中正中学 义顺

CHUNG CHENG HIGH SCHOOL (YISHUN)

NA

2023 End-Of-Year Examination
Secondary Two Normal Academic

CANDIDATE NAME

CLASS

INDEX NUMBER

MATHEMATICS
Section A

4052
5 October 2023
2 hours 30 minutes

Candidates answer on the Question Paper.
No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your name, index number and class in the spaces at the top of this page.
Write in dark blue or black pen.
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Answer all questions in Section A and Section B.
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For π, use your calculator value, 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 section is **50**.

Question Number	Marks Possible	Marks Obtained
1	2	
2	4	
3	4	
4	2	
5	3	
6	3	
7	4	
8	2	
9	6	
10	6	
11	2	
12	4	
13	4	
14	4	
Presentation Deduction		– 1 / – 2
Section A	50	
Section B	50	
Total	100	

[Turn over

1 **(a)** Solve $2 - 5t < 36$.

Answer ..... [1]

(b) Hence, write down the smallest value of t if t is an integer.

Answer $t =$ ..... [1]

---

2 A map is drawn to a scale of 1 : 200.

(a) Given that the actual distance between two towns is 50 m, find the distance, in centimetres, between the two towns on the map.

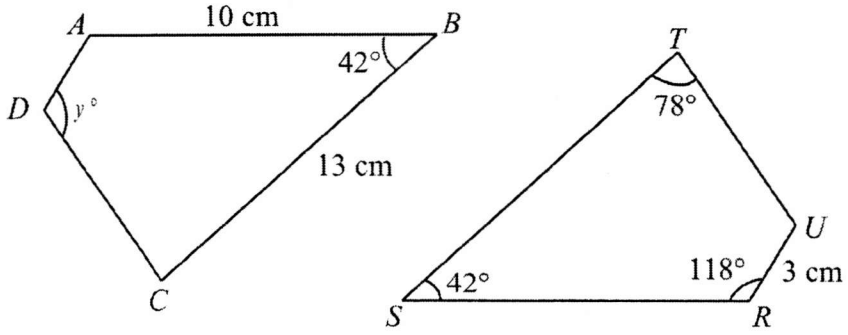
Answer ..... cm [2]

(b) A farm has an area of 30 cm^2 on the map.
Calculate the actual area, in square metres, of the farm.

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

---

3 The diagram below shows two congruent quadrilaterals. It is given that angle $SRU = 118°$, angle $STU = 78°$, angle $RST = 42°$, angle $ABC = 42°$, $AB = 10$ cm, $BC = 13$ cm and $RU = 3$ cm.



(a) State the figure that is congruent to $ABCD$.

Answer $ABCD \equiv$ ..... [1]

(b) State the length of SR.

Answer ..... cm [1]

(c) Find the value of y.

Answer $y =$ ..... [2]

---

4 Express $\frac{x+1}{5} - \frac{5x+2}{6}$ as a fraction in its simplest form.

Answer ..... [2]

---

5 Solve the following pair of simultaneous equations.

$$3x + 2y = 10$$
$$x - 4y = 1$$

Answer $x =$ ..... , $y =$ ..... [3]

---

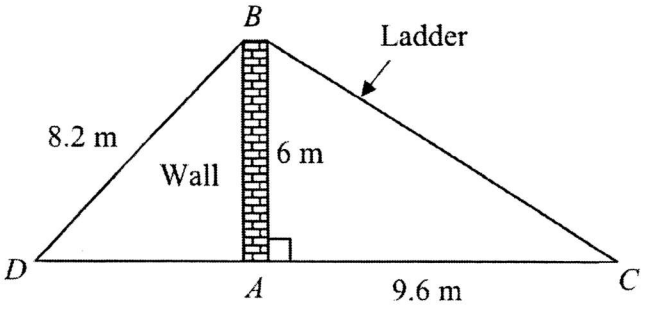
6 Solve $\dfrac{4x+3}{5} - \dfrac{x}{2} = 3$.

Answer $x =$ ..... [3]

---

7 A ladder BC is leaning against the wall AB and touching the top of the wall at B. The height of the wall is 6 m and the distance from the foot of the ladder to the foot of the wall, AC, is 9.6 m.

(a) Find the length of the ladder BC.



Answer ..... m [2]

AD is the shadow casted by the wall on the ground and $BD = 8.2$ m.

(b) Find AD.

Answer ..... m [2]

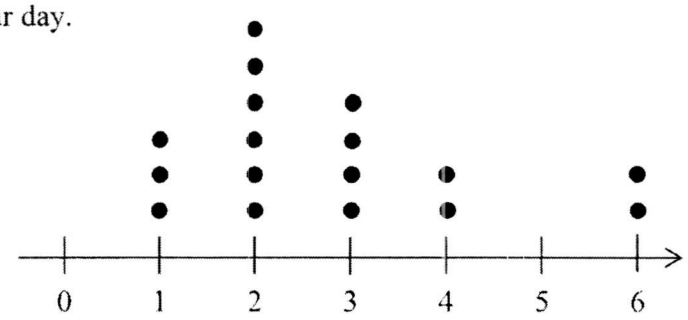
---

8 There are some red balls, green balls and blue balls in a bag. The table shows the probability of drawing a ball of the respective colour.

	Red	Green	Blue
Probability	$\frac{1}{10}$	$\frac{1}{6}$	$\frac{11}{15}$

Explain, with clear working, why the minimum number of balls in the bag is 30. [2]

9 The following dot diagram shows the number of hours that 16 students spent on the computer on a particular day.



(a) Find

(i) the mean,

Answer ..... hours [2]

(ii) the median,

Answer ..... hours [1]

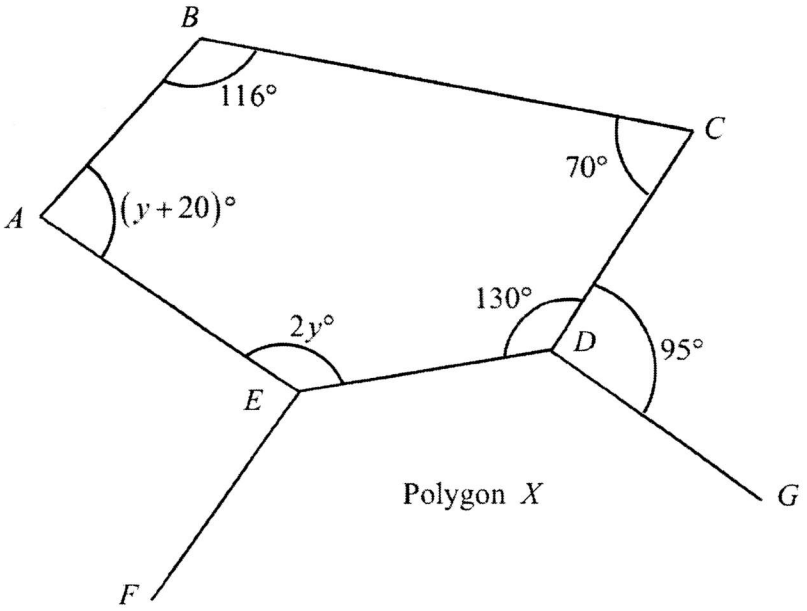
(iii) the mode.

