SWISS COTTAGE SECONDARY SCHOOL
SECONDARY TWO EXPRESS
SECOND SEMESTRAL EXAMINATIONS

Name: _____( ) Class: Sec 2E____

MATHEMATICS **4048/01**
Paper 1 **Friday 2 October 2015**
1 hour 15 minutes

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.
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.
If working is needed for any question it must be shown with the answer.
Omission of essential working will result in loss of marks.

Calculators are **NOT ALLOWED** in this paper.

Give answers in degrees to one decimal place.
For π, use 3.142 unless the question requires the answer in terms of π.

The number of marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this paper is 50.

For Examiner's Use
50

This question paper consists of **10** printed pages.

Setter: Mr Wilson Wee
Vetter: Ms Zoe Pow

[Turn over

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Answer **all** the questions.

1 **(a)** Express 180 as a product of its prime factors.

Answer (a) 180 = ... [2]

(b) Given that $504 = 2^3 \times 3^2 \times 7$, find the highest common factor of 504 and 180. Express your answer as a product of its prime factors.

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

---

2 Given that $a = 5, b = 2, c = -3$ and $d = 8$, evaluate $\frac{3d}{b} - ac^2$.

Answer ..... [2]

---

3 Make a the subject of the formula $7a - 3b = 2ac + 8c$.

Answer ..... [2]

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4 **(a)** Solve the inequality $16-4x<\frac{1}{2}x$.

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

(b) Hence, find the smallest possible value of x if

(i) x is an integer,

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

(ii) x is a prime number.

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

---

5 Simplify the following.

(a) $3+\frac{5m-n}{3}-\frac{3m}{4}$

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

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(b) $\dfrac{x+3}{x-1} \div \dfrac{2x^2+7x+3}{2x-2}$

Answer (b) ..... [3]

---

6 Expand and simplify $(x+3)^2 - (x^2 - 2x + 3)$.

Answer ..... [2]

---

7 Factorise the following.

(a) $2ab - 6b^2 - ac + 3bc$

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

(b) $3x^2 - 75$

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

---

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8 Solve the simultaneous equations

$$2x - 3y = 14,$$

$$3x = 4 - 4y.$$

Answer $x =$ .....

$y =$ ..... [3]

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9 8 workers can build a tower in 60 days.

(a) How many days will it take to build the same tower if 3 workers were injured?

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

(b) How many workers are required to build 5 towers in 30 days?

Answer (b) ..... workers [3]

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10 A 3 km road is represented by 6 cm on a map.

(a) Find the scale of the map in the form 1 : n.

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

(b) A park has an area of 27 km^2.

Find the area of the park on the map in cm^2.

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

---

11 A laptop costs \$2500. Jonathan buys the laptop under hire purchase. According to the terms of the hire purchase, there is a down payment of 20%. The remaining amount is to be paid in monthly instalments over 4 years at a simple interest rate of 5% per annum. Calculate the monthly instalment that he has to pay.

Answer \$ ..... [3]

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12 A bag contains 5 red chips, 3 green chips and 6 yellow chips.

(a) Expressing your answer as a fraction in its lowest term, find the probability that

(i) the first chip taken is red.

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

(ii) the first chip taken is not yellow.

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

(iii) the first chip taken is either green or yellow.

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

(b) If the first chip taken is yellow and is **not replaced** in the bag, find the probability that the second chip taken is green.

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

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13 The table below shows the number of books that a group of people have read over 2 months.

Number of books	0	1	2	3	4
Frequency	1	3	4	x	2

(a) If the mode is 2, write down the largest possible value of x.

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

(b) If the median is 2, write down the largest possible value of x.

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

(c) If the mean is 2, calculate the value of x.

Answer (c) $x =$ ..... [2]

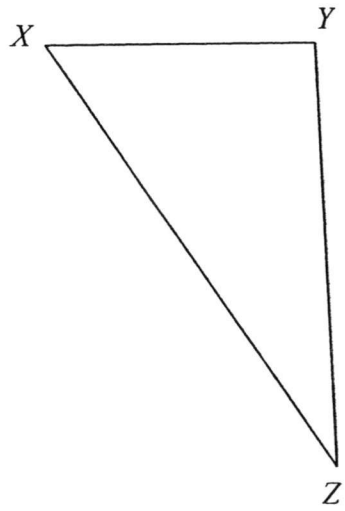
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14 In the diagram below,

Answer (a)



(a) construct the

(i) angle bisector of $\angle YXZ$, [1]

(ii) perpendicular bisector of XZ. [1]

(b) The angle bisector in **(a)(i)** meets the perpendicular bisector in **(a)(ii)** at point P. Measure the shortest distance of P from XZ.

