of this question paper.
DO NOT DETACH THIS SHEET

1	Which of these lines is perpendicular to the line $2y + x - 5 = 0$ A. $2y + x = 0$ B. $2y + x + 5 = 0$ C. $x - 2y + 5 = 0$ D. $2x - y + 5 = 0$
2	A set of scores has a mean of 84 and a standard deviation of 10.5. A score of 54 is added. A. The Mean and the Standard Deviation will both go up B. The Mean and the Standard Deviation will both go down C. The Mean will go up and the Standard Deviation will go down D. The Mean will go down and the Standard Deviation will go up.
3	  The value of x in the triangle at left is: A. 5 B. 7 C. $\frac{28}{3}$ D. 21
4.	The point M (3, -2) is the midpoint of the line AB. If A is (6, - 8) and B is (p, q), then A. p = 0 and q = 4 B. p = 0 and q = -14 C. p = 9 and q = 4 D. p = 9 and q = -14
5	3 solid balls of identical radius, r, are packed tightly into a cylindrical tin, so that there is no room between the balls or the sides or top of the tin. The volume of the balls compared to the volume of the cylinder is: A. 1:3 B. 1:2 C. 2:3 D. 3:4

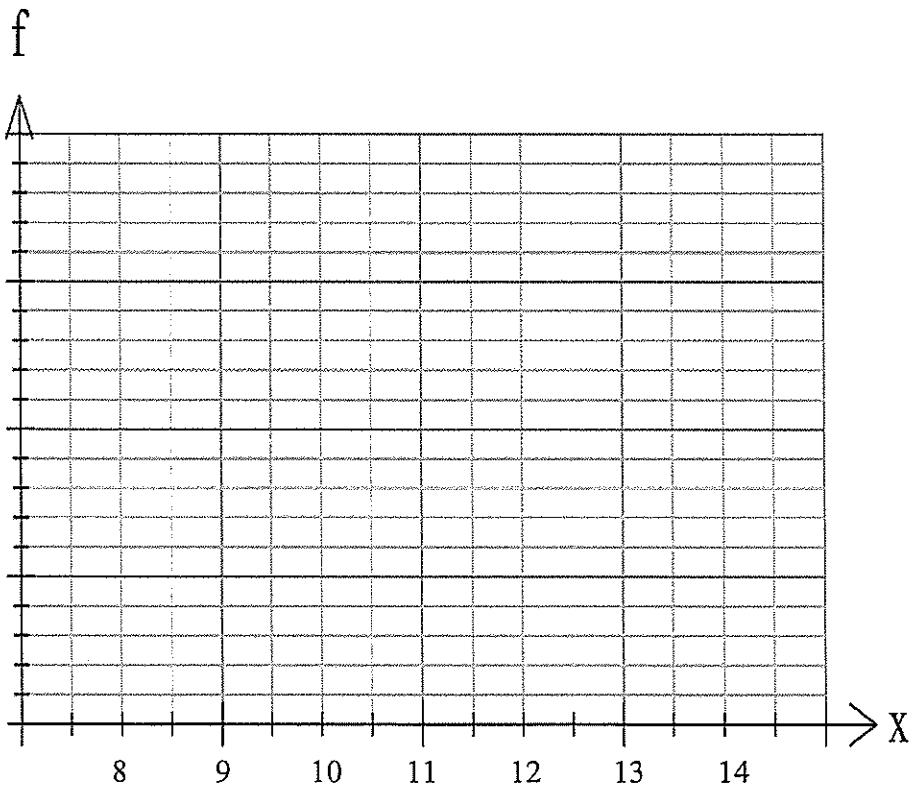
SECTION B

QUESTION 1: (13 Marks)

(a) The frequency distribution for a set of scores recorded in a certain archery competition is shown below:

Score (x)	*Frequency (f)*
8	3
9	7
10	15
11	12
12	1
13	2

Draw both the cumulative frequency histogram below AND draw the ogive on it. **2**



