Name: ..... Teacher: .....

SYDNEY TECHNICAL HIGH SCHOOL

Year 9

Mathematics

Yearly

Part 1

September, 2015

Time allowed: 70 minutes

General Instructions:

- Write using blue or black pen
- Approved calculators may be used
- Use pencil to draw or complete graphs and diagrams

Section 1 Multiple Choice
Questions 1-30
30 Marks

Section II Short Answer

25 Marks

Section I	Section II	TOTAL
30	25	55

SECTION 1

Attempt ALL questions.

Mark your answers on the *separate* Answer Sheet provided.

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1 Factorise $2x^2 + 6x$.

(A) $2x(x+3)$ (B) $2x(x+4)$ (C) $2x(x+6)$ (D) $2x(2x+3)$

---

2 The number 147·658 correct to two significant figures is

(A) 15 (B) 150 (C) 147·65 (D) 147·66

---

3 An integer is selected at random from the integers 3 to 10 inclusive.

The probability that the integer is divisible by 2 and 3 is

(A) $\frac{1}{8}$ (B) $\frac{3}{16}$ (C) $\frac{3}{4}$ (D) $\frac{7}{8}$

---

4 $\frac{2}{3a^2} =$

(A) $\frac{2a^{-2}}{3}$ (B) $\frac{2a^{-\frac{1}{2}}}{3}$ (C) $6a^{-2}$ (D) $6a^{-\frac{1}{2}}$

---

5 $\sqrt{50} + \sqrt{75} =$

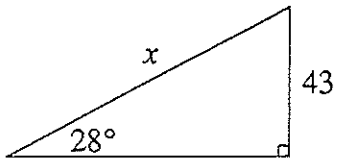
(A) $5\sqrt{5}$ (B) $10\sqrt{5}$ (C) $25\sqrt{2} + 25\sqrt{3}$ (D) $5\sqrt{2} + 5\sqrt{3}$

---

6 Simplify $5 - 2(x+1)$.

(A) $3 - 2x$ (B) $4 - 2x$ (C) $3 + 3x$ (D) $7 - 2x$

7



The value of x is given by

(A) $43 \times \cos 28°$ (B) $43 \times \sin 28°$ (C) $\frac{43}{\cos 28°}$ (D) $\frac{43}{\sin 28°}$

8 Calculate $\frac{\sqrt{3}-1}{2\sqrt{2}}$ correct to two decimal places.

(A) 0·26 (B) 0·52 (C) 1·02 (D) 1·38

---

9 The number of matchsticks counted in 15 randomly selected cartons was recorded in a stem-and-leaf plot shown below.

15	1	1	1	2		
16	0	0	3	3	3	3
17	2	3	5			
18	0	1				

What is the cumulative frequency of 163?

(A) 4
(B) 6
(C) 7
(D) 10

---

10 If $5^k\left(5^2\right)^3 = 1$, then $k =$

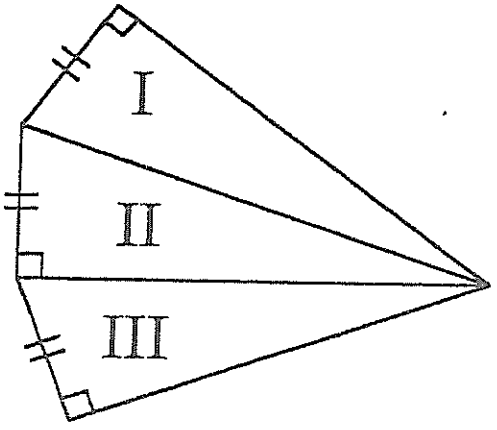
(A) -6 (B) -5 (C) $\frac{1}{6}$ (D) $\frac{1}{5}$

---

11 If a standard cubic die is rolled 60 times, it is most likely that the number '4' would be shown

(A) 4 times (B) 6 times (C) 10 times (D) 24 times.

12



Which triangles are congruent?

(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

13 The volume of a sphere is given by $V = \frac{4}{3}\pi r^3$.

If $V = 100 \text{ cm}^3$, find r to the nearest millimetre.