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

End of Paper

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Answer Key for Math 2E SA2 P1 2015

<table>
<tr><th>Qn</th><th>Marking Point</th></tr>
<tr><td>1(a)</td><td>$2^2 \times 3^2 \times 5$</td></tr>
<tr><td>1(b)</td><td>$2^2 \times 3^2$</td></tr>
<tr><td></td><td></td></tr>
<tr><td>2</td><td>-33</td></tr>
<tr><td></td><td></td></tr>
<tr><td>3</td><td>$a = \dfrac{8c+3b}{7-2c}$</td></tr>
<tr><td></td><td></td></tr>
<tr><td>4(a)</td><td>$3\dfrac{5}{9} < x$</td></tr>
<tr><td>4(b)(i)</td><td>4</td></tr>
<tr><td>4(b)(ii)</td><td>5</td></tr>
<tr><td></td><td></td></tr>
<tr><td>5(a)</td><td>$\dfrac{36+11m-4n}{12}$</td></tr>
<tr><td>5(b)</td><td>$\dfrac{2}{(2x+1)}$</td></tr>
<tr><td></td><td></td></tr>
<tr><td>6</td><td>$8x+6$</td></tr>
<tr><td></td><td></td></tr>
<tr><td>7(a)</td><td>$(a-3b)(2b-c)$</td></tr>
<tr><td>7(b)</td><td>$3(x+5)(x-5)$</td></tr>
<tr><td></td><td></td></tr>
<tr><td>8</td><td>$y = -2$
$x = 4$</td></tr>
<tr><td></td><td></td></tr>
<tr><td>9(a)</td><td>96 days</td></tr>
<tr><td>9(b)</td><td>
<table>
<tr><th>Workers</th><th>Days</th><th>Towers</th></tr>
<tr><td>8</td><td>60</td><td>1</td></tr>
<tr><td>$\times 5$</td><td></td><td>$\times 5$</td></tr>
<tr><td>$= 40$</td><td>60</td><td>$= 5$</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>$\times 2$</td><td>$\div 2$</td><td></td></tr>
<tr><td>$= 80$</td><td>$= 30$</td><td></td></tr>
</table>
Answer 80 workers
</td></tr>
<tr><td></td><td></td></tr>
<tr><td>10(a)</td><td>Scale = 1 : 50000</td></tr>
<tr><td>10(b)</td><td>108 cm^2</td></tr>
</table>

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11	\$50
12(a)(i)	$\frac{5}{14}$
12(a)(ii)	$\frac{4}{7}$
12(a)(iii)	$\frac{9}{14}$
12(b)	$\frac{3}{13}$
13(a)	3
13(b)	5
13(c)	$x = 1$
14(c)	1.7 ± 0.1 cm

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Marking Scheme for Math 2E SA2 P1 2015

Qn	Marking Point	Marks Awarded	Remarks
1(a)	$2 \mid \underline{180}$ $2 \mid \underline{90}$ $3 \mid \underline{45}$ $3 \mid \underline{15}$ $5 \mid \underline{5}$ 1 $180 = 2^2 \times 3^2 \times 5$	**M1** **A1**	
1(b)	$180 = 2^2 \times 3^2 \times 5$ $504 = 2^3 \times 3^2 \times 7$ $\text{HCF} = 2^2 \times 3^2$	**B1**	
2	$\frac{3d}{b} - ac^2$ $= \frac{3(8)}{2} - 5(-3)^2$ $= \frac{24}{2} - 5(9)$ $= 12 - 45$ $= -33$	**M1** **A1**	Evaluation of c^2 as 9.
3	$7a - 3b = 2ac + 8c$ $7a - 2ac = 8c + 3b$ $a(7 - 2c) = 8c + 3b$ $a = \frac{8c + 3b}{7 - 2c}$	**M1** **A1**	Factorising the terms containing a.