(i) Indicate on your diagram, the MEDIAN score. **1**

(ii) What is the probability an archer scored over 11? **1**

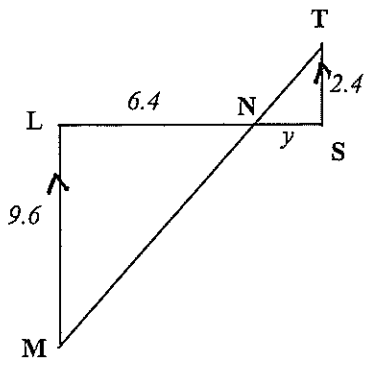
(d) The figures shown below are similar solids.

The area of the front of the tyre at left is $54cm^2$ while the front area of the tyre on the right is $96cm^2$

(i) What is the ratio of the radius of the tyre on the left compared to the tyre on the right? **2**

(ii) What is the volume of the larger tyre if the volume of the smaller tyre is $270\ cm^3$ **1**

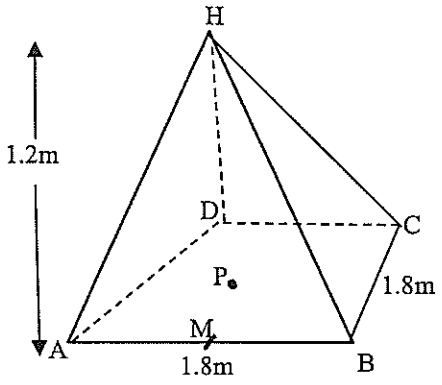
(e) In the diagram given, TS ∥ LM. Find the value of y. **1**

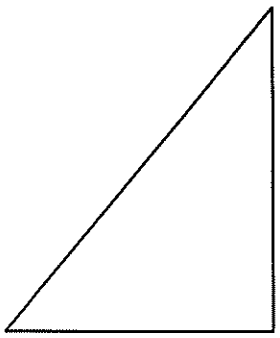


(b) An ornamental solid concrete right pyramid is to be built in a local park.
It has a square base of length 1.8 m and is 1.2 m high.

The entire ornament <u>except the base</u> is to be painted.

(i) What is the surface area to be painted? (Use the letters and the extra triangle provided. P is the centre of the base and M is the centre of one side of the base.) **3**





(ii) If the paint used covers at the rate of 1 L for 0.5 square metres, and paint comes in 4 L cans, how many cans will be necessary to paint the ornament? **2**

(b) The following stem and leaf plot lists the scores for Steve Smith, the Australian Cricket Captain, on his last tour of India, but does not include centuries

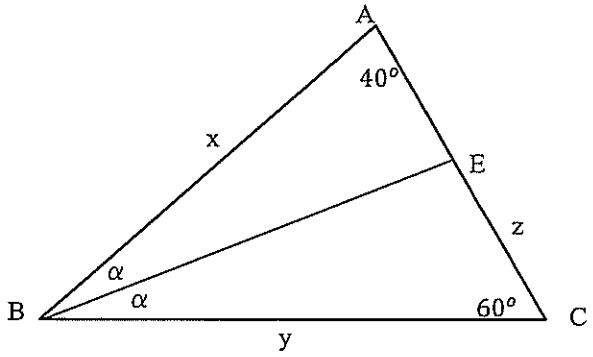
Stem	Leaf
4	2 4
5	1 1 3 5
6	2 4 5 5 6 7 7
7	1 3 9
8	0
9	3

Using the information provided above, find:

	ANSWER	
(i) The median score for the batsman		**1**
(ii) The range of scores		**1**
(iii) The Lower Quartile		**1**
(iv) The Upper Quartile		**1**
(v) The Interquartile range		**1**

(c) For the diagram below, $\angle BAC = 40^o$, $\angle ACB = 60^o$
EB bisects ABC

AB = x, BC = y and EC = z.