(A) 29 mm (B) 35 mm (C) 62 mm (D) 75 mm

---

14 $9x^2 - 4y^2 =$

(A) $(3x-2y)^2$ (B) $(9x-4y)^2$

(C) $(3x-2y)(3x+2y)$ (D) $(9x-4y)(9x+4y)$

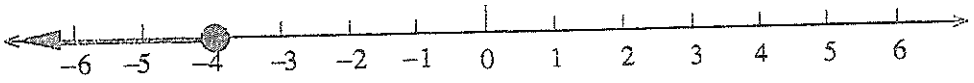
---

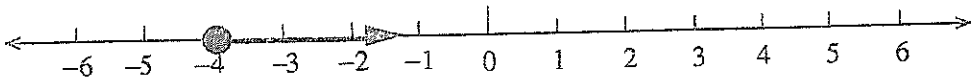
15 A coin is tossed three times. What is the probability that the side showing on the last toss is the same as that showing on the first toss?

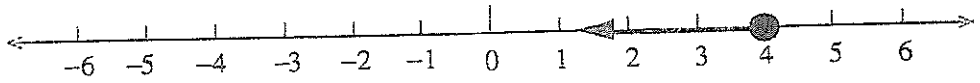
(A) $\frac{1}{8}$ (B) $\frac{1}{4}$ (C) $\frac{3}{8}$ (D) $\frac{1}{2}$

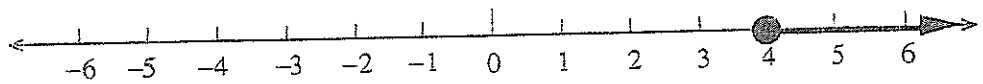
---

16 The solution to $5 - x \leq 9$ is represented on the number line as:

(A) 

(B) 

(C) 

(D) 

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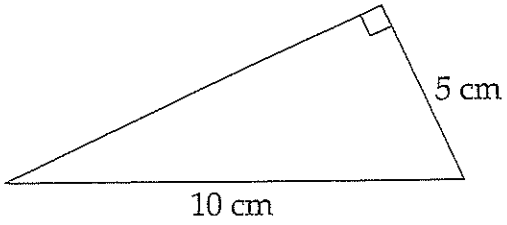
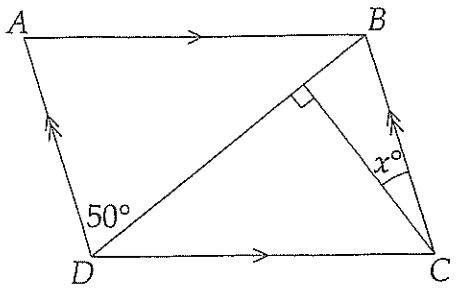
17 

NOT TO SCALE

What is the perimeter of this triangle, to the nearest centimetre?

(A) 20 (B) 24 (C) 25 (D) 26

18 *ABCD* is a parallelogram.



NOT TO SCALE

What is the value of x?

(A) 30 (B) 40 (C) 50 (D) 60

19

One error has been made in solving the equation below.

Which line is incorrect?

	$6(m + 2) - 2(m - 3)$	=	23
(A)	$6m + 12 - 2m + 6$	=	23
(B)	$4m + 18$	=	23
(C)	$4m$	=	5
(D)	m	=	$\frac{4}{5}$

---

20 Make n the subject of $nc = n + 50$.

(A) $n = 50 - c$ (B) $n = 50 - c + 1$ (C) $n = \frac{c + 50}{c}$ (D) $n = \frac{50}{c - 1}$

---

21 Which of the following correctly expresses r as the subject of $d = \frac{3r}{5} + w$?

(A) $r = \frac{5d - 5w}{3}$ (C) $r = \frac{5d - w}{3}$

(B) $r = 15d - 15w$ (D) $r = \frac{5d}{3} - w$

---

22 A spelling test was given to a group of Year Six students and to a group of Year Nine students. The 30 Year Six students had an average score of 13, and the 60 Year Nine students had an average score of 19.