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4(a)	$16-4x<\frac{1}{2}x$ $16<4x+\frac{1}{2}x$ $16<4\frac{1}{2}x$ $16<\frac{9}{2}x$ $32<9x$ $3\frac{5}{9}<x$	**M1** **A1**	Shifting the variables to one side.
4(b)(i)	4	**B1**	
4(b)(ii)	5	**B1**	
5(a)	$3+\frac{5m-n}{3}-\frac{3m}{4}$ $=\frac{36}{12}+\frac{4(5m-n)}{12}-\frac{9m}{12}$ $=\frac{36+4(5m-n)-9m}{12}$ $=\frac{36+20m-4n-9m}{12}$ $=\frac{36+11m-4n}{12}$	**M1** **A1**	Combining second and third term into one fraction with common denominator.
5(b)	$\frac{x+3}{x-1}\div\frac{2x^2+7x+3}{2x-2}$ $=\frac{x+3}{x-1}\times\frac{2x-2}{2x^2+7x+3}$ $=\frac{x+3}{x-1}\times\frac{2(x-1)}{(x+3)(2x+1)}$ $=\frac{2}{(2x+1)}$	**M1** **M1** **A1**	Changing to multiply sign. Factorising $2x^2+7x+3$
6	$(x+3)^2-(x^2-2x+3)$ $=x^2+6x+9-x^2+2x-3$ $=8x+6$	**M1** **A1**	Correct expansion and opening of bracket.

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7(a)	$2ab-6b^2-ac+3bc$ $=2b(a-3b)-c(a-3b)$ $=(a-3b)(2b-c)$	 **M1** **A1**	
7(b)	$3x^2-75$ $=3(x^2-25)$ $=3(x+5)(x-5)$	 **M1** **A1**	
8	$2x-3y=14$ --------(1) $3x+4y=4$ ---------(2) $(1)\times 3$, $6x-9y=42$ -----(3) $(2)\times 2$, $6x+8y=8$ -----(4) $(3)-(4)$, $-17y=34$ $y=-2$ Subst. $y=-2$ into (1), $2x-3(-2)=14$ $2x+6=14$ $2x=8$ $x=4$	 **M1** **A1** **A1**	Subtracting eq. (4) from (3).
9(a)	8 workers ----- 60 days 5 workers ----- $\frac{8}{5}\times 60$ $=96$ days	 **M1** **A1**	
9(b)	<table><tr><th>Workers</th><th>Days</th><th>Towers</th></tr><tr><td>8</td><td>60</td><td>1</td></tr><tr><td>$\times 5$</td><td></td><td>$\times 5$</td></tr><tr><td>$=40$</td><td>60</td><td>$=5$</td></tr><tr><td></td><td></td><td></td></tr><tr><td>$\times 2$</td><td>$\div 2$</td><td></td></tr><tr><td>$=80$</td><td>$=30$</td><td></td></tr></table> *Answer* 80 workers	 **M1** **M1** **A1**	

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10(a)	6 cm ----- 300000 cm 1 cm ----- $\frac{300000}{6}$ $= 50000$ cm Scale = 1 : 50000	 **B1**	
10(b)	3 km ----- 6 cm $(3\text{km})^2$ ----- $(6\text{cm})^2$ 9 km^2 ----- 36 cm^2 27 km^2 ----- $\frac{27}{9} \times 36$ $= 108\ \text{cm}^2$	 **M1** **A1**	Area scale
11	Down payment $= \frac{20}{100} \times \$2500$ $= \$500$ Remaining amt. $= \$2500 - \$500$ $= \$2000$ Interest $= \frac{\$2000 \times 5 \times 4}{100}$ $= \$400$ Total amt. to be paid for 4 years $= \$2000 + \$400$ $= \$2400$ Monthly installment $= \frac{\$2400}{12 \times 4}$ $= \$50$	**M1** **M1** **A1**	
12(a)(i)	Probability $= \frac{5}{5+3+6}$ $= \frac{5}{14}$	 **B1**	

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12(a)(ii)	Probability $= 1-\frac{6}{14}$ $=\frac{8}{14}$ $=\frac{4}{7}$	**M1** **A1**	
12(a)(iii)	Probability $=\frac{3+6}{14}$ $=\frac{9}{14}$	**M1** **A1**	
12(b)	Probability $=\frac{3}{14-1}$ $=\frac{3}{13}$	**M1** **A1**	
13(a)	3	**B1**	
13(b)	0 1 1 1 2 2 2 2 3 ..... 3 4 4 *Answer* 5	 **B1**	
13(c)	$\frac{0\times1+1\times3+2\times4+3\times x+4\times2}{1+3+4+x+2}=2$ $3x+19=2(x+10)$ $3x+19=2x+20$ $x=1$	**M1** **A1**	
14(c)	1.7 ± 0.1 cm	**B1**	

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SWISS COTTAGE SECONDARY SCHOOL
SECONDARY TWO EXPRESS
SECOND SEMESTRAL EXAMINATIONS

Name: _____( ) Class: Sec 2E____

MATHEMATICS

Paper 2

4048/02
Thursday 8 October 2015
1 hour 15 minutes

Additional Materials: Graph Paper (1 sheet)

Additional Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.
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** the questions.
If working is needed for any question it must be shown with the answer.
Omission of essential working will result in loss of marks.
Calculators should be used where appropriate.
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, unless the question requires the answer in terms of π.