Answer ..... hours [1]

(b) When the data of a new student, Ken, is added to the dot diagram, the mean score of the 17 students is 3 hours. Find the number of hours spent by Ken on the computer.

Answer ..... hours [2]

10 The diagram shows a pentagon $ABCDE$.



(a) Find the sum of interior angles of a pentagon.

Answer .....° [1]

(b) Find the value of y.

Answer $y =$ ..... [2]

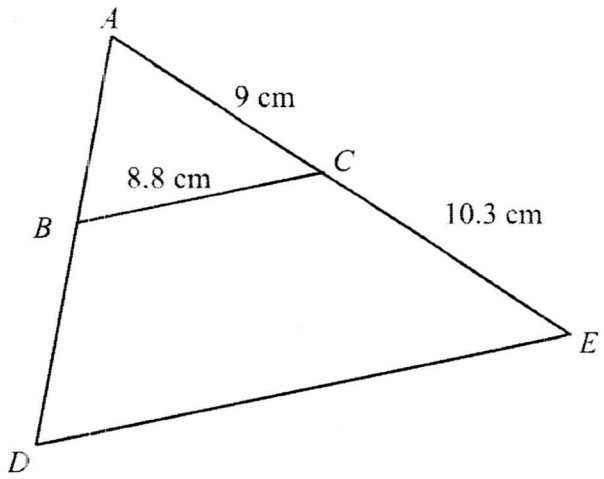
(c) $FEDG$ is part of a **regular** polygon X. Find the number of sides of polygon X.

Answer ..... [3]

11 In the diagram, triangle ABC is similar to triangle ADE.

$AC = 9\,\text{cm}$, $CE = 10.3\,\text{cm}$ and $BC = 8.8\,\text{cm}$.

Find the length of DE.



Answer ..... cm [2]

---

12 A bag contains 12 balls, numbered 1 to 12. A ball is drawn at random from the bag.
Find the probability that the ball drawn is

(a) an even number,

Answer ..... [1]

(b) greater than 8,

Answer ..... [1]

(c) a prime number,

Answer ..... [1]

(d) a negative number.

Answer ..... [1]

13 F is inversely proportional to x^3.
Given that $F = 12$ when $x = 2$, find

(a) an expression for F in terms of x,

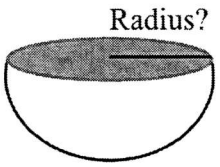
Answer ..... [2]

(b) the value of x when $F = 0.768$.

Answer $x =$ ..... [2]

---

14 A solid hemisphere has a volume of 144π cm^3.



(a) Find the radius of the hemisphere.

Answer ..... cm [2]

(b) Find the total surface area of the hemisphere, correct your answer to 3 significant figures.

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

中正中学 义顺

CHUNG CHENG HIGH SCHOOL (YISHUN)

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2023 End-Of-Year Examination

Secondary Two Normal Academic

CANDIDATE NAME

CLASS | INDEX NUMBER

MATHEMATICS **4052**

Section B

5 October 2023

2 hours 30 minutes

Candidates answer on the Question Paper.
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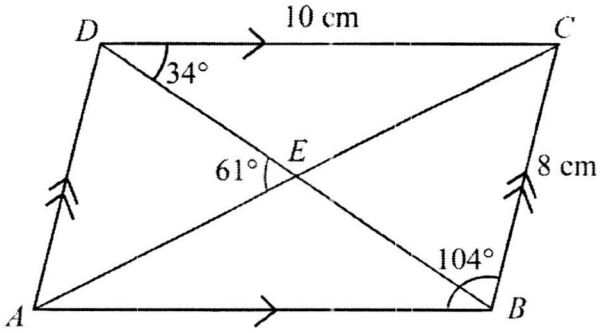
Question Number	Marks Possible	Marks Obtained
1	8	
2	9	
3	5	
4	8	
5	5	
6	7	
7	8	
Section B	50	

1 The diagram shows a parallelogram $ABCD$. Angle $ABC = 104°$, angle $AED = 61°$, angle $BDC = 34°$, $DC = 10$ cm and $BC = 8$ cm



Find, **giving your reasons clearly**,

(a) the length of AD,

Answer ..... cm [2]

(b) angle ADB,

Answer ..... ° [2]

(c) angle DAC,

Answer ..... ° [2]

(d) angle CAB .

Answer ..... ° [2]

2 **(a)** Expand and simplify $(x-5)^2-(x-3)(x+2)$.

Answer ..... [3]

(b) Factorise completely

(i) $2y^2-19y+24$

Answer ..... [2]

(ii) $16y-24$

Answer ..... [1]

(iii) $2y^2-128$

Answer ..... [2]

(b) Hence simplify $\dfrac{2y^2-19y+24}{2y^2-128}\div\dfrac{16y-24}{4}$.

Answer ..... [1]

3 The stem-and-leaf diagram shows the time taken, in minutes by some students to complete an assignment.

2	1	2	5	5	6	6	8	
3	0	1	2	4	4	4	4	7
4	1	3	4	8				
5								
6								
7	1							

Key: 2 | 1 means 21 minutes

(a) Find the modal time.

Answer ..... min [1]

(b) Find the mean time.

Answer ..... min [2]

(c) Explain why the mean may not be an appropriate average to use to summarise the times taken by these students.