What was the average score of the combined groups?

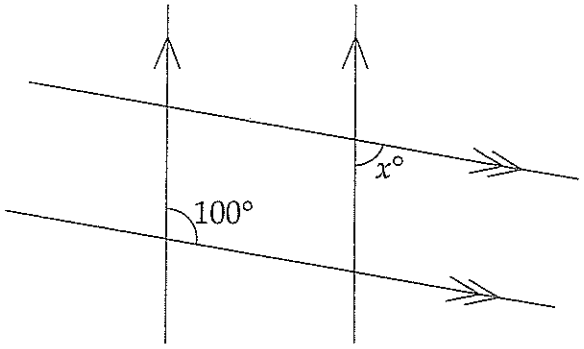
(A) 16 (B) 17 (C) 32 (D) 45

23 If $\frac{x+1}{3} + \frac{x-7}{4} = 2$, then

(A) $3(x+1)+4(x-7)=2$
(B) $4(x+1)+3(x-7)=2$
(C) $3(x+1)+4(x-7)=24$
(D) $4(x+1)+3(x-7)=24$

---

24 Sharyn was asked to find the value of x.

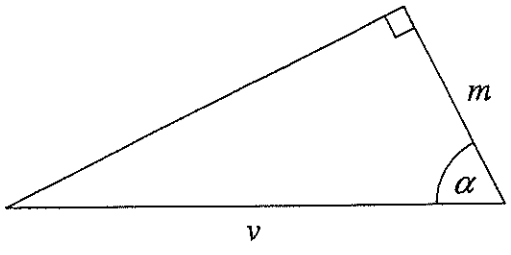


In two steps, she correctly found the value of x.

Which types of angles could Sharyn have used?

(A) Corresponding and co-interior angles
(B) Vertically opposite and co-interior angles
(C) Alternate and corresponding angles
(D) Corresponding and vertically opposite angles

25



Which statement is correct?

(A) $m = v\sin\alpha$
(B) $v = m\sin\alpha$
(C) $m = v\cos\alpha$
(D) $v = m\cos\alpha$

---

26 The statement "4 more than half a number n is 3 less than twice the number n" may be represented by

A. $\frac{n}{2} + 4 = 2n - 3$
C. $4 - \frac{n}{2} = 2n - 3$
B. $\frac{n}{2} + 4 = 3 - 2n$
D. $4 - \frac{n}{2} = 3 - 2n$

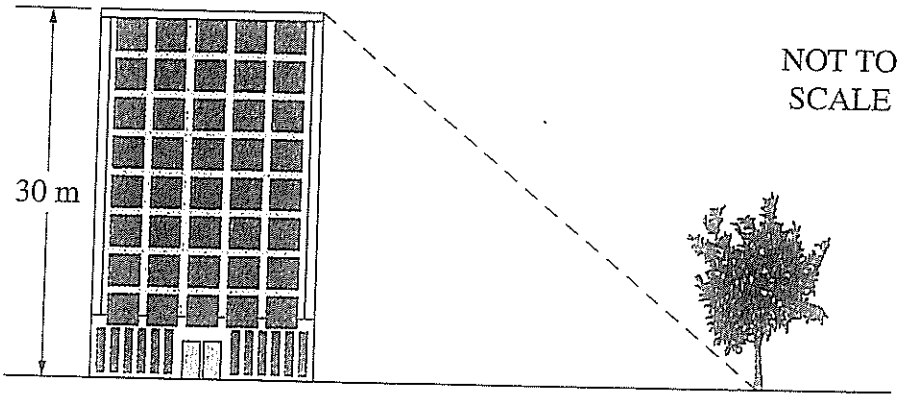
27 My pocket contains a 5 cent coin, a 20 cent coin and a $2 coin. If I take out two coins together at random, the probability of the total value of the coins being $2.05 is

(A) ½ x ⅓ (B) ⅓ x ⅓ (C) ⅓ x ⅓ x 2 (D) ½ x ⅓ x 2

---

28 The angle of depression of the base of the tree from the top of the building is 65°. The height of the building is 30 m.

