TANJONG KATONG SECONDARY SCHOOL
Year-End Examination 2022
Secondary 1

CANDIDATE NAME			
CLASS		INDEX NUMBER	

MATHEMATICS 4052/02

Paper 2

Friday 30 September 2022

1 hour and 15 minutes

READ THESE INSTRUCTIONS FIRST

Write your name, class and register 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/tape.

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.
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, unless the question requires the answer in terms of π.

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

Answer all questions.

1 **(a)** Bob, Celia and Mei take part in a run for charity.

(i) The time taken for them to complete the run are in the ratio
Bob : Celia : Mei = 4 : 5 : 7.

Find the time taken by Celia as a percentage of time taken by Mei.

Answer ……% [1]

(ii) The time taken for Bob to complete the run is 55 minutes 40 seconds.
Find the time taken by Mei to complete the run.
Give your answer in minutes and seconds.

Answer …… mins ……..... s [2]

(b) Celia collects $820 for charity.

(i) Bob collects 28% more than Celia.
Find the amount Bob collects.

Answer $ …….. [2]

(ii) Celia collects 60% less than Mei.
Find how much more money Mei collects than Celia.

Answer $ ……..…….. [2]

(c) They dine at Tikea Restaurant and the bill they received after their meal is shown below.

TiKea Restaurant		
Invoice Number		**79317**
Table No		**12**
Monday 25/7/22 5:20 pm		**3 pax**
4 HOT DOG	_ _ _ _ _	
2 FRIES	$12.80	
1 COFFEE	$4.90	
1 COKE LIGHT	$3.50	
	SubTotal	$29
	10% SVC CHG	$2.90
	7% GST	_ _ _ _ _
	Total	_ _ _ _ _

(i) Calculate the cost of **one** hot dog.

Answer $ ……..……. [1]

(ii) Find the amount of GST payable.

Answer $ ……..……. [1]

(iii) Hence, calculate the total bill.

Answer $ ……..……. [1]

2 **(a)** Given that a and b are integers, $-6 < a \leq 8$ and $-5 \leq b \leq 2.3$, find

(i) the least possible value of $a^2 + b$,

Answer ……[1]

(ii) the greatest possible value of ab.

Answer ……[1]

(b) Write each of the following as a single fraction, in its simplest form.

(i) $\frac{9}{4x} \div \frac{3}{16y}$

Answer ……[2]

(ii) $2 - \frac{3+w}{6}$

Answer ……[2]

3 The *n*th term of a sequence is given by $T_n = \dfrac{3n+2}{47-2n}$.

(a) Find T_3.

Answer …….. [1]

(b) Given that $T_k = 13$, find the value of *k*.

Answer *k* = ..…….. [2]

(c) **(i)** Explain why $3n + 2$ is always positive.

Answer

……..

…….. [1]