At the end of the examination, fasten all your work securely together.
Attach the graph paper at the back of the question paper.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this paper is 50.

For Examiner's Use
50

This question paper consists of **12** printed pages.

Setter: Mr Ngoh Kia Joon
Vetter: Ms Zoe Pow

[Turn over
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Mathematical Formulae

Compound Interest

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

Mensuration

$$\text{Curved surface area of a cone} = \pi rl$$

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

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

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

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Answer **all** questions.

1 **(a)** Evaluate $\dfrac{17.69^2 - \sqrt{22.11}}{\frac{8}{3}\pi}$, giving your answer correct to 1 decimal place.

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

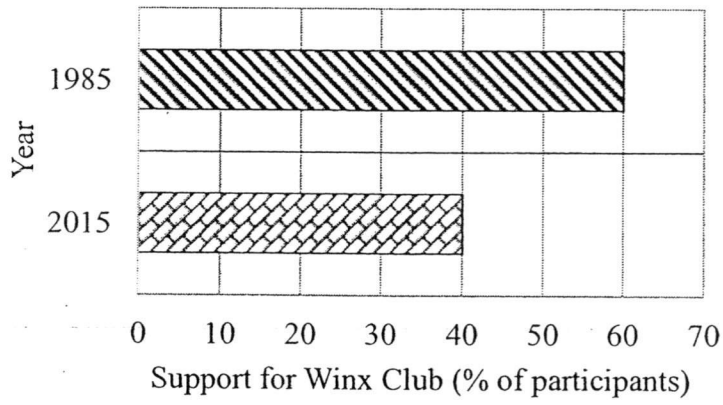
(b) A rectangular pond has a length of 31.356 m and breadth of 17.282 m.

Estimate the area of the pond by rounding off each given dimension to 1 significant number.

Answer (b) .....m^2 [1]

---

2 **(a)** Results of a recent poll on the support for Winx Football Club in the year 1985 and 2015 are shown below. Both polls were conducted on 100 participants.



Find the percentage decrease in the support for Winx Football Club in 2015 as compared to 1985.

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

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(b) John came across the following advertisement while he was shopping.

GAMING CONCEPT STORE

PS4 console



Usual Price: $699
Discounted Price: $499

PS4 games bundle



Usual Price: $125
Discount: 15% off Usual Price

(i) Calculate the percentage discount given for the PS4 console.

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

(ii) Calculate the discounted price of the PS4 games bundle.

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

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3 **(a)** David wishes to deposit $2000 in a bank for 5 years. During his research, two brochures caught his interest.

SBD BANK

- 8% simple interest for 1st year
- 4% simple interest for subsequent years

CBCO Bank

- 4% compound interest per annum, compounded monthly

(i) Calculate the interest David would earn from SBD Bank at the end of 5 years.

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

(ii) Which bank should David deposit his money to earn the higher interest at the end of 5 years? Show all workings clearly.

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

(b) During the December holidays, Kalif wishes to bring his family to Malaysia for a short getaway. On that particular day, the exchange rate between Singapore Dollar (S$) and Malaysia Ringgit (RM) was S$ 1 = RM 2.87.

(i) Given that Kalif changed S$950 in total, find the amount of Malaysia Ringgit he received.

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

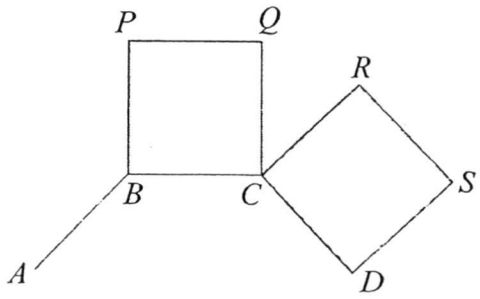
(ii) In Malaysia, Kalif and his family spent a total of RM 1220. Upon return, he decided to change his Malaysian Ringgit back to Singapore Dollar at the rate of S$1 = RM 2.92.

Find the amount of Singapore Dollar he received from the exchange.

Answer (b)(ii) S$..... [2]

---

4 The diagram below shows part of a **regular** polygon *ABCD*... and 2 squares *PQCB* and *RSDC*.



Given that polygon *ABCD*... has an exterior angle of 45°, find

(a) the number of sides of polygon *ABCD*...,

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

(b) ∠QCR.

Answer (b) .....° [2]

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5 At 1000, Peter began cycling from Town A towards Town B, which is 85 km away. He cycled for 1 hour 40 minutes and covered a distance of 30 km before stopping to take a rest at a cafe. He spent x minutes in the cafe and before proceeding with his journey. For the rest of the journey, he cycled at an average speed 20 km/h and finally reached Town B at 1545.

