NT	Name	Register Number	Class

GREENRIDGE SECONDARY SCHOOL

End-of-Year Examination 2018
Secondary 2 Normal (Technical)

MATHEMATICS SYLLABUS T **4046/01**
Paper 1

04 October 2018
1 hour 15 minutes

Candidates answer on the Question Paper

READ THESE INSTRUCTIONS FIRST

Write your name, register number and class on the question paper.
Write in dark blue or black pen.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **ALL** questions.
The number of marks is given in brackets [ ] at the end of each question or part question.

If working is needed for any question it must be shown with the answer.
Omission of essential working will result in loss of marks.
The total number of marks for this paper is 40.

You are expected to use a scientific calculator to evaluate explicit numerical expressions.
If the degree of accuracy is not specified in the question and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π , use either your calculator value or 3.142.

Setter: Mr Goh Kee Lee

For Examiner's Use
40

Mathematical Formulae

Compound Interest

$$\text{Total amount} = P\left(1+\frac{r}{100}\right)^n$$

Quadratic Equation $ax^2+bx+c=0$

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

Geometry and Measurement

Curved surface area of a cone = πrl

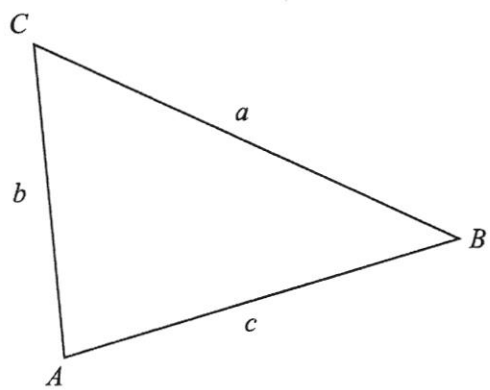
Surface area of a sphere = $4\pi r^2$

Volume of a cone = $\frac{1}{3}\pi r^2 h$

Volume of a pyramid = $\frac{1}{3}\times \text{base area}\times \text{height}$

Volume of a sphere = $\frac{4}{3}\pi r^3$

Area of triangle ABC = $\frac{1}{2}ab\sin C$



1.

(a) On the diagram, draw all the lines of symmetry. [1]

(b) Write down the order of rotational symmetry of the diagram.

Answer (b) ..... [1]

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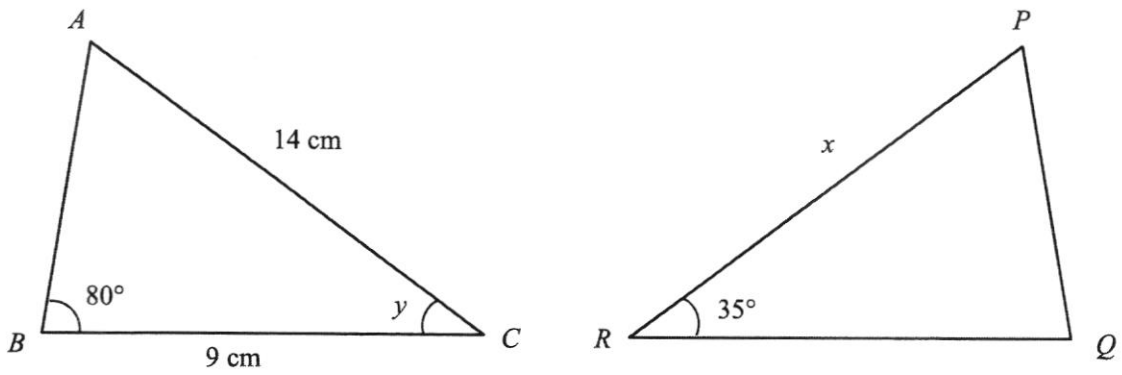
2. The two triangles shown below are congruent.



Find the value of

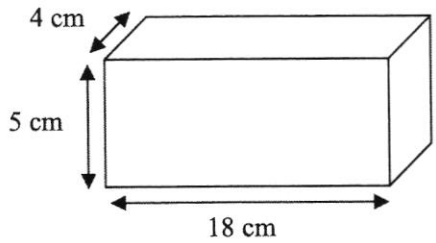
(a) x,

Answer (a).....cm [1]

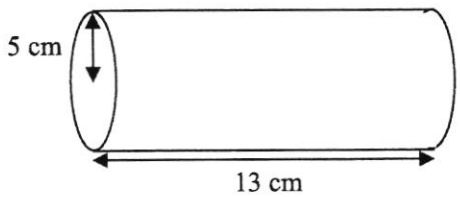
(b) y.

