



GREENRIDGE SECONDARY SCHOOL
2024 PRELIMINARY EXAMINATION
SECONDARY 4 NORMAL (ACADEMIC)

CANDIDATE
NAME

CLASS

-

INDEX NUMBER

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MATHEMATICS SYLLABUS A

4045/01

Paper 1

5 August 2024

Setter: Mrs Goh-Kok Mei Leng

2 hours

Candidates answer on the Question Paper.

Additional Materials: Nil

READ THESE INSTRUCTIONS FIRST

Write your class, index number and name 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, glue or correction fluid.

Answer **all** the 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 of the marks for this paper is 70.

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.

For Examiner's Use	
Total	70

[Turn over

This paper consists of **14** printed pages, including this cover page.

Mathematical Formulae*Compound interest*

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

Mensuration

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

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

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

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

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

$$\text{Arc length} = r\theta, \text{ where } \theta \text{ is in radians}$$

$$\text{Sector area} = \frac{1}{2} r^2 \theta, \text{ where } \theta \text{ is in radians}$$

Trigonometry

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

Statistics

$$\text{Mean} = \frac{\sum fx}{\sum f}$$

$$\text{Standard deviation} = \sqrt{\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f} \right)^2}$$

Answer **all** the questions.

1 It is given that $m = \frac{78.9}{\sqrt{24.05 - 7.85}}$.

- (a) Without the use of a calculator, estimate the value of m . Show your working clearly.

Answer [1]

- (b) Use your calculator to find the value of m , leaving your answer to 2 decimal places.

Answer [1]

2 The weight of a golf ball is 0.0459368 kg.

- (a) Write this weight correct to 3 significant figures.

Answer [1]

- (b) Write your answer in part (a) in standard form.

Answer [1]

3 Find the least integer value of x satisfying $5x > -21$.

Answer [2]

4

3, 8, 13, 18, 23, ...

- (a) Find an algebraic expression for the n th term in the sequence.

Answer [1]

- (b) Show that 403 is a term in the sequence.

Answer

[2]

- 5 (a) Find the obtuse angle of A such that $\sin A^\circ = 0.8667$.

Answer $A =$ [1]

- (b) Write the following in order of size, starting with the smallest.

$$32.5\% \quad 0.3255 \quad 0.3\dot{2} \quad \sqrt{\frac{64}{625}}$$

Answer , , [2]
smallest

- 6 (a) Write $\frac{5^4 \times 5^2}{\sqrt{5}}$ as a single power of 5.

Answer [2]

- (b) Given that $\frac{1}{32} = 2^m$, find the value of m .

Answer $m =$ [1]

- 7 Factorise

(a) $2ap - 6bp + aq - 3bq$,

Answer [2]

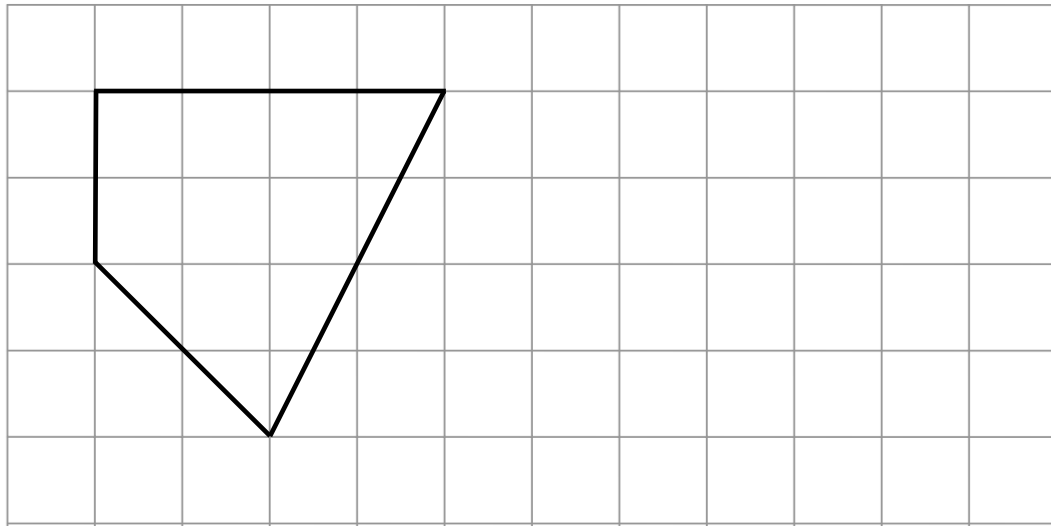
(b) $2x^2 + x - 10$.

Answer [1]

- 8 In a sale, the price of a watch was reduced by 30% of its original price to \$385.
Find the original price of the watch.

Answer \$ [2]

- 9 Draw a reduction of this quadrilateral using the scale factor of $\frac{1}{2}$.