Find

(a) Peter's average speed while traveling from Town A to the cafe, giving your answer in km/h,

Answer (a) .....km/h [2]

(b) the time Peter took to travel from the cafe to Town B, giving your answer in minutes,

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

(c) the value of x.

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

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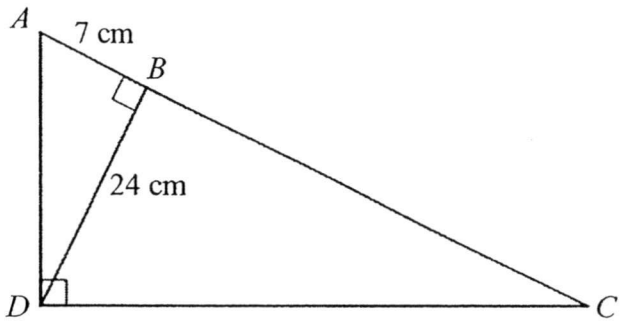
On the return journey, Peter cycled at a uniform speed and took 5 hours to travel from Town B to Town A.

(d) Calculate Peter's speed for the return journey.

Answer (d) .....km/h [1]

---

6 In the diagram below, $\angle ABD = \angle ADC = 90°$, $AB = 7$ cm and $BD = 24$ cm.



Find

(a) length AD,

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

(b) $\angle BCD$.

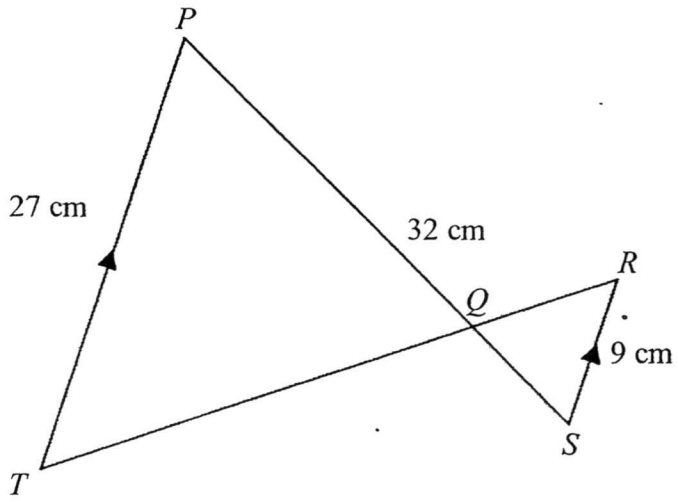
Answer (b) .....° [2]

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7 In the diagram below, TP // SR, $PT = 27$ cm, $RS = 9$ cm and $PS = 32$ cm. PQS and TQR are straight lines.



(a) Prove that ΔPQT is similar to ΔSQR.

Answer

[2]

(b) Find the length of QS.

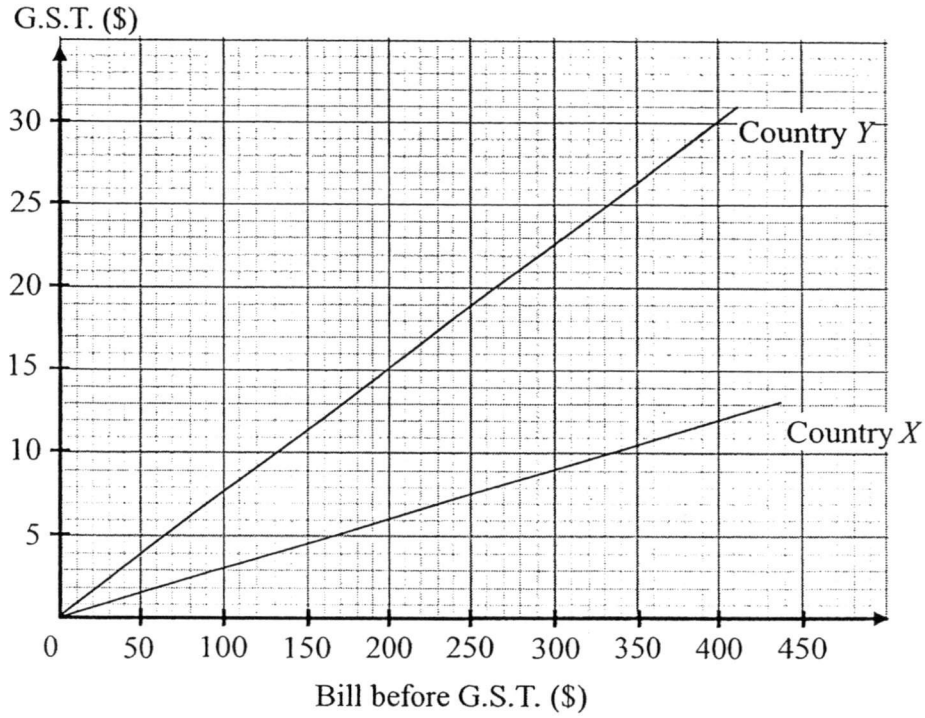
Answer (b) QS =.....cm [2]