Answer (b).....° [1]

3. **(a)** Draw the front view of the following cuboid. [1]



(b) Draw the net of the following cylinder. [1]



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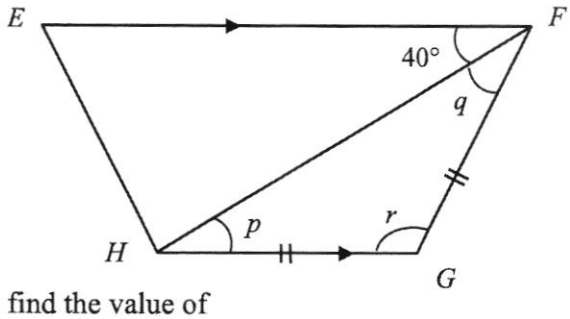
4. Fill in the missing numbers.

(a) $\frac{\square}{10} = 2\frac{3}{10}$ [1]

(b) $\frac{5}{7} = \frac{15}{\square}$ [1]

(c) $0.322 = \frac{161}{\square}$ [1]

5. In the diagram, a trapezium *EFGH* is shown.



Stating reasons clearly, find the value of

(a) p,

Answer (a).....° [1]

(b) q,

Answer (b).....° [1]

(c) r.

Answer (c).....° [1]

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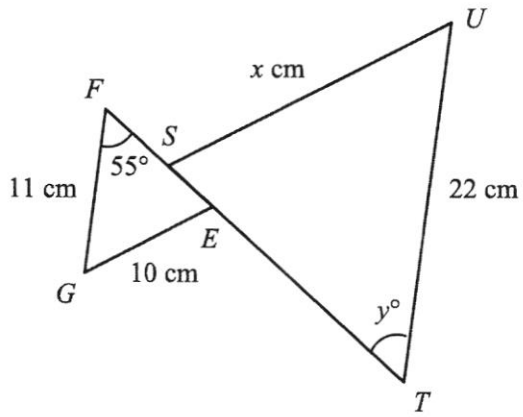
6. Triangle *EFG* is enlarged to obtain triangle *STU* as shown below.



Find

(a) the scale factor of enlargement,

Answer (a).....[1]

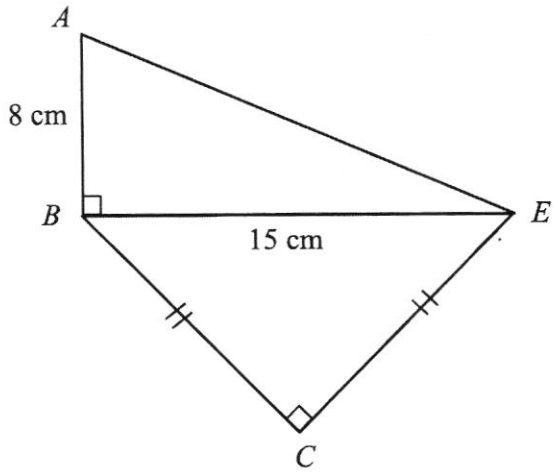
(b) x,

Answer (b).....[1]

(c) y.

Answer (c).....[1]

7. A composite shape $ABCE$ is made up of 2 right-angled triangles as shown below.



Find the length of

(a) AE,

Answer (a)..... cm [1]

(b) BC.

Answer (b)..... cm [2]

---

8. The equation of a straight line is given as $y = 3x + 4$.

Find

(a) the value of y when $x = 1$,

Answer (a) y = ... [1]

(b) the gradient,

Answer (b) ..... [1]

(c) the y-intercept.

Answer (c)..... [1]

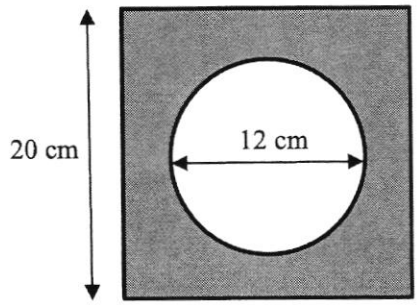
9. In triangle ABC, $AB = 9$ cm, $BC = 8$ cm and $AC = 6$ cm.
Construct

(a) the triangle ABC, [2]

(b) the perpendicular bisector of side AB. [2]

Answer (a) and (b)

10. The figure below shows a circular hole in a square.
The circle has diameter 12 cm. The length of each side of the square is 20 cm.



