CHUNG CHENG HIGH SCHOOL (YISHUN)

G3

2023 End-Of-Year Examination

Secondary One G3/Express

CANDIDATE NAME

CLASS

INDEX NUMBER

MATHEMATICS

2 October 2023

SECTION A MARKING SCHEME

2 hours

Candidates answer on the Question Paper.

No Additional Materials are required.
READ THESE INSTRUCTIONS FIRST

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

Answer **all** the questions.
Give non exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.
The use of an approved scientific calculator is expected, where appropriate.
You are reminded of the need for clear presentation in your answers.
Up to 2 marks may be deducted for improper presentation.

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

Question Number	Marks Possible	Marks Obtained
1	3	
2	2	
3	1	
4	2	
5	3	
6	3	
7	2	
8	3	
9	4	
10	4	
11	5	
12	4	
13	4	
Presentation Deduction		– 1 / – 2
TOTAL	40	

This document consists of **10** printed pages.

[Turn over]

1 Consider the following list of numbers:

$$\frac{\pi}{3},\ -\sqrt{2},\ \frac{100}{90},\ 1.\dot{0}\dot{1}$$

(a) Write the numbers in order of size, starting with the smallest.

Answer $-\sqrt{2}$, $1.\dot{0}\dot{1}$, $\frac{\pi}{3}$, $\frac{100}{90}$ [2]

(b) Write down all the irrational numbers.

Answer $\frac{\pi}{3}$, $-\sqrt{2}$ [1]

2 Round off the following values

(a) 13.449 to one decimal place.

13.4

Answer ..... [1]

(b) $\frac{3}{127}$ to two significant figures.

0.024

Answer ..... [1]

3 Write down and simplify an algebraic expression for the following statement.

Subtract the product of 3 and $4a$ from the sum of $2b$ and $16a$.

$(2b+16a)-3\times 4a$
$=2b+4a$

Answer ..... [1]

4 Given that $a = 2$, $b = -15$, and $c = 13$, find the value of $\frac{-b+\sqrt{b^2-4ac}}{2a}$.

$$= \frac{-(-15)+\sqrt{(-15)^2-4(2)(13)}}{2(2)}$$
$$= \frac{15+11}{4}$$
$$= 6.5$$

If student didn't put bracket for (-15), minus 1 mark for Ps

Answer ..... [2]

5 **(a)** Convert 78 000 cm^2 to m^2.

$$\frac{78000}{10000} = 7.8 \text{ m}^2$$

Answer ..... [1]

(b) By rounding each number to 1 significant figure, estimate the value of $\frac{\sqrt[3]{989}}{0.132\times 472}$.
Show your working clearly.

$$\frac{\sqrt[3]{989}}{0.132\times 472}$$
$$\approx \frac{\sqrt[3]{1000}}{0.1\times 500}$$
$$\approx 0.2$$

Answer ..... [2]

6 **(a)** Simplify $\frac{3}{2}b - \frac{1}{2}ba - 7b + 3ab$.

$$= -7b + \frac{3}{2}b + 3ab - \frac{1}{2}ba$$
$$= \frac{5}{2}ab - \frac{11}{2}b$$

Answer ..... [2]

(b) Factorise $-8xyz - 18yz + 6xz$ completely.

$$-8xyz - 18yz + 6xz$$
$$= -2z(4xy + 9y - 3x)$$
or $2z(-4xy - 9y + 3x)$

Answer ..... [1]

7 Express $\frac{2a}{5} - \frac{a-4}{3}$ as a single fraction in its simplest form.

$$= \frac{6a}{15} - \frac{5(a-4)}{15}$$
$$= \frac{6a - 5a + 20}{15}$$
$$= \frac{a+20}{15}$$

Answer ..... [2]

8 Two numbers A and B written as the product of their prime factors are

$$A = 2^3 \times 3^{12} \times 5$$
$$B = 2^6 \times 3^8 \times 7.$$

(a) Find the largest integer which is a factor of both A and B, leaving your answer as a product of its prime factors.

$\text{HCF} = 2^3 \times 3^8$

Answer ..... [1]

(b) Find the smallest integer k such that $A \times k$ is a multiple of B.

$A = 2^3 \times 3^{12} \times 5$
$B = 2^6 \times 3^8 \times 7.$

All factors of B must be included, $k = 2^3 \times \quad 7 = 56$

Answer ..... [1]

(c) Find the smallest integer p such that $A \times p$ is a perfect square.

$2^3 \times 3^{12} \times 5 \times p$
$= 2^3 \times 3^{12} \times 5 \times 5 \times 2 = 2^4 \times 3^{12} \times 5^2$
$p = 2 \times 5 = 10$

Answer ..... [1]

9 During the Great Singapore Sale, a washing machine was sold at a discounted price of $578.50.

(a) If the washing machine was sold at a discount of 35%, find the original price of the washing machine.