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8 The Government Service Tax (G.S.T.) charged to a bill before G.S.T. in Country *X* and Country *Y* is shown in the graph below.



(a) State the amount of G.S.T. when the bill before G.S.T. in Country *X* is $200.

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

(b) State the bill before G.S.T. when the G.S.T. charged in Country *Y* is $19.

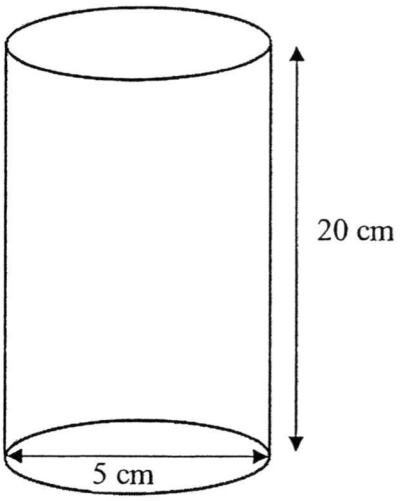
Answer (b) $..... [1]

(c) If Thomas spends $170 before G.S.T., find the difference in the amount of G.S.T. charged between Country *X* and Country *Y*.

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

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9 Gong Gong Teahouse sells milk tea with pearls in cups that take the shape of a closed cylinder with height 20 cm and base diameter 5 cm. Each cup of milk tea with pearls is filled to the brim with milk tea and 60 spherical pearls each of radius 0.5 cm.



(a) Calculate the surface area of 1 spherical pearl.

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

(b) Calculate the volume of the milk tea in the cup.

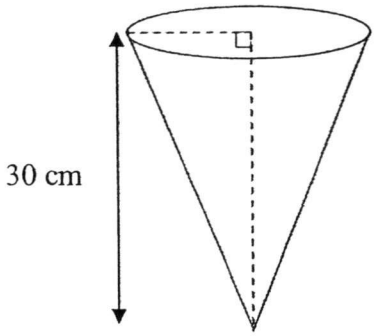
Answer (b) .....cm^3 [3]

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(c) In a special edition, the same volume of milk tea from **(b)** is poured into an inverted cone of height 30 cm and filled it to the brim. Calculate the radius of the cone.



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

---

10 Answer the whole of this question on a single sheet of graph paper.

The table below shows the x and y values for the equation $y = -x^2 - 5x + 4$.

x	-7	-5	-3	-2	0	1
y	-10	k	10	10	4	-2

(a) Calculate the value of k. [1]

(b) Taking 2 cm to represent 1 unit on the x-axis and 1 cm to represent 1 unit on the y-axis, draw the graph of $y = -x^2 - 5x + 4$ for $-7 \leq x \leq 1$. [3]

(c) Using your graph, find

(i) the coordinates of the maximum point of the graph, [1]

(ii) the value of y when $x = -1$, [1]

(iii) the solution(s) of $-x^2 - 5x + 4 = 0$. [1]