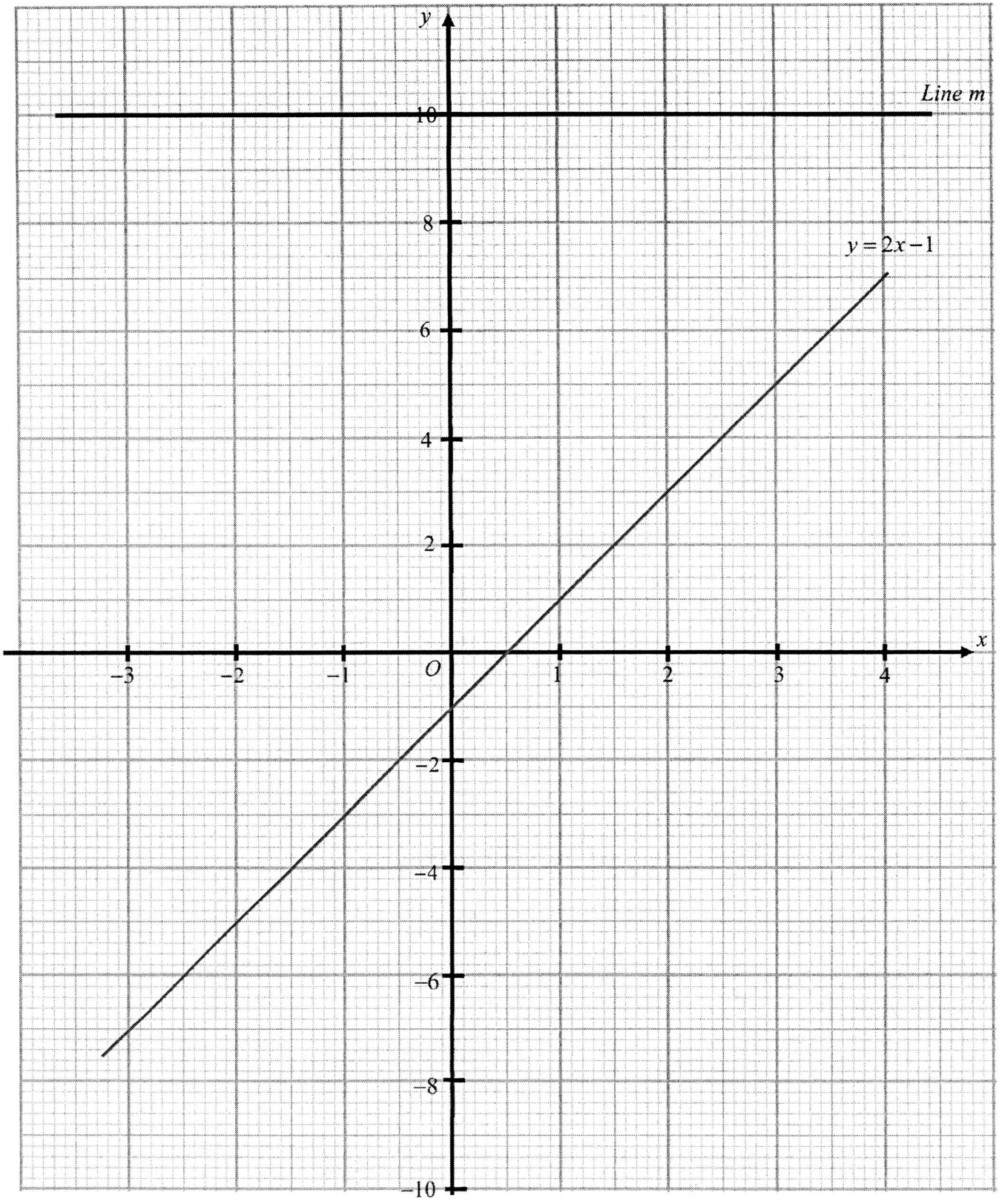
Answer .....

..... [1]

(d) The time taken, t minutes, by another student to complete the assignment is included in the data set. The new median time is 32 minutes. The new difference between the maximum value and minimum value is 54 minutes. Find the value of t.

Answer $t =$ ..... [1]

4 The diagram below shows the graph of $y = 2x - 1$ and *Line m*.



(a) **Using your graph of** $y = 2x - 1$, find the value of x when $y = 2.2$.

Answer $x =$ ..... [1]

(b) Find the gradient of the line $y = 2x - 1$.

Answer ..... [1]

(c) Write down the coordinates of the point where the line $y = 2x - 1$ cuts the x-axis.

Answer (..... , ...) [1]

(d) Write down the equation of *Line m*.

Answer ..... [1]

(e) The table of values for $y = -2x - 3$ is given below.

x	−3	−1	1	3
y	3	p	−5	−9

(i) Find the value of p.

Answer $p =$ ..... [1]

(ii) Draw and **label** the graph of $y = -2x - 3$ on the diagram provided on page 5. [2]

(iii) Hence **use the graphs** to solve the simultaneous equations

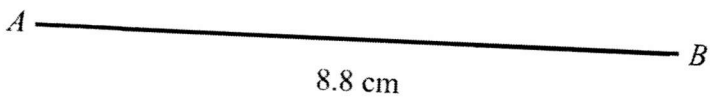
$$y = 2x - 1$$
$$y = -2x - 3$$

Answer $x =$ .....

$y =$ ..... [1]

5 **(a)** Construct a triangle such that $AB = 8.8$ cm, $BC = 8.6$ cm and $CA = 13$ cm.
The line AB is shown below.

[2]



(b) Measure and write down the **angle** opposite the longest side of the triangle.

Answer ..... ° [1]

(c) Find the perpendicular distance from B to AC.

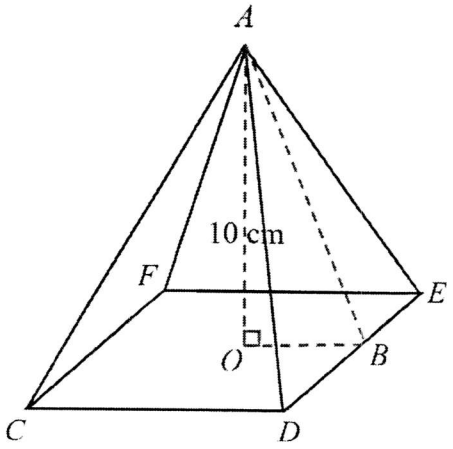
Answer ..... cm [1]

(d) **Hence** find the area of triangle ABC.

Answer ..... cm^2 [1]

6 The diagram shows a candle in the shape of a pyramid with a vertical height of 10 cm . The base of the pyramid is a square $CDEF$ and the volume of the pyramid is 235.2 cm^3.

