TANJONG KATONG SECONDARY SCHOOL

Year End Examination 2022
Secondary 1

CANDIDATE NAME			
CLASS		INDEX NUMBER	

MATHEMATICS **4052/01**

Paper 1 **Thursday 6 October 2022**
1 hour 15 minutes

Candidates answer on the Question Paper.

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 an HB 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.
The use of an approved scientific calculator is expected, 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.
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.

For Examiner's Use

1 **(a)** Calculate $\sqrt{\frac{76+4.37^3}{1.82-0.195}}$, giving your answer correct to 4 significant figures.

Answer...……[1]

(b) Mike evaluates 150.91×29.8 using a calculator and he says that the answer is 8407.136. Without doing the actual calculation, use estimation to determine whether Mike's answer is reasonable.

Answer ……..……...……...……

……...……...……..…..[2]

2 **(a)** Solve the inequality $1-2x\le 5+x<13-x$.

Answer...……[3]

(b) Hence, write down the smallest integer *x* which satisfies the inequality above.

Answer x = ……[1]

3 **(a)** Given that $28x - 20y = 9x - 12y$, find the value of $\frac{x}{y}$.

Answer $\frac{x}{y}$ = ... [2]

(b) **(i)** Factorise $15a - 9b - 18bk + 30ak$ completely.

Answer..... [2]

(ii) By factorising $t^2 + t$, show that it is always even for all positive integers of *t.*

Answer .....

.....[2]

4 **(a)** Write down the next two terms in the sequence, $\frac{1}{4}, \frac{2}{9}, \frac{3}{16}, \frac{4}{25}, \ldots$.

Answer..... [1]

(b) Write down an expression, in terms of *n,* for the *n*th term of the sequence.
$8, 5, 2, -1, -4, \ldots$

Answer..... [2]

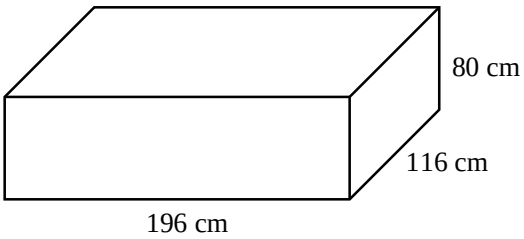
5 **(a)** **(i)** Find the prime factorisation of 196.

Answer..... [1]

(ii) Find the smallest positive integer value of k such that $196k$ is a perfect cube.

Answer k = ... [1]

(b)



A rectangular block of wood has dimension 196 cm by 116 cm by 80 cm.
Find the smallest number of identical cubes John can cut from the block of wood such that no wood is left.

Answer..... [2]

6 On average, SUSA Company sells 300 computers at $2000 each daily. When the price of each computer increases by 15%, the total sales drops by 20%.

What is the percentage change in the earnings with the increase in price and the drop in sales?

Answer..……% [4]

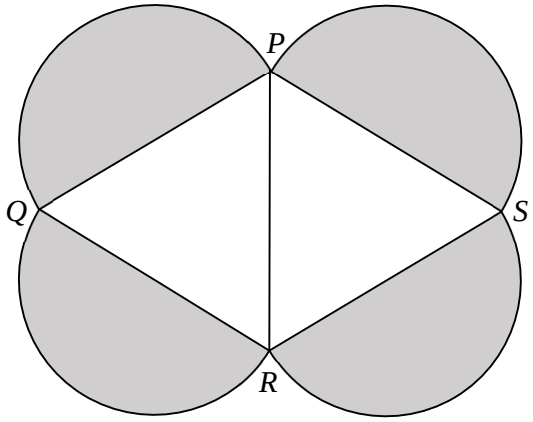
7 Mr Tan can mark 30 scripts in 2.5 hours.
Mrs Lim can mark 25 scripts in 1.25 hour.

Working at constant rates, Mr Tan and Mrs Lim work together to complete marking the scripts for a class of 42 students.

How long will it take to complete the marking? Leave your answer in hours and nearest minutes.

Answer ……h …….mins [3]

8 In the diagram, *PQRS* is a quadrilateral that is enclosed by 4 identical semicircles.



(a) What is the special name of the quadrilateral *PQRS?*

Answer..... [1]

(b) The diameter of each of the semicircle is 5 cm.
Find the total area of the 4 semicircles, in terms of π.

Answer..... cm^2 [2]

(c) It is given that the area of quadrilateral *PQRS* is 24 cm^2 and the length of the diagonal *PR* is 6 cm.