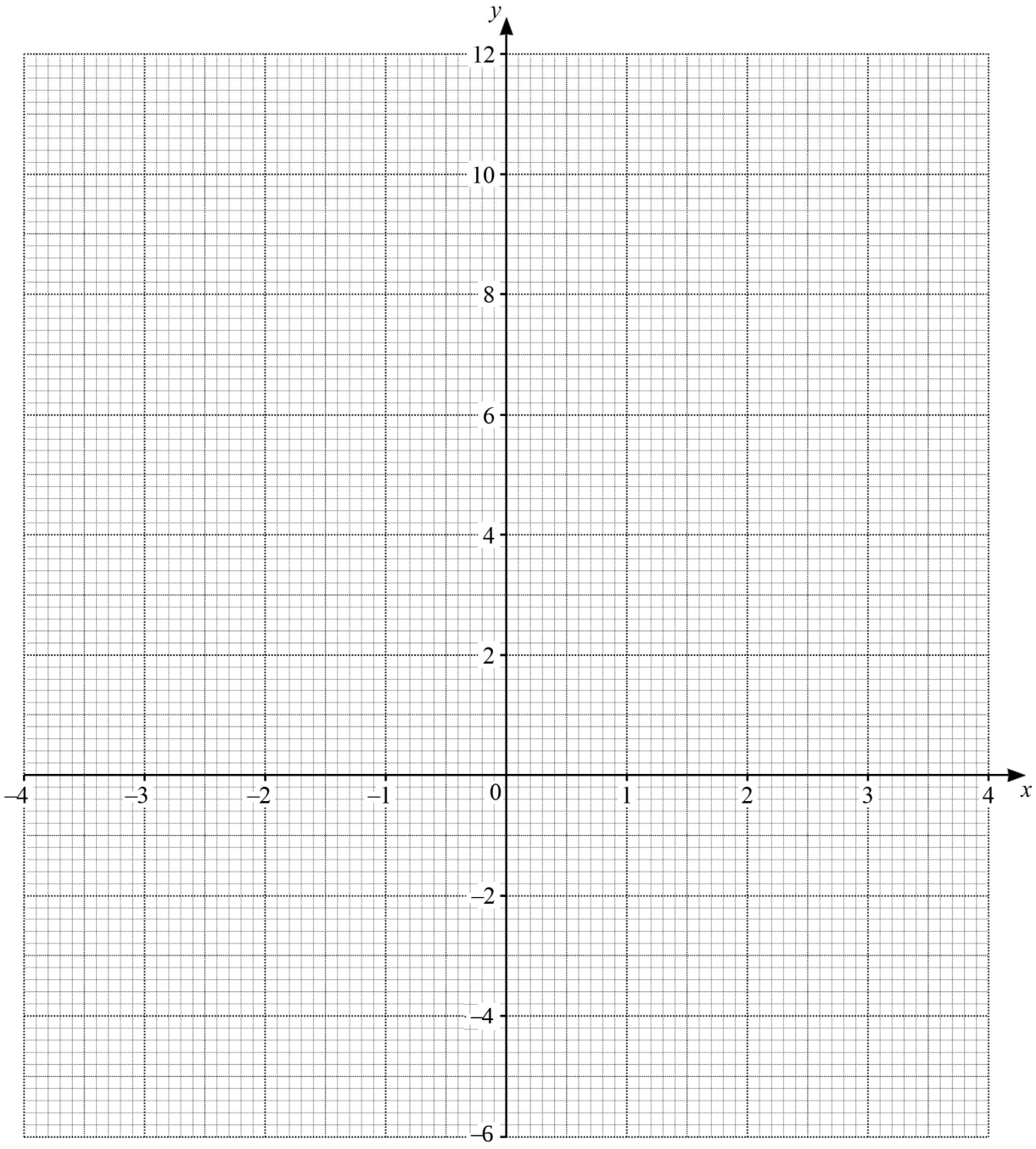
(ii) Hence or otherwise, find the least value of *n* for which $T_n < 0$.

Answer *n* = ..…….. [1]

4 The straight line $y = ax + b$, where a and b are constants, passes through the points $(-4, -3)$, $(-1, 3)$ and $(3, 11)$.

(a) Plot the points and draw the straight line $y = ax + b$ on the grid below. [2]

Answer



(b) Using your graph, find

(i) the x-intercept,

Answer x = ……..…..…….. [1]

(ii) the value of y when $x = 2$.

Answer y = ……..…..…….. [1]

(c) Using your graph or otherwise, determine the value of a and of b.

Answer a = ……...……. , b = ……..……. [2]

(d) Write down the equation of the horizontal line that cuts the line $y = ax + b$ at $(3,\ 11)$.

Answer ……..…..…….. [1]

5 **(a)** Written as the product of its prime factors, $1200 = 2^x \times 3^y \times 5^2$.

Find the value of x and y.

Answer x = ……..…..…….. [1]

y = ……..…..…….. [1]

(b) Ander has 785 one-centimetre cubes.
He makes the largest cube possible using some of the 785 cubes.

How many cubes does he have left?

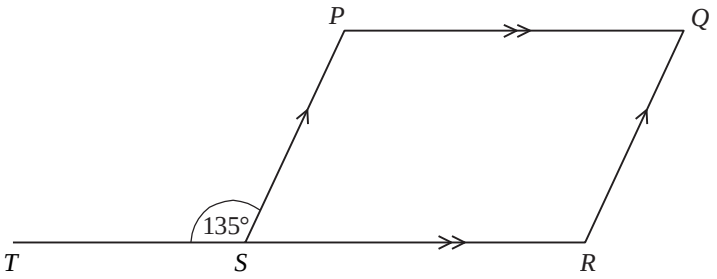
Answer ……..…..…….. [2]

(c) The kth multiple of 5 and kth multiple of 7 has a difference of 2022.