How far away is the base of the tree from the building, correct to one decimal place?



(A) 12.7 m

(B) 14.0 m

(C) 33.1 m

(D) 64.3 m

---

29 In which quadrilaterals do the diagonals always intersect at right angles?

(A) Kite, square, rhombus

(B) Kite, square, rectangle

(C) Rhombus, parallelogram, trapezium

(D) Square, parallelogram, trapezium

---

30 In two years time, Karishma's age will be three times Emily's age.

Emily is now t years old.

How old is Karishma now?

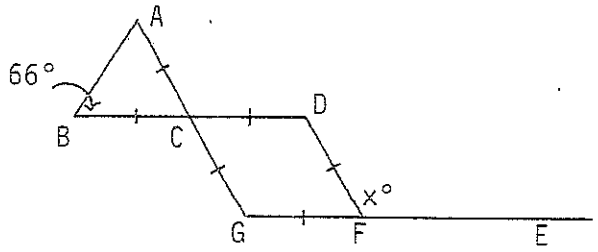
(A) $3t$ (B) $3t + 2$ (C) $3t + 4$ (D) $3t + 6$

YEAR 9 YEARLY EXAMINATION 2015 Name : _____

MATHEMATICS

SECTION II : SHORT ANSWER (25 MARKS)

Instructions:
Answer Questions 1 – 25 in the spaces provided.

QUESTION	ANSWER
1. Evaluate $x^4 - x^3$ when $x = -2$	
2. Simplify $\frac{10ab}{3} \div \frac{2a}{b}$	
3.  ACG, BCD and GFE are straight lines. AC = BC = CG = CD = DF = GF. Angle ABC = 66° Find the value of x.	
4. Solve $x = \frac{x}{4} + 2$	
5 Simplify $(7.2 \times 10^{-5}) \div (9.6 \times 10^{-2})$, expressing your answer in scientific notation.	

6 If $(x + 2)(x + k) = x^2 + nx + 8$, find the values of k and n.

k = ...

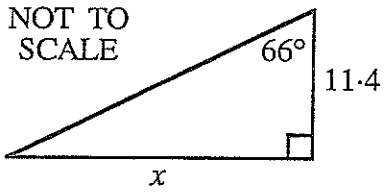
n = ...

7 If $S = \frac{a}{1 - r}$, find r when $S = 40$ and $a = 50$.

8

Find the size of each interior angle of a regular hexagon

9 Find the value of x correct to 1 decimal place.

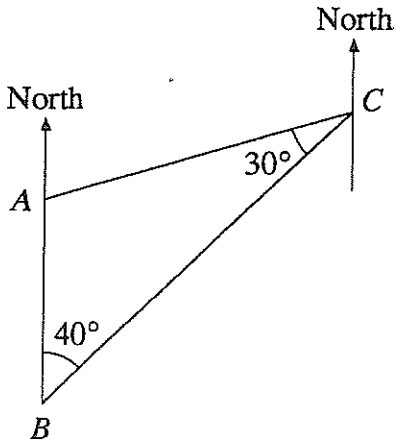


10 Find x if $4\sqrt{2} = \sqrt{x}$

11 Solve $a + 18 = 4a - 57$

12 Expand and simplify $(3x - 4)(2x - 1)$.

13



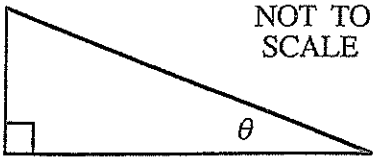
NOT TO SCALE

Find the bearing of A from C.

14 $x + y = 8$ and $x^2 - y^2 = 36$.

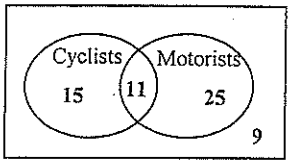
Find the value of $x - y$.

15 If $\sin\theta = \frac{3}{5}$ find the value of $\tan\theta$.



16

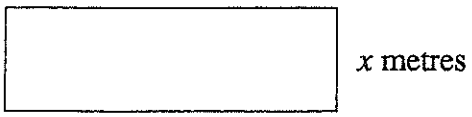
This Venn diagram illustrates the transport choices in a small community.