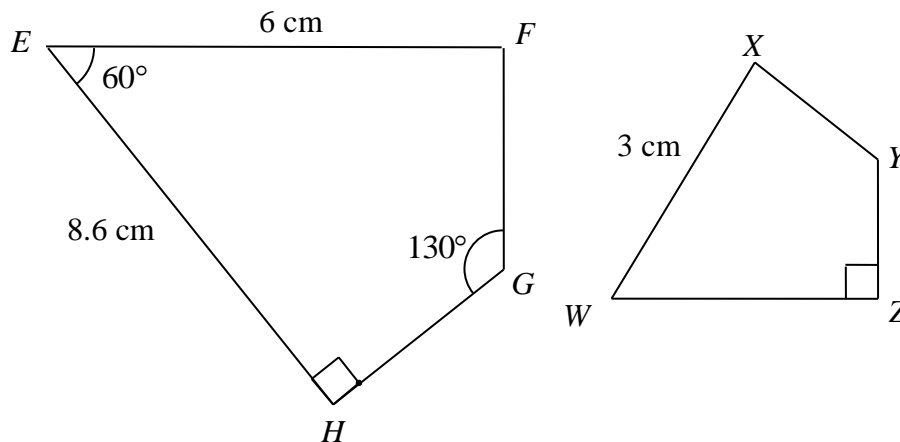


[2]

- 10 If Jenny buys x kg of sugar at the price of 99 cents, how much will y kg of sugar cost in dollars? Express your answer in terms of x and y .

Answer \$ [2]

- 11** Quadrilateral $WXYZ$ is a reduction of quadrilateral $EFGH$.
 $XW = 3$ cm, $EF = 6$ cm and $EH = 8.6$ cm.
 Angle $\angle FEH = 60^\circ$, angle $\angle FGH = 130^\circ$ and angle $\angle WZY = 90^\circ$.



Find

- (a) the scale factor,

Answer [1]

- (b) WZ ,

Answer $WZ = \dots\dots\dots$ cm [1]

- (c) Angle WXY .

Answer Angle $WXY = \dots\dots\dots$ [1]

- 12** Tim scored 16 out of 20 marks in Test A and 49 out of 56 marks in Test B.
 In which test did Tim do better? Justify your answer.

Answer

[Turn over

[2]

-
- 13** Solve these simultaneous equations.

$$5x - 2y = 16$$

$$x + 3y = -7$$

Answer $x = \dots\dots\dots$, $y = \dots\dots\dots$ [3]

- 14** Three bells ring every 15 minutes, 21 minutes and 25 minutes respectively.

- (a) Given that they rang together at 08 30, when will they next ring together again?

Answer $\dots\dots\dots$ [2]

- (b) How many times will they ring together over a period of 19 hours?

Answer [1]

- 15** (a) Express $x^2 + 6x + 2$ in the form $(x + a)^2 - b$.

Answer [1]

- (b) Hence solve $x^2 + 6x + 2 = 0$.

Answer [3]

- 16** p is inversely proportional to the square of x .
When $x = 3$, $p = 20$.

- (a) Show that $p = \frac{180}{x^2}$.

Answer

[2]

- (b) Find the values of x when $p = 7.2$.

[Turn over]

Answer $x = \dots\dots\dots$ or $\dots\dots\dots$ [2]

- 17 (a)** Show that the point (1, 2) lies on the line $3y = 2x + 4$.

Answer

[1]

- (b)** Find the coordinates of the y-intercept of the line $3y = 2x + 4$

Answer ($\dots\dots\dots$, $\dots\dots\dots$) [1]

- 18 (a)** The ratio of Peter's age to his father's age is 2 : 7.
Peter is 14 years old now. How old is his father?

Answer $\dots\dots\dots$ [1]

- (b)** The ratio of George's age to his mother's age is 3 : 8.
The total of their ages is 66 years.

- (i)** How old is George?

Answer $\dots\dots\dots$ [2]

- (ii) Find George's mother's age to his age 3 years from now.

Answer [2]

- 19 (a) In a regular polygon, the interior angle is 120° .
Calculate the number of sides of the polygon.

Answer [2]

- (b) Explain why the exterior angle of a regular polygon cannot be 23° .

Answer

[2]

- 20 Detergent powder is being sold in packet of 2 different sizes.
The small packet costs \$8.70 and weighs 600 g.
The larger packet costs \$19.50 and weighs 1.5 kg.

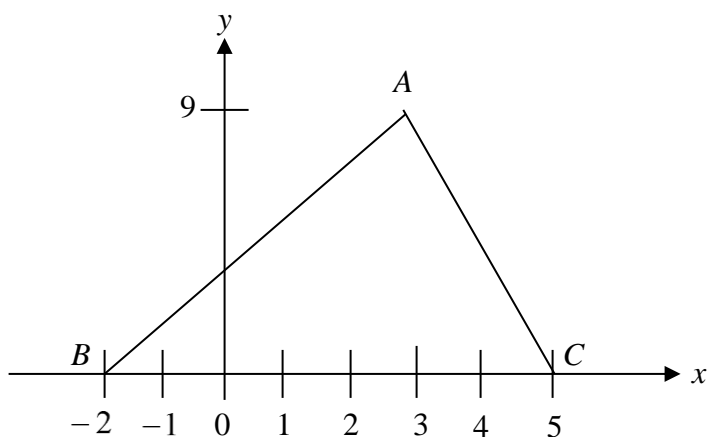
- (a) Which packet gives a better value? Show your working clearly.