Find the value of k.

Answer k = ..…….. [2]

6 **(a)** The diagram shows a quadrilateral *PQRS*.
PQ is parallel to *SR* and *SP* is parallel to *RQ*. *TSR* is a straight line.
*A*ngle *PST* = 135°.



(i) Calculate the angle *SPQ*.
Give a reason for each step of your working.

Answer

[1]

(ii) *PS* and *ST* are two sides of a regular polygon.
By showing your calculations clearly, find the number of sides of this regular polygon.

Answer …….. [2]

(b) The interior angles of another polygon are in the ratio 9 : 5 : 8 : 7 : 11.
Find the difference between the largest and smallest interior angles of the polygon.

Answer …….. [3]

7 Omar lives in Johor Bahru and drives a SUV.
The table below gives information that Omar can use to work out his driving cost.

	Amount of fuel used (litres/100 km)			
	Type of car			
Type of driving	Compact	Sedan	Large Family	SUV
City	6.2	6.8	8.8	9.2
Expressway	4.6	4.7	5.6	6.6
Combination of City and Expressway	5.2	5.5	6.8	7.6

Fuel Prices per litre		
Regular	Premium	Diesel
RM 2.05	RM 4.05	RM 2.15
10% discount with loyalty card		

(a) In a week, Omar drives a total distance of 76 km in the city.
He estimates that he uses 7.0 litres of fuel.

Show that Omar is correct. [1]

Answer

(b) In one particular trip, Omar drives for 50 mins on the expressway at an average speed of 90 km/h.

Calculate the amount of the fuel he uses on this trip.

Answer ……...……... litres [2]

(c) Omar and Hamid go on a journey together in Omar's car.
They drive from Johor Bahru to Malacca.

The distance for the first part of the journey is x km and the second part is 23 km more.
The average speed that Omar drives for the whole journey is 105 km/h.
The journey takes a total of 2 hours 36 mins.

(i) Form an equation in x and show that $x = 125$.

Answer

[3]

(ii) Hamid offers to pay half of the cost of the fuel used for the journey.
Omar's car uses regular fuel and he has a loyalty card.

Hence, find the cost of the fuel used in the journey and suggest a suitable amount for Hamid to pay Omar.
Justify the decision you make and show your calculations clearly.

……

……... [4]

End of Paper

Qn	Answer		
1ai	71.4% or $71\frac{3}{7}$	4bii	$y = 9$
1aii	97 mins 25 s	4c	$a = 2, b = 5$
1bi	\$1049.60	4d	$y = 11$
1bii	\$1230	4bii	$y = 9$
1ci	\$1.95	4c	$a = 2, b = 5$
1cii	\$2.23	5a	$x = 4$ $y = 1$
1ciii	\$34.13	5b	56
		5c	$k = 1011$
2ai	-5	5a	$x = 4$ $y = 1$
2aii	25	6ai	135^o (alternate angle)
2bi	$\frac{12y}{x}$	6aii	$n = 8$
2bii	$\frac{9-w}{6}$	6b	81^o
3ai	$\frac{11}{41}$	7a	$6.992 \approx 7.0$
3aii	$\frac{3n+2}{47-2n} = 13$ $3n + 2 = 13(47 - 2n)$ $29n = 609$ $n = 21$	7b	Dist travelled $= \frac{50}{60} \times 90$ = 75 km Petrol used = $75 \div 100 \times 6.6$ = 4.95 litres
3bi	$n > 0$ as ***n* is positive ineger** $3n > 0$ so $3n + 2 > 0$	7ci	$\frac{x}{105} + \frac{23+x}{105} = 2.6$ $2x + 23 = 2.6 \times 105$ $2x = 250$ $x = 125$
3bii	$n = 24$	7cii	total distance travelled = 273 km fuel cost = 16.834 × 2.05 × 0.9 = RM 38.28 Hamid can pay RM 19, 19.14, 19.10, 19.20 to Omar
4bi	$x = -2.5$		