(a) Show that the length of CD is 8.4 cm. [2]



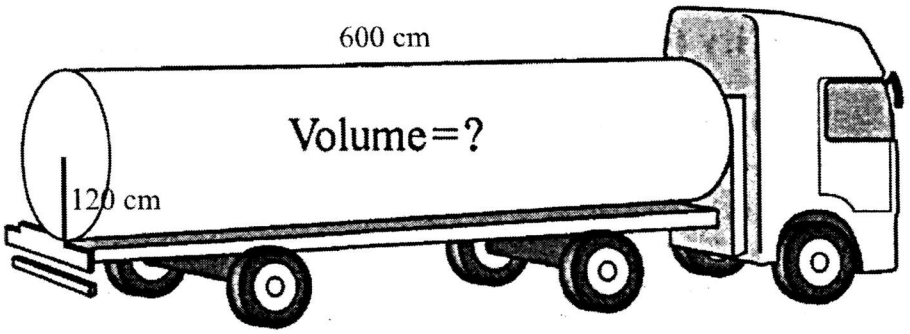
(b) Find the length of AB.

Answer ..... cm [2]

(c) Find the total surface area of the candle.

Answer ..... cm^2 [3]

7 A water tanker has a cylindrical tank of radius 120 cm and length 600 cm.



(a) Calculate the volume of water that it holds when full. **Give your answer in m^3, correct to one decimal place. Use your calculator value for π.** [1 m^3 = 1 000 000 cm^3]

Answer ..... m^3 [2]

(b) The tanker delivers the water to a factory.
The factory uses the water to fill 500 cm^3 bottles.
How many full bottles can it fill from the tanker?

Answer ..... [1]

(c) The factory packs these bottles in boxes of 24 bottles.
How many complete boxes does it pack?

Answer ..... [1]

The diagram below shows the breakdown of water price in Singapore.
Water usage is charged per cubic metre, with the amount of water consumed (in m^3) corrected to one decimal place.

Monthly Water Usage	Price per m^3 for the first 40 m^3	Price per m^3 thereafter (>40 m^3)
Tariff	$1.21	$1.52
Water Conservation Tax (% of Tariff)	$0.61 (50% of $1.21)	$0.99 (65% of $1.52)
Waterborne Fee	$0.92	$1.18
Total Price	**$2.74**	**$3.69**

Note: All figures are **before** GST.

Source: https://www.pub.gov.sg/watersupply/waterprice

(d) Calculate the price of water (before GST) that the water tanker, in **(a)**, holds when full.

Answer $ ..... [1]

(e) A shop uses 50 m^3 of water.
Calculate the total price that the shop has to pay for the water used, **inclusive of 8% GST**.

Answer $ ..... [3]

新加坡 中正中学 CHUNG CHENG HIGH SCHOOL SINGAPORE 义顺

中正中学 义顺
CHUNG CHENG HIGH SCHOOL (YISHUN)

NA

2023 End-Of-Year Examination
Secondary Two Normal Academic

CANDIDATE NAME			
CLASS		INDEX NUMBER	

Mathematics
5 October 2023

Section A
2 hour 30 minutes

Additional Materials: NIL

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For Examiner's Use	
Section A	**/ 50**
Section B	**/ 50**
Total	**/ 100**

Setter: Ms Teo Shin Yeow

This document consists of 10 pages including the cover page.

[Turn over

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

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

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

1 **(a)** Solve $2-5t<36$.

$-5t<36-2$

$-5t<34$

$t>-6.8$

Answer $t>-6.8$ [1]

(b) Hence, write down the smallest value of t if t is an integer.

Answer $t=-6$ [1]

---

2 A map is drawn to a scale of 1 : 200.

(a) Given that the actual distance between two towns is 50 m, find the distance, in centimetres, between the two towns on the map.

Distance on map

$=50\div 2$

$=25cm$

Answer 25 cm [2]

(b) A farm has an area of 30 cm^2 on the map.
Calculate the actual area, in square metres, of the farm.

1 cm^2 : 4 m^2

30 cm^2 : ?

Actual distance

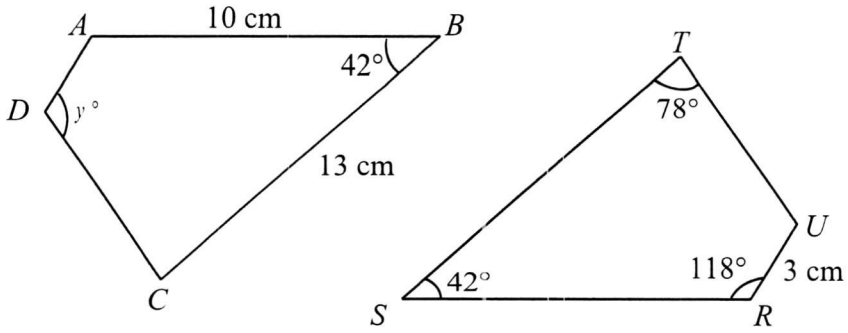
$=4\times 30$

$=120m^2$

Answer 120 m^2 [2]

---

3 The diagram below shows two congruent quadrilaterals. It is given that angle $SRU = 118°$, angle $STU = 78°$, angle $RST = 42°$, angle $ABC = 42°$, $AB = 10$ cm, $BC = 13$ cm and $RU = 3$ cm.



(a) State the figure that is congruent to $ABCD$.

Answer $ABCD \equiv$ .....*RSTU*..... [1]

(b) State the length of SR.

$SR = BA = 10cm$

Answer .....10..... cm [1]

(c) Find the value of y.

$\angle CDA = \angle TUR$

$y° = 360° - 42° - 118° - 78°$

$= 122°$

$y = 122$

Answer $y =$ .....122..... [2]

---

4 Express $\frac{x+1}{5} - \frac{5x+2}{6}$ as a fraction in its simplest form.

$$\frac{6(x+1)-5(5x+2)}{30}$$

$$= \frac{6x+6-25x-10}{30}$$

$$= \frac{-19x-4}{30}$$

Answer $\frac{-19x-4}{30}$ [2]

5 Solve the following pair of simultaneous equations.

$3x+2y=10$ --------- [1]
$x-4y=1$ --------- [2]

[1]×2: $6x+4y=20$ --------[3]

[2]+[3]: $x-4y+6x+4y=1+20$

$7x=21$

$x=3$

Sub $x=3$ into [2]:

$3-4y=1$

$-4y=-2$

$y=0.5$

Answer x = ...3..... , y = ...0.5..... [3]

---

6 Solve $\frac{4x+3}{5}-\frac{x}{2}=3$.

$\frac{2(4x+3)-5x}{10}=3$

$8x+6-5x=30$

$3x+6=30$

$3x=24$

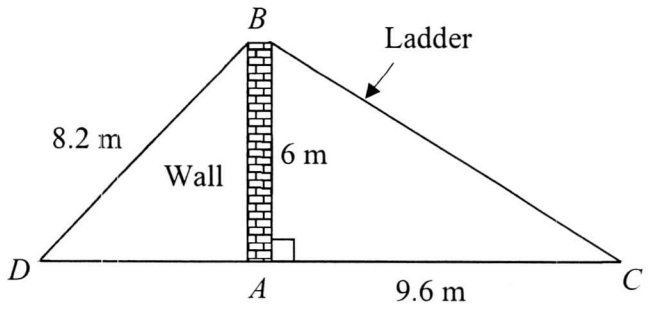
$x=8$

Answer x = ...8..... [3]

---

7 A ladder BC is leaning against the wall AB and touching the top of the wall at B. The height of the wall is 6 m and the distance from the foot of the ladder to the foot of the wall, AC, is 9.6 m.