If a person were selected at random, what is the probability that

the person does not drive a car?

17

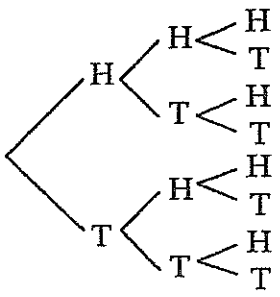


The perimeter of the rectangle is 60 metres.

Find x.

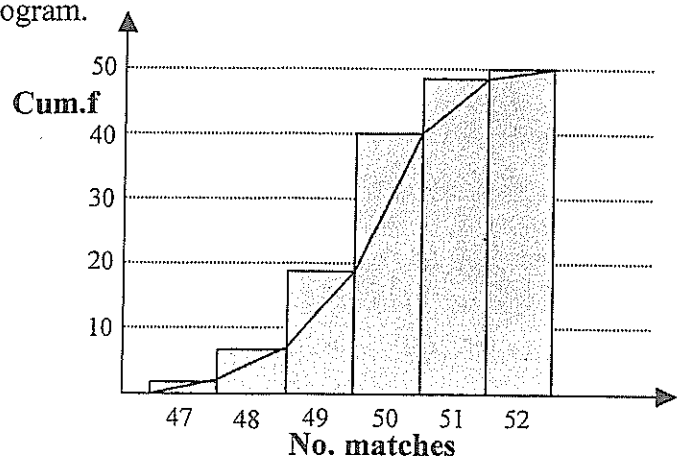
18 Factorize $xy + 3y - xt - 3t$ completely.

19 James tosses a coin 3 times. The possible results are shown below:



What is the probability of James tossing exactly one head?

A random sample of matchboxes was taken and the number of matches recorded in each box. The results are illustrated on this cumulative frequency histogram.



21. Calculate the median number of matches in the sample.

22. Find the mode

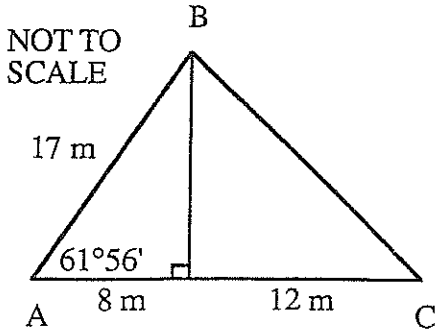
22. A barrel contains 15 marbles which are coloured red, white or blue.

If you draw one marble at random, then

- you are most likely to draw a red.
- you are twice as likely to draw a white than a blue.

How many white balls could be in the barrel ?

23.



Find the area of triangle ABC.

Use the following information to answer Questions 24 and 25

24

Twenty people were surveyed to find the time they waited for surgery at the local hospital.

The results are shown in the table.

Waiting time (months)	*Number of people*
1	1
2	5
3	7
4	4
5	3

Find the *mean* waiting time.

25

One person was chosen at random from the survey.

What is the probability that this person waited at least 4 months for surgery?

SYDNEY TECHNICAL HIGH SCHOOL

MULTIPLE CHOICE ANSWER SHEET

Name : .....

Teacher: .....

Course: ***Year 9 Mathematics – Yearly 2015***

Circle the letter that best answers the question

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
6.	A	B	C	D
7.	A	B	C	D
8.	A	B	C	D
9.	A	B	C	D
10.	A	B	C	D
11.	A	B	C	D
12.	A	B	C	D
13.	A	B	C	D
14.	A	B	C	D
15.	A	B	C	D
16.	A	B	C	D
17.	A	B	C	D
18.	A	B	C	D
19.	A	B	C	D
20.	A	B	C	D
21.	A	B	C	D
22.	A	B	C	D
23.	A	B	C	D
24.	A	B	C	D
25.	A	B	C	D
26.	A	B	C	D
27.	A	B	C	D
28.	A	B	C	D
29.	A	B	C	D
30.	A	B	C	D