End of Paper

trendyline

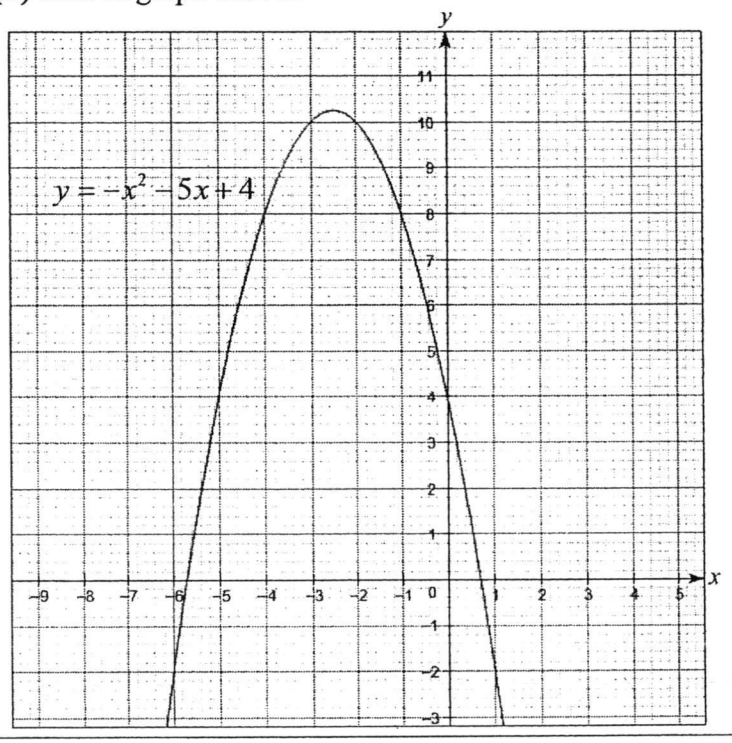
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Q# No.	Solution
1	**(a)** 36.8 (1 dp) **(b)** Area = 600 m^2
2	**(a)** % decrease = $33\frac{1}{3}$% or 33.3% (3sf) **(b)(i)** % discount = 28.6% (3sf) **(b)(ii)** Discounted price = \$106.25
3	**(a)(i)** Interest (SBD) = \$480 **(a)(ii)** Interest (CBCO) = \$441.99 (nearest cents) Therefore David should deposit his money in **SBD Bank** to earn a higher interest. **(b)(i)** Amount received = RM 2726.50 **(b)(ii)** Amount remaining (S\$) = SG\$515.92 (nearest cents)
4	**(a)** number of sides = 8 **(b)** $\angle QCR = 45°$
5	**(a)** Averagespeed = 18 km/h **(b)** Time taken = 165 minutes **(c)** $x = 80$ **(d)** Uniform speed = 17 km/h
6	**(a)** AD = 25 cm **(b)** $\angle BCD = 16.3°$ (1 dp)
7	**(a)** $\angle TQP = \angle RQS$ (vert.opp.$\angle$s) $\angle QPT = \angle QSR$ (alt $\angle$s, $PT // RS$) $\angle PTQ = \angle SRQ$ (alt $\angle$s, $PT // RS$) Since all corresponding angles are equal, therefore, ΔPQT is similar to ΔSQR. **(b)** QS = 8 cm

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8	**(a)** \$6 **(b)** \$250 **(c)** \$8
9	**(a)** Surface area $= 3.14\ \text{cm}^2$ (3 sf) **(b)** Volume of milk tea $= 361\ \text{cm}^3$ (3sf) **(c)** radius $= 3.39$ cm (3sf)
10	**(a)** $k = 4$ **(c)(i)** (−2.5, 10.3) **(c)(ii)** $y = 8$ **(c)(iii)** −5.7 and 0.7 **(b)** seen in graph below. 

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Qn No.	Solution	Marks
1	**(a)** 36.8 (1 dp) **(b)** Area $= 30 \times 20$ $= 600\,\text{m}^2$	B1 B1
2	**(a)** $\%\text{ decrease} = \frac{60-40}{60} \times 100\%$ $= 33\frac{1}{3}\%$ or 33.3% (3sf) **(b)(i)** $\%\text{ discount} = \frac{699-499}{699} \times 100\%$ $= 28.6\%$ (3sf) **(b)(ii)** $\text{Discounted price} = \frac{85}{100} \times 125$ $= \$106.25$	 M1 A1 M1 A1 M1 A1
3	**(a)(i)** $\text{Interest (SBD)} = \frac{8}{100} \times 2000 + \frac{4}{100} \times 2000 \times 4$ $= \$480$ **(a)(ii)** $\text{Final Amount (CBCO)} = 2000(1+\frac{\frac{4}{12}}{100})^{60}$ $= \$2441.993$ $\text{Interest (CBCO)} = 2441.993 - 2000$ $= \$441.99$ (nearest cents) Therefore David should deposit his money in **SBD Bank** to earn a higher interest. **(b)(i)** Amount received $= 950 \times 2.87$ $= \text{RM } 2726.50$ **(b)(ii)** Amount remaining (RM) $= 2726.50 - 1220$ $= \text{RM } 1506.50$ $\text{Amount remaining (S\$)} = \frac{1506.50}{2.92}$ $= \text{SG\$}515.92$ (nearest cents)	 M1 A1 M1 A1 (Conclusion) B1 M1 A1