(a) Find the length of the ladder BC.



$BC^2 = 6^2 + 9.6^2$

$BC^2 = 128.16$

$BC = 11.3m$

Answer ..... 11.3 ..... m [2]

AD is the shadow casted by the wall on the ground and $BD = 8.2$ m.

(b) Find AD.

$AD^2 = 8.2^2 - 6^2$

$AD^2 = 31.24$

$AD = 5.59m$

Answer ..... 5.59 ..... m [2]

---

8 There are some red balls, green balls and blue balls in a bag. The table shows the probability of drawing a ball of the respective colour.

	Red	Green	Blue
Probability	$\frac{1}{10}$	$\frac{1}{6}$	$\frac{11}{15}$

Explain, with clear working, why the minimum number of balls in the bag is 30. [2]

The total number of balls in the bag must be divisible by 10, 6 and 15.

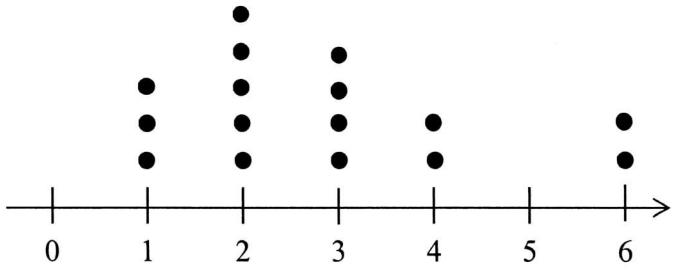
$10 = 2 \times 5$
$6 = 2 \times 3$
$15 = 3 \times 5$

LCM $= 2 \times 3 \times 5 = 30$

Therefore minimum number of balls in the bag is 30.

---

9 The following dot diagram shows the number of hours that 16 students spent on the computer on a particular day.



(a) Find

(i) the mean,

$$\text{Mean} = \frac{1\times3+2\times5+3\times4+4\times2+6\times2}{16}$$
$$= \frac{45}{16}$$
$$= 2\frac{13}{16} \text{ hours}$$

Answer $2\frac{13}{16}$ hours [2]

(ii) the median,

$$\text{Position of median} = \frac{16+1}{2} = 8.5$$

$$\text{Median} = \frac{2+3}{2} = 2.5 \text{ hours}$$

Answer 2.5 hours [1]

(iii) the mode.

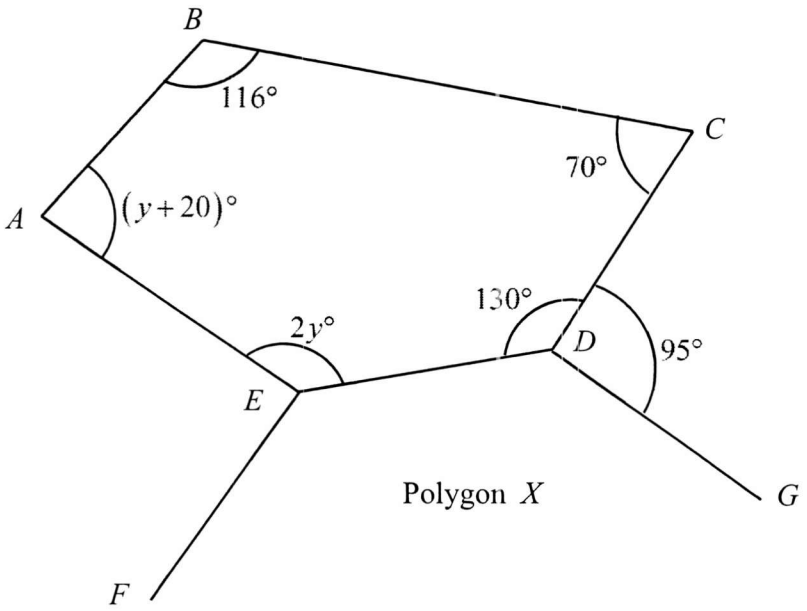
Answer 2 hours [1]

(b) When the data of a new student, Ken, is added to the dot diagram, the mean score of the 17 students is 3 hours. Find the number of hours spent by Ken on the computer.

$$45 + x = 17\times3$$
$$x = 51 - 45$$
$$x = 6$$

Answer 6 hours [2]

10 The diagram shows a pentagon $ABCDE$.



(a) Find the sum of interior angles of a pentagon.

Sum of interior angles

$=(5-2)\times 180°$

$=540°$

Answer .....540.....° [1]

(b) Find the value of y.

$116+70+130+2y+y+20=540$

$3y+336=540$

$3y=204$

$y=68$

Answer $y=$.....68..... [2]

(c) $FEDG$ is part of a **regular** polygon X. Find the number of sides of polygon X.

$\angle EDG=360°-130°-95°$

$=135°$

Ext angle = $45°$

Number of sides = $360\div 45$

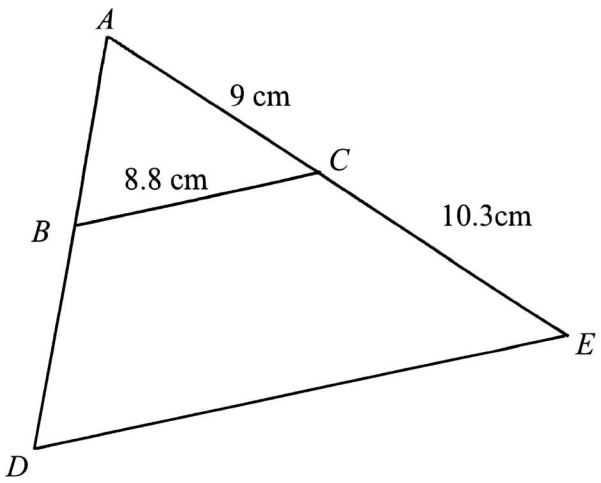
$=8$

Answer .....8..... [3]

11 In the diagram, triangle ABC is similar to triangle ADE.

$AC = 9\,\text{cm}$, $CE = 10.3\,\text{cm}$ and $BC = 8.8\,\text{cm}$.