(a) Find the shaded area,

Answer (a) ..... cm^2 [2]

(b) The figure above is the shape of the base of a prism.
The length of the prism is 100 cm long. Find the volume of the prism.

Answer (b) ..... cm^3 [2]

11. (a) An object travels at a constant speed of 2 m/s.
Find the time needed for it to travel a distance of 300 m.

Answer (a) ..... s [1]

(b) A car travelled at a speed of 70 km/h for 1 hour. After that, it stopped for 30 mins and then continued to travel another 120 km for 2 hours before ending its journey.
Calculate the average speed of the car.

Answer (b) ..... km/h [3]

12. John has S$10000. He is thinking of investing this amount of money and he has 2 choices.

Choice 1: Put the amount into a compound interest account at 5% per annum for 3 years.
Choice 2: Exchange for US$ at the following exchange rate of S$ relative to US$.

Currency	Unit	Selling	Buying
US$	1	1.30	1.24

He expects the rate to be better after 3 years so he could get back more S$.

(a) Find the amount of S$ he will get if he chooses Choice 1.

Answer (a) S$..... [2]

(b) Calculate the amount of US$ he will receive if he chooses Choice 2.

Answer (b) US$..... [2]

(c) After 3 years, John predicts that the exchange rate of S$ relative to US$ will be as follows.

Currency	Unit	Selling	Buying
US$	1	1.65	1.63

Showing clear working and stating a reason, explain which choice John should make.

Answer (c) Reason: .....

..... [3]

~ End of Paper ~

NT	Name	Register Number	Class

GREENRIDGE SECONDARY SCHOOL

End-of-Year Examination 2018
Secondary 2 Normal (Technical)

MATHEMATICS SYLLABUS T **4046/02**
Paper 2

08 October 2018
1 hour 15 minutes

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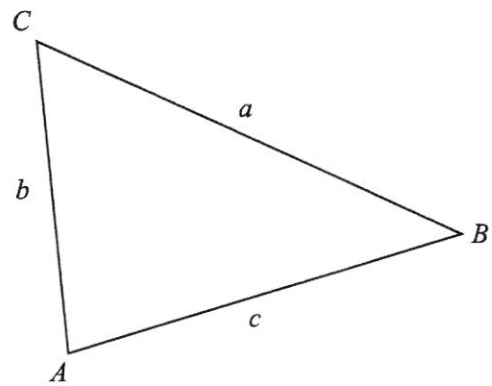

1. The data shows the number of hours spent online in a day by a class of 20 students.

1	3	4	3	5	1	4	2	3	4
2	5	3	5	4	3	6	4	3	5

Complete the frequency table using the information. [2]

No. of hours	Tally	Frequency
1	||	2
2		
3		
4		
5		
6		

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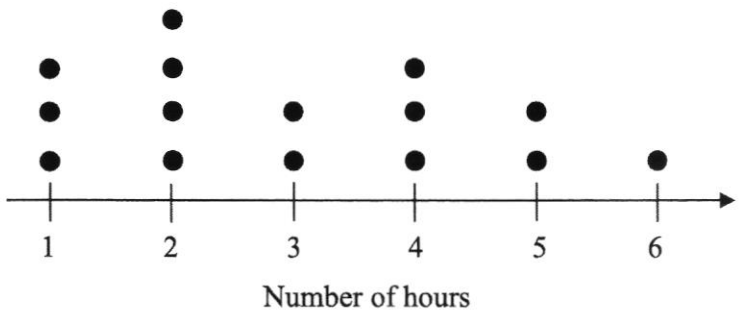
2. The dot diagram below represents the number of hours spent on studying daily by 15 students.



Find the

(a) mode,

Answer (a) ..... hrs [1]

(b) mean.

Answer (b) ..... hrs [2]

3. **(a)** Round off 35.92 to 2 significant figures.

Answer (a) ..... [1]

(b) By rounding each figure to the nearest whole number, estimate the value of $\frac{5.03^2}{\sqrt{99.9}}$.