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4	**(a)** number of sides $= \frac{360}{45}$ $= 8$ **(b)** 1 interior angle $= 180 - 45$ $= 135°$ $\angle QCB = \angle RCD = 90°$ (Given) $\angle QCR = 360 - 90 - 90 - 135$ (Angles at a pt) $= 45°$	M1 A1 M1 A1
5	**(a)** Average speed $= \frac{30}{1\frac{2}{3}}$ $= 18$ km/h **(b)** $85 - 30 = 55$ km Time taken $= \frac{55}{20}$ $= 2.75$h $= 165$ minutes **(c)** $1545 - 1000 = 5$h 45 mins $= 345$ mins $x = 345 - 100 - 165$ $= 80$ **(d)** Uniform speed $= \frac{85}{5}$ $= 17$ km/h	M1 A1 M1 A1 B1 B1
6	**(a)** **By Pythagoras theorem,** $AD^2 = 7^2 + 24^2$ $AD^2 = 625$ $AD = 25$ cm **(b)** $\tan \angle DAB = \frac{24}{7}$ $\angle DAB = \tan^{-1}\frac{24}{7} = 73.740$ $\angle BCD = 180 - 90 - \tan^{-1}\frac{24}{7}$ $= 16.3°$ (1 dp)	M1 A1 M1 A1

trendyline

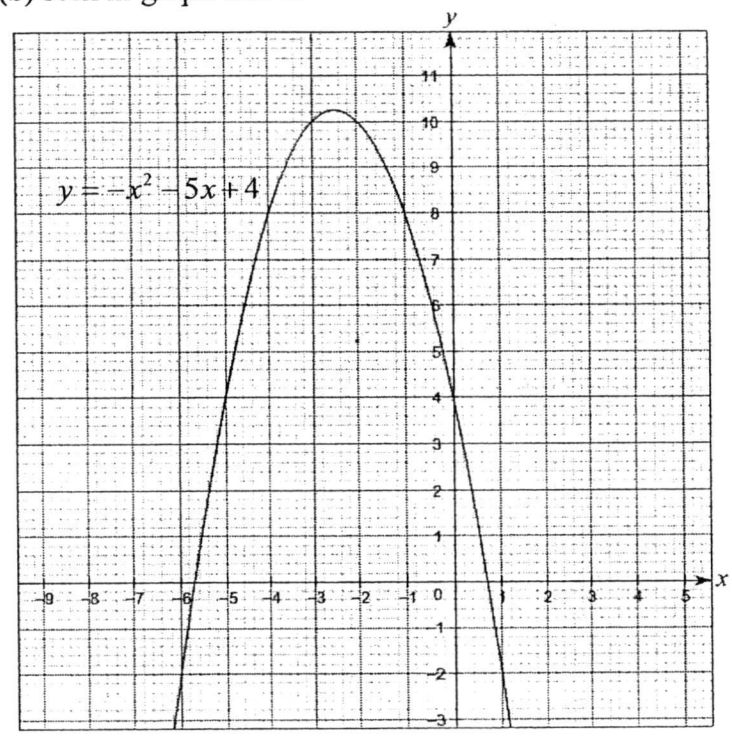
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7	**(a)** $\angle TQP = \angle RQS$ (vert.opp. $\angle$s) $\angle QPT = \angle QSR$ (alt $\angle$s, $PT // RS$) $\angle PTQ = \angle SRQ$ (alt $\angle$s, $PT // RS$) Since all corresponding angles are equal, therefore, ΔPQT is similar to ΔSQR. **(b)** $\frac{QS}{QP} = \frac{RS}{TP} = \frac{1}{3}$ $PS = 4QS$ $QS = \frac{32}{4}$ $QS = 8\,\text{cm}$	M1 A1 M1 A1
8	**(a)** \$6 **(b)** \$250 **(c)** \$13 − \$5 = \$8	B1 B1 B1
9	**(a)** Surface area $= 4 \times \pi \times 0.5^2$ $= 3.14\,\text{cm}^2$ (3 sf) **(b)** Volume of cylinder $= \pi \times 2.5^2 \times 20$ $= 125\pi\ \text{cm}^3$ Volume of 60 pearls $= \frac{4}{3} \times \pi \times 0.5^3 \times 60$ $= 10\pi\ \text{cm}^3$ Volume of milk tea $= 125\pi - 10\pi$ $= 361\,\text{cm}^3$ (3sf) **(c)** $115\pi = \frac{1}{3}\pi(r)^2(30)$ radius = 3.39 cm (3sf)	M1 A1 M1 (For correct method) M1 (For correct method) A1 M1 A1

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10	**(a)** $k = 4$ **(c)(i)** (−2.5, 10.3) **(c)(ii)** $y = 8$ **(c)(iii)** −5.7 and 0.7 **(b)** seen in graph below.  	B1 B1 B1 B1 B1 for correct scale and label B1 for all points plotted B1 for smoothness of curve

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END

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