Find the length of DE.



$$\frac{BC}{DE} = \frac{AC}{AE}$$

$$\frac{8.8}{DE} = \frac{9}{19.3}$$

$$9DE = 169.84$$

$$DE = 18.9cm$$

Answer 18.9 cm [2]

---

12 A bag contains 12 balls, numbered 1 to 12. A ball is drawn at random from the bag.
Find the probability that the ball drawn is

(a) an even number,

Even number: {2, 4, 6, 8, 10,12}

P (even number) = $\frac{6}{12} = \frac{1}{2}$

Answer $\frac{1}{2}$ [1]

(b) greater than 8,

Greater than 8: {9, 10, 11, 12}

P (greater than 8) = $\frac{4}{12} = \frac{1}{3}$

Answer $\frac{1}{3}$ [1]

(c) a prime number,

Prime: {2, 3, 5, 7, 11}

P (prime) = $\frac{5}{12}$

Answer $\frac{5}{12}$ [1]

(d) a negative number.

Answer 0 [1]

13 F is inversely proportional to x^3.
Given that $F = 12$ when $x = 2$, find

(a) an expression for F in terms of x.

$$F = \frac{k}{x^3}$$
$$12 = \frac{k}{2^3}$$
$$k = 96$$
$$F = \frac{96}{x^3}$$

Answer $F = \frac{96}{x^3}$ [2]

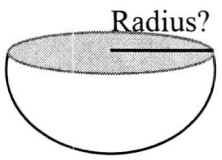
(b) the value of x when $F = 0.768$.

$$F = \frac{96}{x^3}$$
$$0.768 = \frac{96}{x^3}$$
$$x^3 = 125$$
$$x = 5$$

Answer $x =$ 5 [2]

---

14 A solid hemisphere has a volume of 144π cm^3.



(a) Find the radius of the hemisphere.

$$144\pi = \frac{2}{3}\pi r^3$$
$$r^3 = 216$$
$$r = 6$$

Answer 6 cm [2]

(b) Find the total surface area of the hemisphere, correct your answer to 3 significant figures.

Total surface area
$= 2\pi r^2 + \pi r^2$
$= 3\pi(6)^2$
$= 339.29$
$= 339 cm^2$ (3 sig. fig)

Answer 339 cm^2 [2]

~~ *End of Section A*~~

中正中学 义顺

CHUNG CHENG HIGH SCHOOL (YISHUN)

NA

2023 End-Of-Year Examination
Secondary Two Normal Academic

CANDIDATE NAME			
CLASS		INDEX NUMBER	

Mathematics

5 October 2023

Section B

2 hour 30 minutes

Additional Materials: NIL

READ THESE INSTRUCTIONS FIRST
Write your name, index number and class in the spaces at the top of this page.
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.

Answer **all** questions in Section A and Section B.
You are advised to spend no more than 1 hour 15 minutes in each section.

If working is needed for any question, it must be shown with the answer.
Omission of essential workings and units will result in loss of marks.
You are reminded of the need for clear presentation in your answers.

Leave your answer in the simplest form. 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.

For π, use your calculator value, unless the question requires the answer in terms of π.

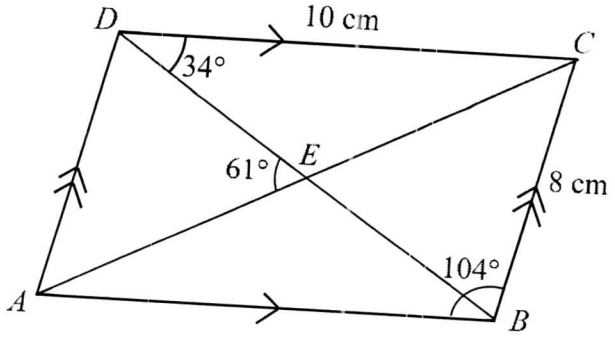
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this section is 50.

For Examiner's Use
/ 50

Setter : Ms Teo Shin Yeow

This paper consists of **10** printed pages, INCLUDING the cover page.

1 The diagram shows a parallelogram $ABCD$. Angle $ABC = 104°$, angle $AED = 61°$, angle $BDC = 34°$, $DC = 10$ cm and $BC = 8$ cm



Find, **giving your reasons clearly**,

(a) the length of AD,

$AD = 8cm$

(opposite sides of parallelogram)

Answer 8 cm [2]

(b) angle ADB,

$\angle ADC = 104°$ (opposite angles of parallelogram)

$\angle ADC = 104° - 34°$

$= 70°$

Answer 70 ° [2]

(c) angle DAC,

$\angle DAC = 180° - 61° - 70°$ (angle sum of triangle)

$= 49°$

Answer 49 ° [2]

(d) angle CAB.

$\angle DAB = 180° - 104°$ (interior angles, AD//BC)

$= 76°$

$\angle CAB = 76° - 49°$

$= 27°$

Answer 27 ° [2]

2 **(a)** Expand and simplify $(x-5)^2-(x-3)(x+2)$.

$x^2-10x+25-(x^2+2x-3x-6)$

$=x^2-10x+25-x^2+x+6$

$=-9x+31$

Answer $-9x+31$ [3]

(b) Factorise completely

(i) $2y^2-19y+24$

$2y$	-3	$-3y$
y	-8	$-16y$
$2y^2$	24	$-19y$

Answer $(y-8)(2y-3)$ [2]

(ii) $16y-24$

Answer $8(2y-3)$ [1]

(iii) $2y^2-128$

$2(y^2-64)$

$=2(y-8)(y+8)$

Answer $2(y-8)(y+8)$ [2]

(b) Hence simplify $\dfrac{2y^2-19y+24}{2y^2-128}\div\dfrac{16y-24}{4}$.

$\dfrac{(2y-3)(y-8)}{2(y-8)(y+8)}\times\dfrac{4}{8(2y-3)}=\dfrac{1}{4(y+8)}$

Answer $\dfrac{1}{4(y+8)}$ [1]

3 The stem-and-leaf shows the times, in minutes taken by some students to complete an assignment.

2	1	2	5	5	6	6	8	
3	0	1	2	4	4	4	4	7
4	1	3	4	8				
5								
6								
7	1							

Key: 2 | 1 means 21 minutes

(a) Find the modal time.

Answer 34 min [1]

(b) Find the mean time.