Answer (b) ..... [2]

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4. Simplify

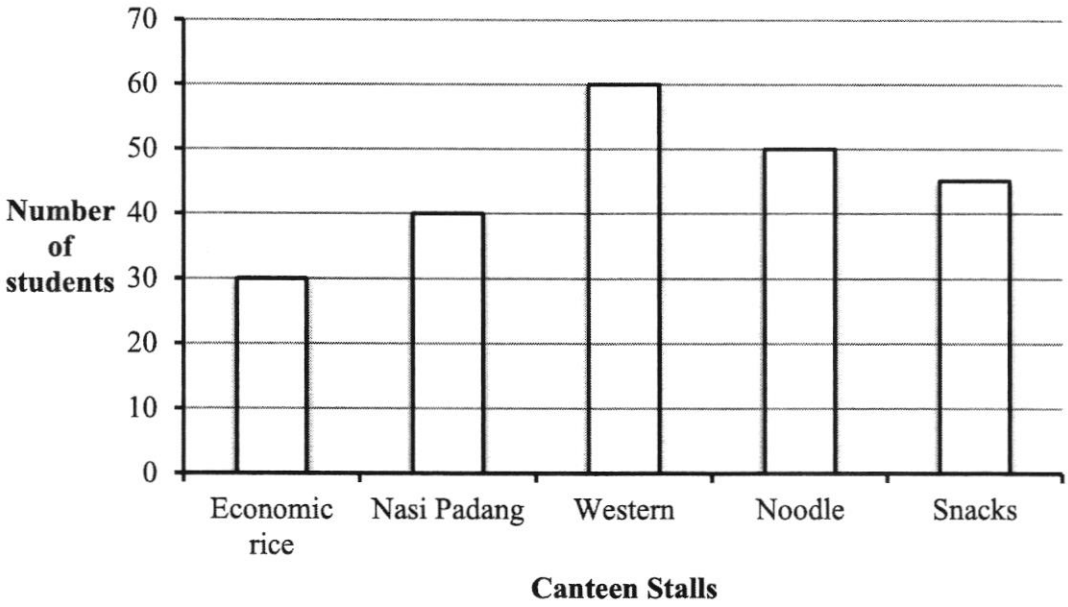
(a) $10x-6y+4x+9y$,

Answer (a) ..... [1]

(b) $\frac{a+2}{3}+\frac{a-1}{4}$.

Answer (b) ..... [2]

5. The bar graph shows the number of students that like the respective stalls in their school canteen.



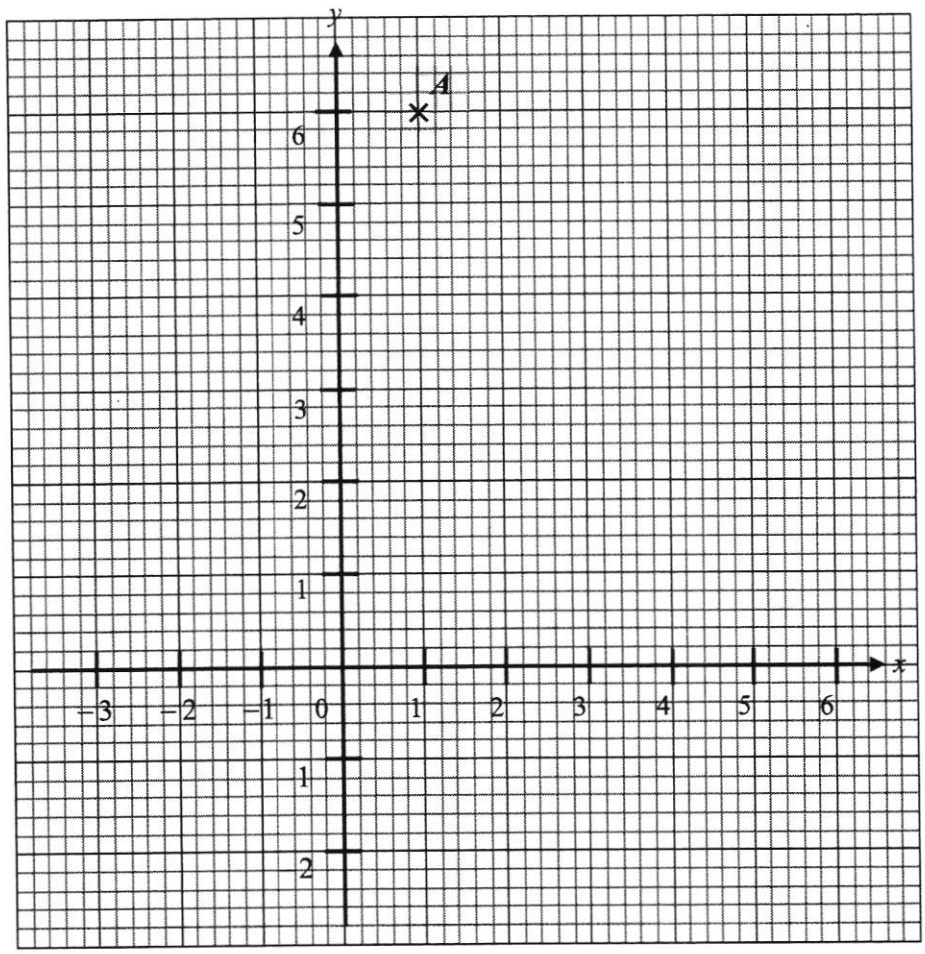
(a) State the ratio of the number of students who like Nasi Pandang to Western.