Since the washing machine was sold for $578.50 at a discount of 35%,

65% rep $578.50

100% rep $\frac{\$578.50}{65} \times 100$

$= \$890$

Hence, the original price of the washing machine was $890

Answer $..... [2]

(b) There is a GST of 8% on the selling price of the washing machine. A customer decided to pay the total amount over a period of 1.5 years. Find the monthly installment of the washing machine. Leave your answer corrected to the nearest dollars.

Since there is a GST of 8% on the selling price of the washing machine,

Price after GST = Price before GST $\times$ (100% + 8%)

$= \$578.50 \times \frac{108}{100}$

$= \$624.78$

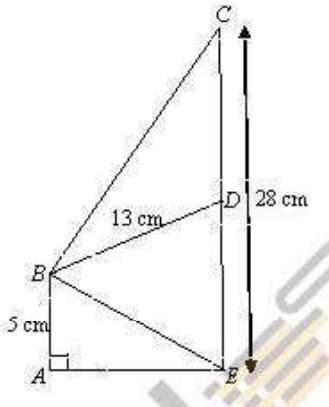
Monthly installment $= \frac{\$624.78}{18}$

$= \$34.71$

$\approx \$35$

Answer $..... [2]

10 The diagram shows a trapezium $ABCE$ and D is a point on CE such that BDE is an equilateral triangle. $AB = 5$ cm, $BD = 13$ cm, $CE = 28$ cm and the area of trapezium $ABDE$ is 108 cm^2.



(a) Find the length of AE.

$\frac{1}{2} \times (5+13) \times AE = 108$

$AE = 12$ cm

Answer ..... m [2]

(b) Find the area of triangle BDC.

$CD = 28 - 13 = 15$ cm

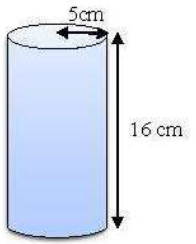
Area of triangle BDC

$= \frac{1}{2} \times 15 \times 12$

$= 90 cm^2$

Answer ..... m^2 [2]

11 A can of drink in the shape of a cylinder has radius 5 cm and height 16 cm.



(a) A label is to be pasted to cover all of the curved surface of the can.
Find the area of the label.

Find the area of the label.

Curved Surface Area $= 2\pi(5)(16)$

$\approx 503 cm^2$ **(corrected to 3 s.f)**

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

(b) Calculate the volume of a dozen cans of drinks, giving your answer to the nearest litre.

Volume of a can $= \pi(5)^2(16)$

Volume of a dozen cans $= \pi(5)^2(16) \times 12$

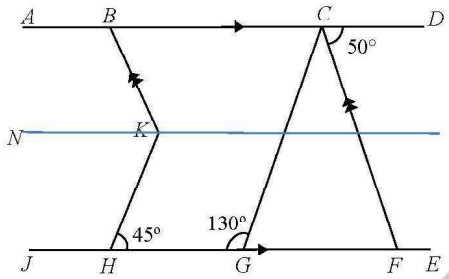
$= 15079.64474 \text{cm}^3$

$\approx 15.079 l$

$\approx 15\ l$ (nearest litres)

Answer ..... l [3]

12 In the diagram below, AD is parallel to JE and BK is parallel to CF. It is given that $\angle DCF = 50°$, $\angle CGH = 130°$ and $\angle KHG = 45°$.



Find, giving reasons for each answer where applicable,

(a) $\angle ABK$,

$\angle CBK = \angle DCF = 50°$ (corr. $\angle$s, BK // CF)
$\angle ABK = 180° - 50°$ (adj $\angle$s on st. line)
$= 130°$

Answer ..... ° [2]

(b) the reflex angle of $\angle BKH$.

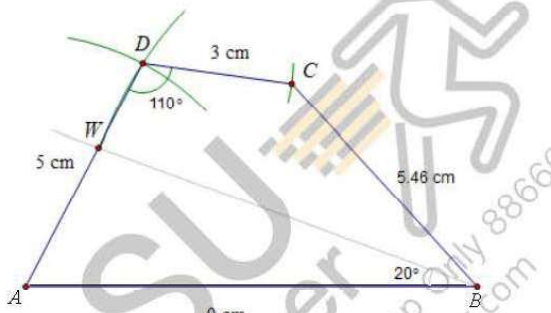
$\angle BKN = \angle KBC = 50°$ (alt $\angle$s, // lines)
$\angle NKH = \angle KHG$ (alt $\angle$s, // lines)
$= 45°$
Reflex $\angle BKH = 360° - 50° - 45°$ ($\angle$s at a point)
$= 265°$

Answer ..... ° [2]

13 A quadrilateral $ABCD$ is such that $AB = 9$ cm, $AD = 5$ cm, $BD = 8$ cm. Angle ADC is 110° and C is 3 cm away from D.

(a) Construct the quadrilateral $ABCD$, showing the construction arcs and measurements clearly. AB has been drawn for you.

Answer (a) [2]



(b) Measure the length BC.

$BC = 5.5$ cm

Answer [1]

(c) W is a point on AD such that angle ABW is 20°.

Mark the point W on the diagram. [1]