Mean

$= \left[21+22+25(2)+26(2)+28+30+31+32+34(4)+37+41+43+44+48+71\right] \div 20$

$= 686 \div 20$

$= 34.3$ min

Answer 34.3 min [2]

(c) Explain why the mean may not be an appropriate average to use to summarise the times taken by these students.

Answer There is an outlier 71, which will push up the mean of the data. [1]

(d) The time taken, t minutes, by another student to complete the assignment is included in the data set. The new median time is 32 minutes. The new difference between the maximum value and minimum value is 54 minutes. Find the value of t.

11^{th} position = 32 min

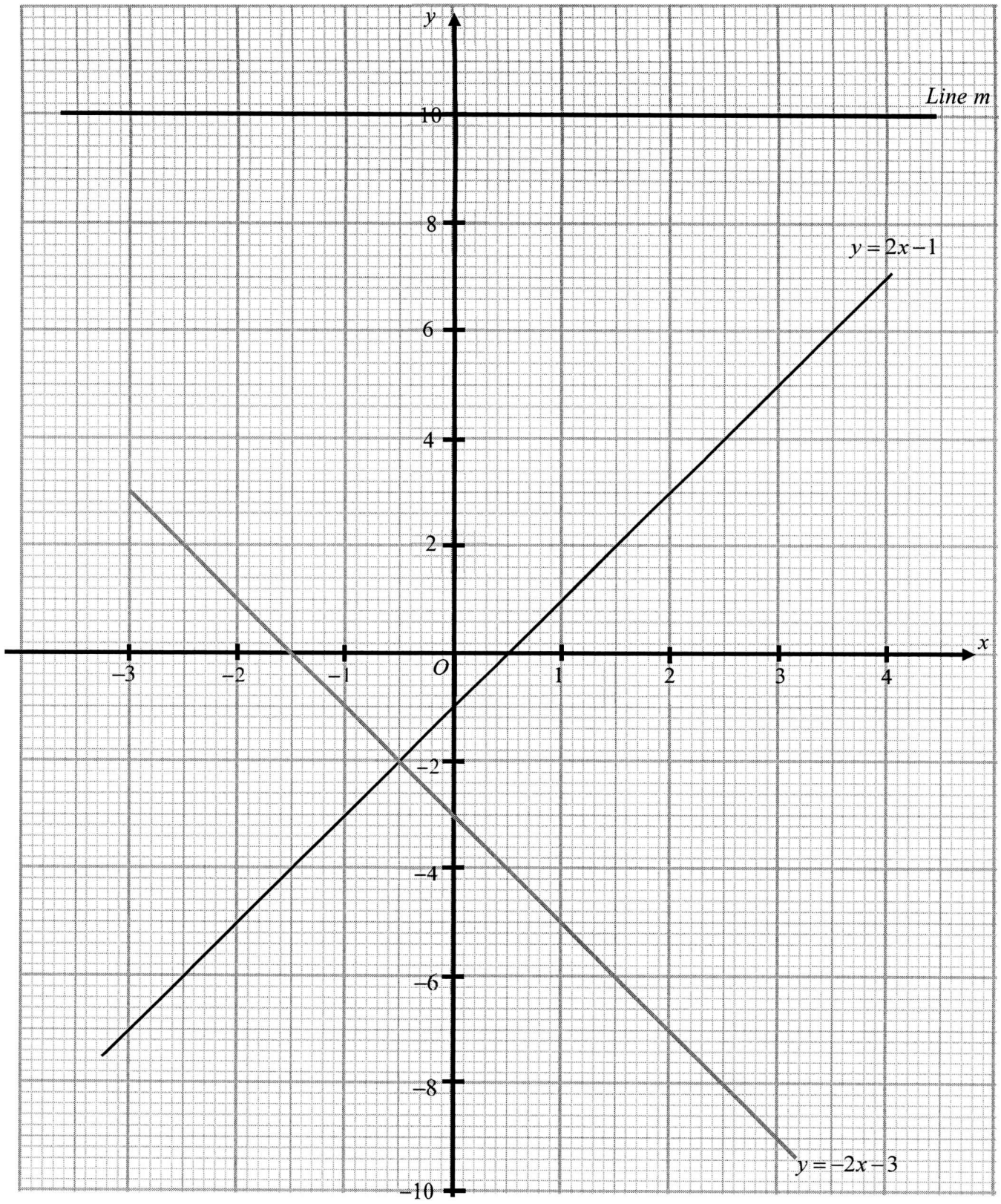
t is the smallest value in the data.

$t = 71 - 54$

$t = 17$

Answer $t =$ 17 [1]

4 The diagram below shows the graph of $y = 2x - 1$ and *Line m*.



(a) **Use your graph**, find the value of x when $y = 2.2$.

Answer $x =$ ..... 1.6 ..... [1]

(b) Find the gradient of the line $y = 2x - 1$.

Answer ..... 2 ..... [1]

(c) Write down the coordinates of the point where the line $y = 2x - 1$ cuts the x-axis.

Answer (..... 0.5 ..... , ... 0 .....) [1]

(d) Write down the equation of *Line m*.

Answer ..... $y = 10$ ..... [1]

(e) The table of values for $y = -2x - 3$ is given below.

x	-3	-1	1	3
y	3	p	-5	-9

(i) Find the value of p.

Answer $p =$ ..... -1 ..... [1]

(ii) Draw and **label** the graph of $y = -2x - 3$ on the diagram provided on page 5. [2]

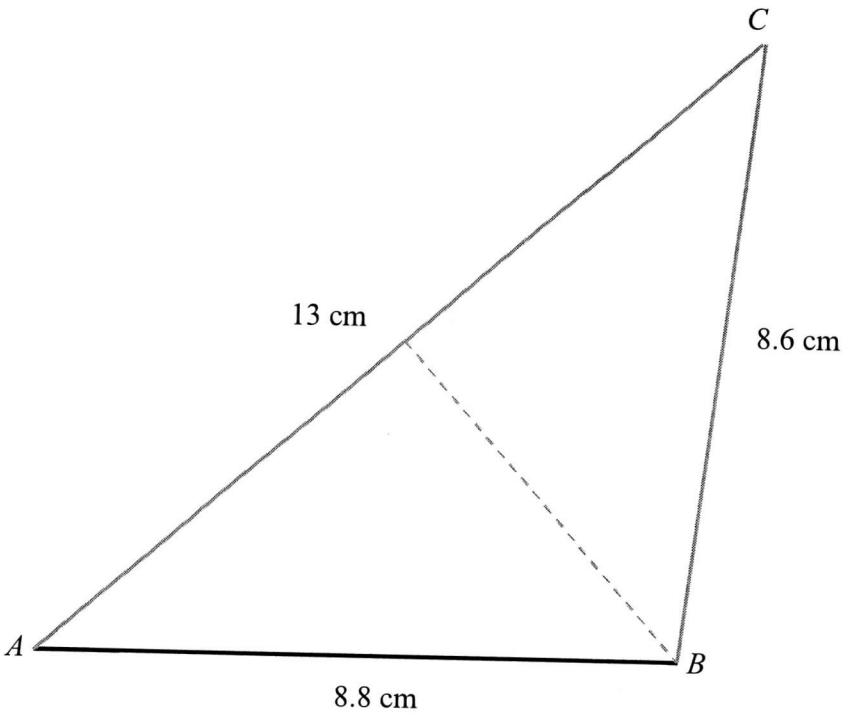
(iii) Hence **use the graphs** to solve the simultaneous equations