Answer (a) ..... : ..... [1]

(b) 10 students changed their preference from Snacks to other stalls.
Find the new fraction representing students that like Snacks.

Answer (b)..... [2]

6. Answer the questions using the grid shown below.



(a) State the coordinates of point A.

Answer (a) (..... , ...) [1]

(b) The table below shows the plot table for a line.

x	−2	0	2	4
y	0	1	2	3

Plot the given points and draw the line in the grid above. [2]

7. Solve

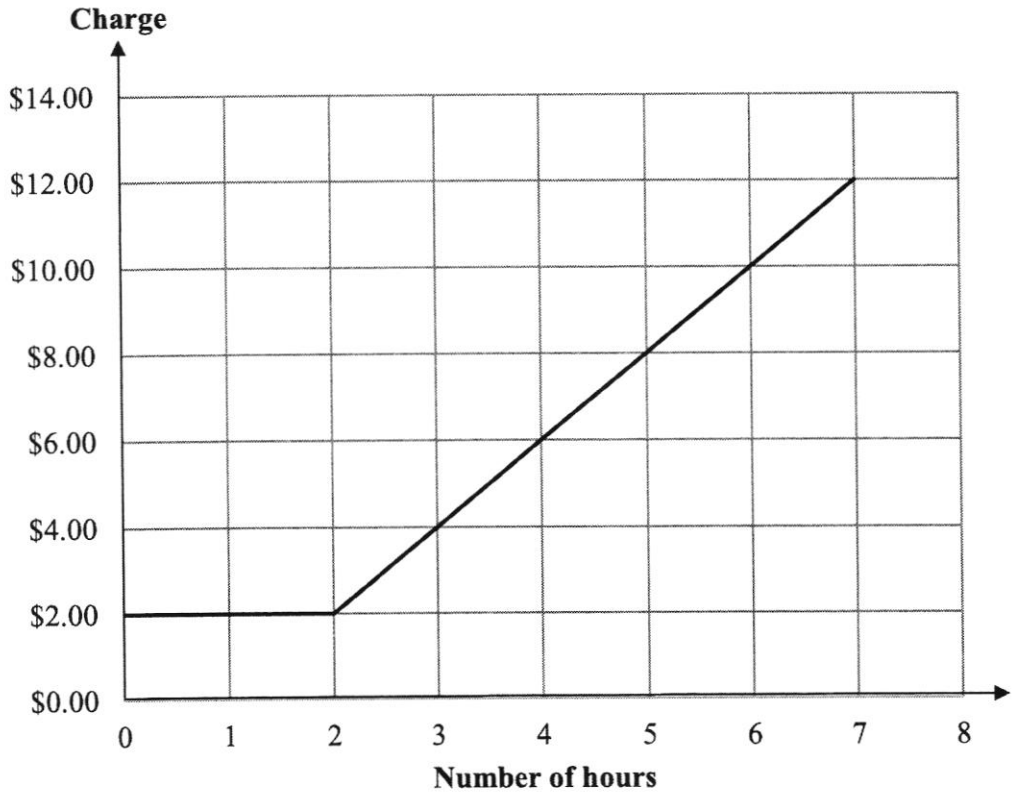
(a) $x-10=22$,

Answer (a) $x =$ ..... [1]

(b) $5y + 1 = 6$.

Answer (b) $y =$ ..... [2]

8. The following diagram shows the graph of the charge against the number of hours of online usage at an internet café. A compulsory administrative fee is also charged.



(a) Find the cost of 5 hours of usage.