Find

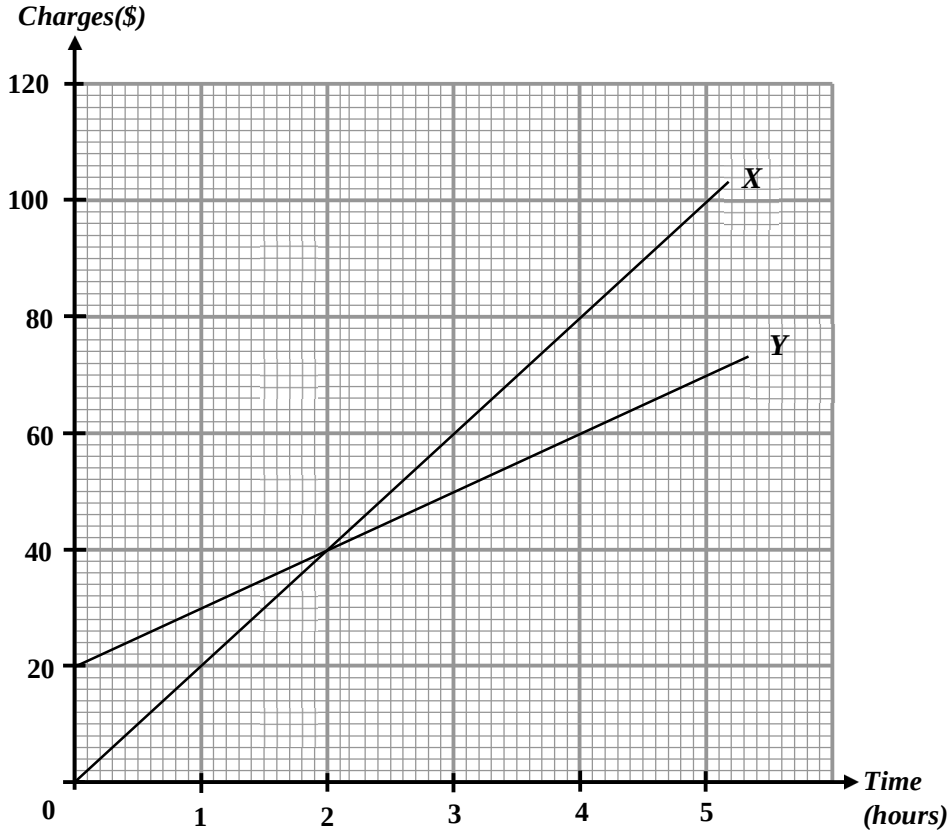
(i) the perpendicular length of *P* to *QR*,

Answer.....cm [2]

(ii) the length of the diagonal *QS.*

Answer.....cm [2]

9 Two bicycle rental companies, *X* and *Y*, offer bicycle rental at the charges as shown in the graph below.



(a) Which company has a greater rate of increase in charges?
Explain your answer.

Answer

Company …… because ……...……..……

……...……...……..…[1]

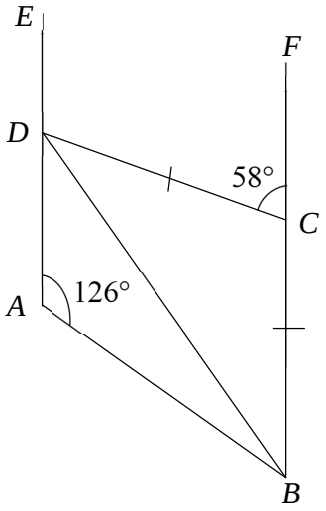
(b) If Henry has a budget of $60, which company should he rent a bicycle from?
Explain your answer.

Answer

Company …… because ……...……..……

……...……...……..…[1]

10 In the figure, *ADE* and *BCF* are straight lines. *AE* is parallel to *BF* and *BC* = *CD*.
$\angle BAE = 126°$ and $\angle FCD = 58°$.



(a) Stating your reasons clearly, find

(i) reflex $\angle BAD$,

Answer..... [1]

(ii) $\angle CBD$.

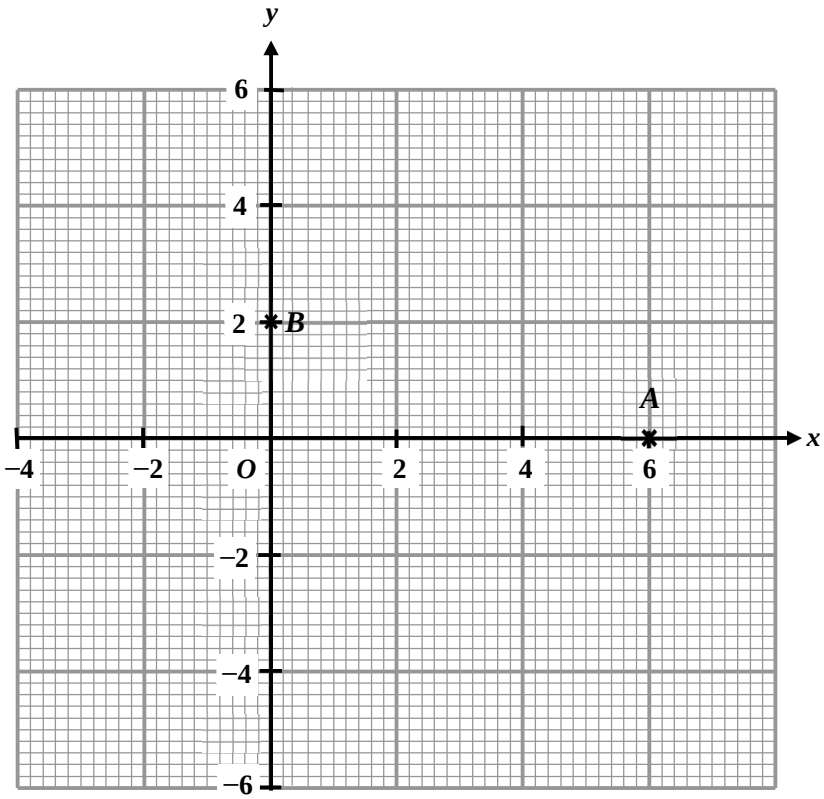
Answer..... [2]

(b) Explain whether the line *BD* is an angle bisector of $\angle ABC$.
Show your workings clearly.