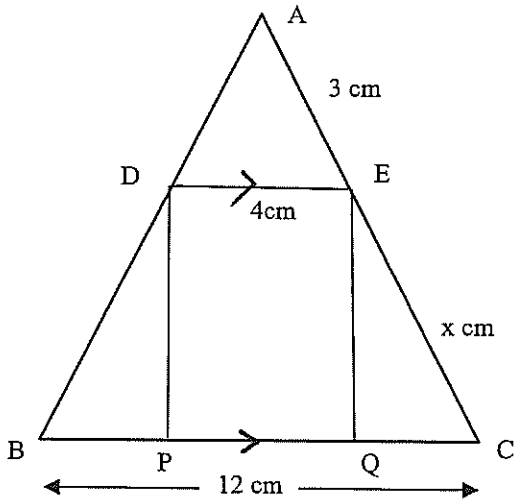
(i) Find the size of $\angle EBC$, giving all reasons **2**

(ii) You are given that ΔABC ||| ΔBEC **(DO NOT PROVE THIS!)** **2**

Prove that BE = $\frac{xy}{z}$

(b)

NOT TO SCALE



In the isosceles triangle ABC above, AB = AC and DE ∥ BC
AE = 3 cm, EC = x cm, DE = 4 cm and BC = 12 cm

(i) Prove that ΔADE ||| ΔABC **3**

(ii) Find the value of x **2**

(iii) Find the area of the rectangle DPQE **2**

DO NOT DETACH THIS SHEET

Sydney Technical High School

MULTIPLE CHOICE ANSWER SHEET

YEAR 10 MATHEMATICS
Term 3 2017

Completely fill the response oval representing the most correct answer.
Do not remove this sheet from the answer booklet.

1. A ○ B ○ C ○ D ○
2. A ○ B ○ C ○ D ○
3. A ○ B ○ C ○ D ○
4. A ○ B ○ C ○ D ○
5. A ○ B ○ C ○ D ○

Sydney Technical High School

Name: Solutions

Maths Class: .....

Year 10

Mathematics

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YEAR 10 MATHEMATICS
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Completely fill the response oval representing the most correct answer.
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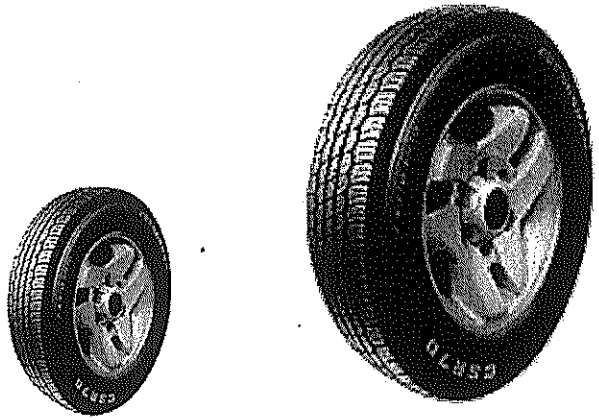
1. A ○ B ○ C ○ D ●
2. A ○ B ○ C ○ D ●
3. A ○ B ○ C ● D ○
4. A ● B ○ C ○ D ○
5. A ○ B ○ C ● D ○

(d) The figures shown below are similar solids.



The area of the front of the tyre at left is $54cm^2$ while the front area of the tyre on the right is $96cm^2$

(i) What is the ratio of the radius of the tyre on the left compared to the tyre on the right? 2

$a^2 : b^2 = 54 : 96$ ← (1)

$= 9 : 16$

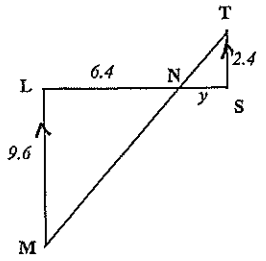
$\therefore a : b = 3 : 4$ ← (1)