Answer (a) $ ..... [1]

(b) Kate paid $10.00
How many hours did she use?

Answer (b) ..... hrs [1]

(c) What is the maximum number of hours that a person can use, without being charged more than the administrative fee?

Answer (c) ..... hrs [1]

9. **(a)** Variables p and q are directly proportional.
Given when $p = 2$ when $q = 6$, find the value of q when $p = 10$.

Answer (a) q = ... [1]

(b) The number of days and men needed to build a bridge is indirectly proportional.
If it takes 24 days for 10 men to build the bridge, find the number of

(i) days needed when there are 15 men,

Answer (b)(i) ..... days [1]

(ii) men needed to build the bridge in 12 days.

Answer (b)(ii) ..... men [1]

10. A bag contains 3 blue balls, 8 red balls and 2 green balls. A ball is chosen at random from the bag. Find the probability that the ball is

(a) blue,

Answer (a) ..... [1]

(b) black,

Answer (b) ..... [1]

(c) not red.

Answer (c) ..... [1]

---

11. Express

(a) $\frac{12}{25}$ as a percentage,

Answer (a) ..... % [1]

(b) 10 km/h in m/s,

Answer (b) ..... m/s [2]

(c) the ratio 20 cm to 1.3 m in simplest form.

Answer (c) ..... : ..... [2]

12. NPCC in Greenridge Secondary School is planning the purchase of CCA T-shirts for its new intake of Sec 1 cadets. NPCC has a budget of $300 to buy the T-shirts.

(a) For vendor A, the original price of a T-shirt was $15.00 but now there is a 10% discount. Calculate the current price of a T-shirt.

Answer (a) $ ..... [2]

(b) If vendor A charges a delivery fee of $6, find the number of T-shirts NPCC is able to purchase from vendor A.

Answer (b) ..... [2]

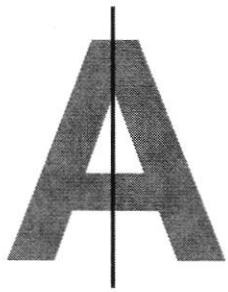
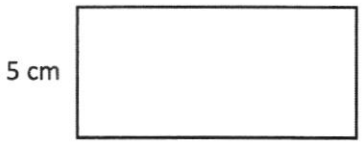
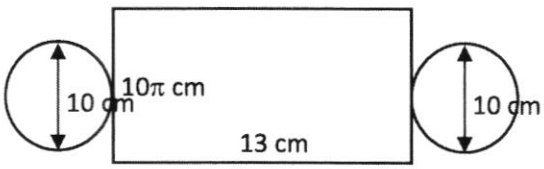
(c) Vendor B charges a price of $12.60 per T-shirt but it does not deliver and must be self-collected.
If the estimated intake of Sec 1 cadets is 22 cadets, explain, with clear working and reason, which vendor NPCC should choose.

Answer (c) .....

..... [2]

~ End of Paper ~

2018 2NT Maths EOY Paper 1: Marking scheme

1	a)  b) 1	B1 B1
2	a) 14 cm b) 35°	B1 B1
3	a)  b)  	B1 B1
4	a) 23 b) 21 c) 500	B1 B1 B1
5	a) 40 (Alt ∠s) b) 40 (∠s of an isos. triangle) c) 100 (Int ∠s) or (∠ sum of triangle)	B1 B1 B1
6	a) 2 b) 20 cm c) 55°	B1 B1 B1
7	a) $AE = \sqrt{8^2 + 15^2} = 17\text{ cm}$ b) $BC = \sqrt{\frac{15^2}{2}} = 10.6\text{ cm (3 sf)}$	B1 B1: any instance of "÷2" B1: CAO
8	a) 7 b) 3 c) 4	B1 B1 B1