Answer .....

..... [2]

11 On the axes shown, A is a point (6, 0), B is a point (0, 2) and C is a point on the negative y-axis. The area of triangle AOB is half that of triangle AOC.



(a) Plot point C on the diagram above and state the coordinates of C.

Answer (……, ……) [2]

(b) State the equation of the vertical line BC.

Answer……. [1]

(c) State the coordinates of D such that $ABCD$ is a parallelogram.

Answer (……, ……) [2]

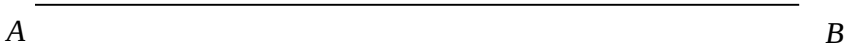
12 **(a)** Construct a triangle ABC such that $AC = 7.3$ cm and angle $BAC = 30°$.
The line AB has been provided below. [1]

(b) Construct the perpendicular bisector of line AB. [1]

(c) Construct the angle bisector of angle BAC. [1]

(d) Label the point M which is equidistant from the lines AC and AB and equidistant from the points A and B. [1]

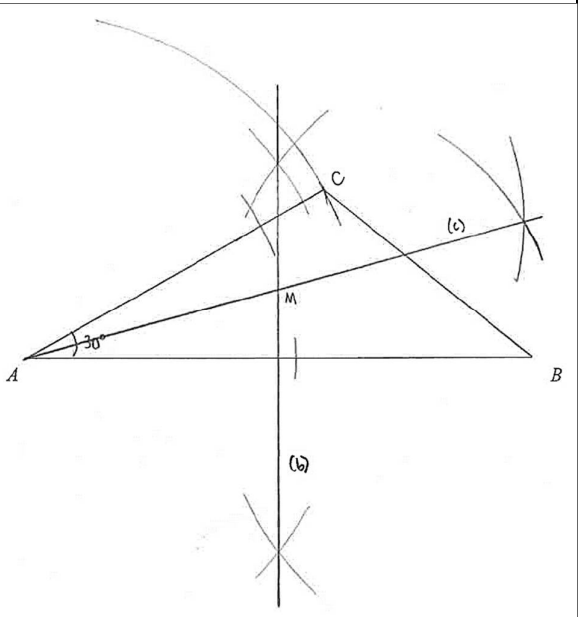
Answer



END OF PAPER

Answers:

Qn No	Solution
1(a)	9.906
1(b)	$150 \times 30 = 4500$ Mike's answer is unreasonable as his answer is far from the true value.
2(a)	$-1\frac{1}{3} \le x < 4$
2(b)	-1
3(a)	$\frac{x}{y} = \frac{8}{19}$
3(b)(i)	$3(5a-3b)(1+2k)$
3(b)(ii)	$t^2 + t = t(t+1)$ $t(t+1)$ are consecutive numbers OR one of the numbers is odd and the other is even. AND The **product of even and odd is always even**.
4 (a)	$\frac{5}{36}, \frac{6}{49}$
4 (b)	$-3n+11$
5(a)	$2^2 \times 7^2$
5(a) (ii)	14
5(b)	28420
6	-8%
7	1h 19 min
8(a)	Rhombus
8(b)	12.5π or $\frac{50}{4}\pi$
8(c)(i)	$h = 4.8$
8(c)(ii)	8 cm
9(a)	Company *X* because it has a steeper gradient.
9(b)	Company *Y* because for the same amount of \$60, he can rent for 4 hours for Company *Y* compared to 3 hours for Company *X* OR He can get to ride an hour more if he rents from Company *Y* which is better value for money.
10(a)(i)	reflex $\angle BAD = 360 - 126$ (angles at a point) $=234^\circ$
10(a)(ii)	$\angle CBD = \frac{58}{2}$ (exterior angle of Δ) $=29^\circ$ OR

	$\angle BCD = 180 - 58 = 122^\circ$ (adjacent angles on a straight line) $\angle CBD = \frac{180-122}{2}$ (base $\angle$s of isos. Δ) $=29^\circ$
10(b)	$\angle ABD = 180 - 29 - 126$ (interior angles) $=25^o$ Since $\angle ABD \neq \angle CBD$, line BD is not an angle bisector of $\angle ABC$.
11(a)	C (0, −4)
11(b)	$x = 0$
11(c)	(6, −6)
12(a)	
12(b)	See construction
12(c)	See construction
12(d)	See construction