Answer [3]

- (b) The manufacturer decides to change the price of the small packet so that both packets cost the same unit price. Find the new price of the small packet.

Answer \$ [1]

- 21** The diagram below shows the points $A(3, 9)$, $B(-2, 0)$ and $C(5, 0)$.



Find

- (a) the gradient of AC ,

Answer [1]

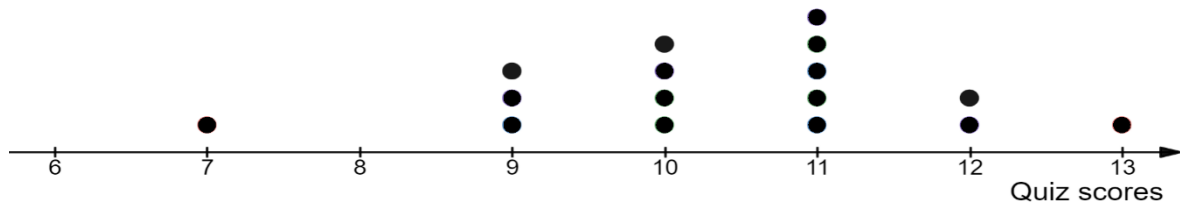
- (b) the equation of AC ,

Answer [2]

- (c) the equation of the line parallel to BC which passes through A .

Answer [1]

- 22 The following dot diagram shows the quiz scores of some students.



- (a) Find the total number of students who took the quiz.

Answer [1]

- (b) State the modal score.

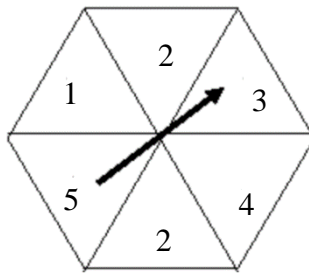
Answer [1]

- (c) Explain why the mean of the above data may not be a good representation of how the students scored in the quiz

Answer

[2]

- 23 A spinner in the form of a regular hexagon is constructed as shown below.



When the pointer is spun, find the probability that the pointer will stop at

- (a) 5,

Answer [1]

- (b) 6,

Answer [1]

- (c) either 1 or 2,

Answer [1]

- (d) a prime number.

Answer [1]

End of Paper

[Turn over

4 (a) (i) question

Answer $x = \dots\dots\dots^\circ$ [1]

(ii) question

Answer angle $ABC = \dots\dots\dots$ [1]

(b) Stem of question

(i) question

Answer $\dots\dots\dots$ [1]

(ii) question

Answer $\dots\dots\dots$ [1]

5 (a) (i) (a) question

Answer $\dots\dots\dots$ [1]

(b) question

Answer $\dots\dots\dots$ [1]

6 Show that aaaaaaaaaa

Answer

[2]

7 (a) Show that aaaaaaaaaa

Answer

[2]

8 (a) (i) Show that aaaaaaaa

Answer

[2]

9 (a) (i) (a) Show that aaaaaaaaaa

Answer

[2]

10 Explain why aaaaaaaaaa

Answer

..... [2]

11 (a) Explain why aaaaaaaaaa

Answer

..... [2]

12 (a) (i) Explain why aaaaaaaa

Answer

..... [1]

13 (a) (i) (a) Explain why aaaaaaaaaa

Answer

..... [1]

14 Write these numbers in order of size, starting from smallest. **(NA & NT)**

Answer , , , [2]
smallest largest

15 Write these numbers in order of size, starting from largest. **(NA & NT)**

Answer , , , [2]
largest smallest

16 Write these numbers in order of size, starting from **smallest**. **(2018 O Level)**

Answer , , , [2]

17 Write these numbers in order of size, starting from **largest**. **(2018 O Level)**

Answer , , , [2]

18 Write these numbers in order of size, starting from smallest. **(NA & NT)**

Answer , , , , [2]
smallest largest

19 Write these numbers in order of size, starting from largest. **(NA & NT)**

Answer , , , , [2]

largest

smallest

20 Write these numbers in order of size, starting from **smallest**. (2018 O Level)

Answer , , , , [2]

21 Write these numbers in order of size, starting from **largest**. (2018 O Level)

Answer , , , , [2]

(a) question

Answer [1]

(b) question

Answer [1]

2

(a) question

Answer [1]

(b) question

[Turn over]

Answer [1]

Fabian ran 5 km in 20 minutes.

He then walked a further 8 km at a speed of 6km/h.

Calculate his average speed for the **total** journey, giving your answer in km/h.

Answer [2]

END OF PAPER

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