9		Triangle ABC B1: Correct shape and dimensions B1: Labels Perpendicular bisector B1: Correct construction with arcs B1: Labels
10	a) Area of trapezium = 20(20) = 400 cm^2 Area of circle = $\pi(6)^2 = 36\pi$ cm^2 Area shaded = $400 - 36\pi = 287$ cm^2 (3 sf) b) Volume = 286.9027 × 100 = 28700 cm^3 (3 sf)	M1: Accurate value for area of square or circle A1 M1: Prev ans multiply 100 A1
11	a) Time needed $= \frac{300}{2} = 150$ s b) Total time = 1 + 0.5 + 2 = 3.5 hrs Total distance = (70 × 1) + 120 = 190 km Average speed = $\frac{190}{3.5} = 54\frac{2}{7}$ km/hr	B1 B1: Total time B1: Total dist B1: CAO
12	a) Balance $= 10000\left(1+\frac{5}{100}\right)^3 = \text{S\$11576.25}$ b) S$ | US$ 1.3 | 1 10000 | 7692.31 Amount is US$7692.31. c) US$ | S$ 1 | 1.63 7692.31 | 12538.47 If the prediction comes true, John will receive S$12538.47. Safe: The amount is only a prediction and the rate could be worse after 3 years so John should make the first choice. Risk: The second choice is more profitable so John should choose that.	M1: Correct sub A1 M1 A1 M1 A1 B1: Reason

2018 2NT Maths EOY Paper 2: Marking scheme

1

No. of hours	Tally	Frequency
1		2
2		2
3		6
4		5
5		4
6		1

A2: all correct
A1: at most 1 wrong

2

a) 2

b) Mean = $\frac{1(3)+2(4)+3(2)+4(3)+5(2)+6(1)}{15}=3$

B1

M1, A1

3

a) 36

b) $\approx \frac{5^2}{\sqrt{100}}=\frac{25}{10}=2.5$

B1

M1: rd off
A1

4

a) $14x + 3y$

b) $\frac{4(a+2)}{12}+\frac{3(a-1)}{12}$

$=\frac{7a+5}{12}$

B1

M1
A1

5

a) 2 : 3

b) Snacks now = 45 – 10 = 35

Fraction = $\frac{35}{225}=\frac{7}{45}$

B1
M1

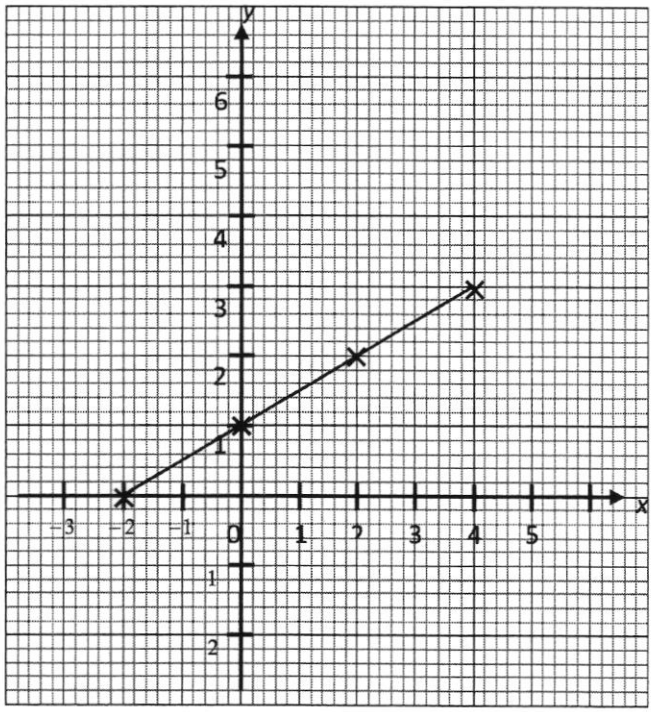
A1

6

a) (1, 6)

b)

B1

		P1: plot points C1: line
7	a) $x = 32$ b) $5y = 5$ $y = 1$	B1 M1 A1
8	a) \$8.00 b) 6 hours c) 2 hours	B1 B1 B1
9	a) 30 b)(i) 16 b)(ii) 20	B1 B1 B1
10	a) $\frac{3}{13}$ b) 0 c) $\frac{3+2}{13} = \frac{5}{13}$	 B1 B1 B1
11	a) 48% b) $\frac{10000}{3600} = 2\frac{7}{9}$ m/s c) 1.3m = 130 cm so ratio = 2 : 13	B1 M1: 10000m or 3600s SOI A1 M1 A1

12	a) Price of T-shirt $= 15 - 0.1(15) = \$13.50$	M1: 10% discount value SOI A1
	b) Let number of T-shirt be n. $13.5n + 6 \leq 300$ Solving, number is 21.	M1: Inequality relationship SOI A1
	c) Number of T-shirt if choose vendor B $= \frac{300}{12.6} = 23.8095...$ so number is 23.	B1
	Vendor A: Intake is estimated so number might be fewer and furthermore has delivery service.	B1
	Vendor B: It is good to buffer for more cadets.	