$$y = 2x - 1$$
$$y = -2x - 3$$

Answer $x =$ ..... -0.5 .....

$y =$ ..... -2 ..... [1]

5 **(a)** Construct a triangle such that $AB = 8.8$ cm, $BC = 8.6$ cm and $CA = 13$ cm.
The line AB is shown below. [2]



(b) Measure and write down the angle opposite the longest side.

Answer 96 - 97 ° [1]

(c) Find the perpendicular distance from B to AC.

Answer 5.7 - 5.8 cm [1]

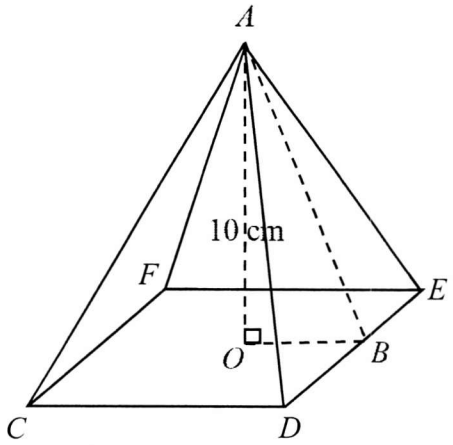
(d) **Hence** find the area of triangle ABC.

$$\text{Area} = \frac{1}{2} \times 5.7 \times 13 = 37.05 \text{ cm}^2$$

Answer 37.05 – 37.7 cm^2 [1]

6 The diagram shows a candle in the shape of a pyramid with a vertical height of 10 cm . The base of the pyramid is a square $CDEF$ and the volume of the pyramid is $235.2\ \text{cm}^3$.

(a) Show that the length of CD is 8.4 cm. [2]



$\frac{1}{3}(\text{base area})(10) = 235.2$

Base area = 70.56

$CD = \sqrt{70.56}$

$CD = 8.4$ cm (shown)

(b) Find the length of AB.

$AB^2 = 10^2 + 4.2^2$

$AB^2 = 117.64$

$AB = 10.846$

$AB = 10.8$ cm

Answer ..... 10.8 ..... cm [2]

(c) Find the total surface area of the candle.

Area of triangle $= \left(\frac{1}{2}\right)(8.4)\left(\sqrt{117.64}\right) = 45.554\ \text{cm}^2$

Total surface area

$= \text{square} + 4\ \text{triangles}$

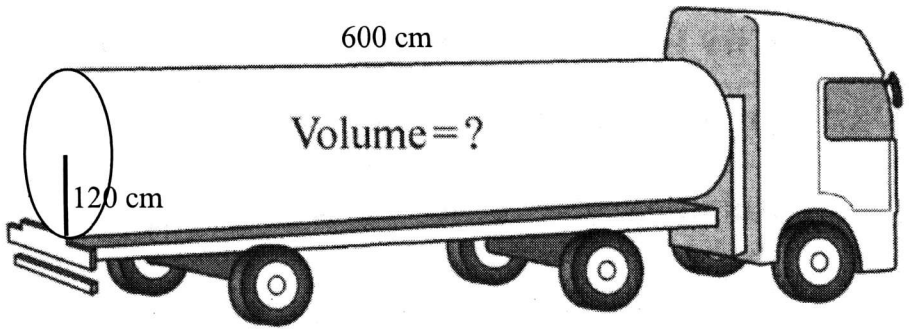
$= 70.56 + 4(45.554)$

$= 252.776$

$= 253\ \text{cm}^2$

Answer ..... 253 ..... cm^2 [3]

7 A water tanker has a cylindrical tank of radius 120 cm and length 600 cm.



(a) Calculate the volume of water that it holds when full. **Give your answer in m^3, correct to one decimal place. Use your calculator value for π.** [1 m^3 = 1 000 000 cm^3]

Volume of water

$= \pi(120)^2(600)$

$= 27\ 143\ 360.53\ cm^3$

$= 27.1\ m^3$

Answer 27.1 m^3 [2]

(b) The tanker delivers the water to a factory.
The factory uses the water to fill 500 cm^3 bottles.
How many full bottles can it fill from the tanker?

Number of bottles

$= 27\ 143\ 360.53 \div 500$

$= 54286$

Answer 54 286 [1]

(c) The factory packs these bottles in boxes of 24 bottles.
How many complete boxes does it pack?

Number of boxes

$= 54286 \div 24$

$= 2261.947$

Answer 2261 [1]

The diagram below shows the breakdown of water price in Singapore.
Water usage is charged per cubic metre, with the amount of water consumed (in m^3) corrected to one decimal place.

Monthly Water Usage	Price per m^3 for the first 40 m^3	Price per m^3 thereafter (>40 m^3)
Tariff	\$1.21	\$1.52
Water Conservation Tax (% of Tariff)	\$0.61 (50% of \$1.21)	\$0.99 (65% of \$1.52)
Waterborne Fee	\$0.92	\$1.18
Total Price	**\$2.74**	**\$3.69**

Note: All figures are **before** GST.

Source: https://www.pub.gov.sg/watersupply/waterprice

(d) Calculate the price of water (before GST) that the water tanker, in **(a)**, holds when full.

Price of water

$= 27.1 \times 2.74$

$= \$74.25$

Answer \$ ..... 74.25 ..... [1]

(e) A shop uses 50 m^3 of water.
Calculate the total price that the shop has to pay for the water used, **inclusive of 8% GST**.

Price of water (before GST)

$= 2.74 \times 40 + 3.69 \times 10$

$= \$146.50$

Price of water with GST

$= \$146.50 \times 1.08$

$= \$158.22$

Answer \$ ..... 158.22 ..... [3]

~~ *End of Section B* ~~