(ii) What is the volume of the larger tyre if the volume of the smaller tyre is $270\ cm^3$

$V_1 : V_2 = 27 : 64$ (1)

$= 640\ cm^3$

(e) In the diagram given, TS ∥ LM. Find the value of y. 1



$\frac{y}{2.4} = \frac{6.4}{9.6}$

$y = 2.4 \times \frac{2}{3}$

$= 1.6$ 1 MARK

QUESTION 2: (12 Marks)

(a) Complete the following frequency table and find the mode and the mean of the distribution 4

Score (x)	*Frequency* (f)	fx
12.6	1	12.6
12.8	5	64.0
13.0	7	91.0
13.2	3	39.6
13.4	4	53.6
	$\Sigma f = 20$	$\Sigma fx = 260.8$

2 MARKS

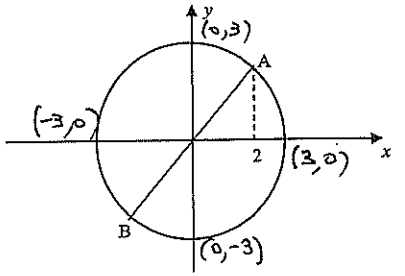
MODE = 13

MEAN = $\frac{260.8}{20}$

$= 13.04$

} 1 each

(b) (i) The curve $x^2 + y^2 = 9$ is shown below. Label the points where it cuts the coordinate axes. 1



1 for all points (accept just 3, 3, -3, -3)

(ii) AB is a diameter of this circle. A has an x-co-ordinate of 2. Find its y-coordinate. 1

$2^2 + y^2 = 9$

$\therefore y = \sqrt{5}$ 1 mark.

accept $(2, \sqrt{5})$ Do not accept $\pm\sqrt{5}$

(iii) Find the co-ordinates of B. 1

$(-2, -\sqrt{5})$ 1 MARK

(b) The following stem and leaf plot lists the scores for Steve Smith, the Australian Cricket Captain, on his last tour of India, but does not include centuries

Stem	Leaf
4	2 4
5	1 1 3 5
6	2 4 5 5 6 7 7
7	1 3 9
8	0
9	3

Using the information provided above, find:

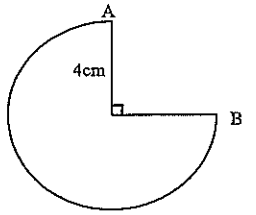
	ANSWER	
(i) The median score for the batsman	65	1
(ii) The range of scores	51	1
(iii) The Lower Quartile	53	1
(iv) The Upper Quartile	71	1
(v) The Interquartile range	18	1

Do not accept 42–93

accept any errors from parts (iii) and (iv)

QUESTION 4: (11 Marks)

(a) The following shape is cut out of a circular piece of sheet metal, of radius 4 cm. It has the shape of a circle with a quadrant removed.



(i) What is the perimeter of the shape? (Give your answer in terms of π) 2

$P = 8 + \frac{3}{4} \times 2\pi(4)$

$= 8 + 6\pi$ ← (1)

(1) →

(ii) The shape is bent and points A and B joined together to form a cone. 2
What is the radius of the cone?

(1)

$C = 6\pi$ from above $\Big| \therefore 6\pi = 2\pi R$

$\therefore R = 3$ (1)

(iii) What is the surface area of the new cone if it has no base? 1
(Give your answer in terms of π)

$SA = \pi R l$

$= \pi(3)(4)$

$= 12\pi \text{ cm}^2$

} (1) MARK must use R from previous part

(b) The statistical results for tests given to all year 10 in Maths and Science were recorded as follows: 2

	Mean	Standard Deviation
Mathematics	65	12.5
Science	80	6.3

Tony received marks of 80 for Maths and 83 for Science.
In which paper did he do better, compared to the rest of the year?
You MUST justify your answer

MATHS (1) MARK for anything reasonable as an argument