PART A (20 MARKS)

1. Simplify $2\frac{1}{5}+\left(\frac{1}{7}\times\frac{2}{3}\right)\div\frac{10}{21}-\left(\frac{1}{2}\right)^2$.

   A. $2\frac{3}{20}$ B. $3\frac{3}{100}$ C. $1\frac{9}{10}$ D. $\frac{3}{20}$

2. In Mathematics test, Albert answered 35 questions out of 50 correctly. What is the percentage he answered the question incorrectly?

   A. 3% B. 0.3% C. 30% D. 70%

3. What is the standard form of the number 0.00004802 ?.

   A. 4.802×10^{3} B. 4.802×10^{-5} C. 0.4802×10^{-4} D. 4.802×10^{5}

4. Given the function $f(x)=\frac{1-2x}{x-1}$. Find $f(6)-f(-2)$.

   A. $-\frac{8}{15}$ B. $-\frac{11}{5}$ C. $\frac{11}{3}$ D. $-\frac{16}{15}$

5. Simplify the algebraic expression $5\left(2x^3+5x^2-8y-2\right)-3\left(4x^2+5x-2y\right)$.

   A. $10x^3+37x^2+15x-40y-10$ B. $10x^3+13x^2-15x-34y-10$

   C. $10x^3-12x^2+15x+40y+10$ D. $10x^3-25x^2-15x+40y-5$

6. Solve the simultaneous equations

$$5x-2y=31$$
$$4x+3y=11$$

   A. $x=-5, y=3$ B. $x=3, y=2$

   C. $x=-1, y=-18$ D. $x=5, y=-3$

7. Given matrix

$$A=\begin{pmatrix}1 & -3 & 1\\ 2 & 0 & 3\\ 1 & -2 & 2\end{pmatrix}.$$

Find the determinant of A.

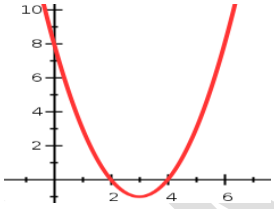
A. -3 B. -5 C. 4 D. 5

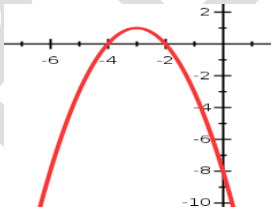
8. If $-2x^2-4x+6=a(x+b)^2+c$, find the value of a, b and c.

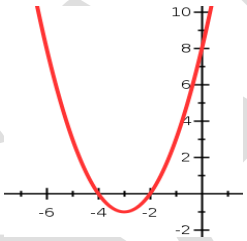
A. $a=-2, b=1, c=8$ B. $a=-2, b=-3, c=8$

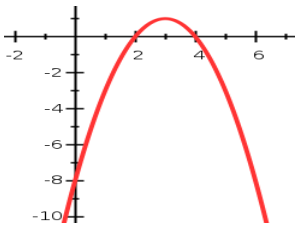
C. $a=-2, b=-8, c=-1$ D. $a=-2, b=-3, c=-8$

9. Which of the following graph represents $f(x)=(x-4)(x-2)$?

A. 

B. 

C. 

D. 

10. The frequency table below shows the number of people.

Number of people	1	2	3	4
Frequency	$3+p$	6	3	p

Table 1

Given the mean is 2.125 people. Find the value of p.

A. 3 B. 2 C. 5 D. 1

END OF QUESTIONS PART A

PART B (80 MARKS)

1. In Diagram 1 below, $PQRSTU$ is a hexagon. APQ and BTS are straight lines.

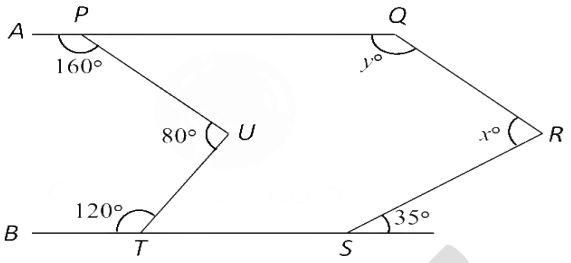


FIGURE 1: Diagram for Question 1

Find the value of $x + y$.

(4 marks)

2. (a)

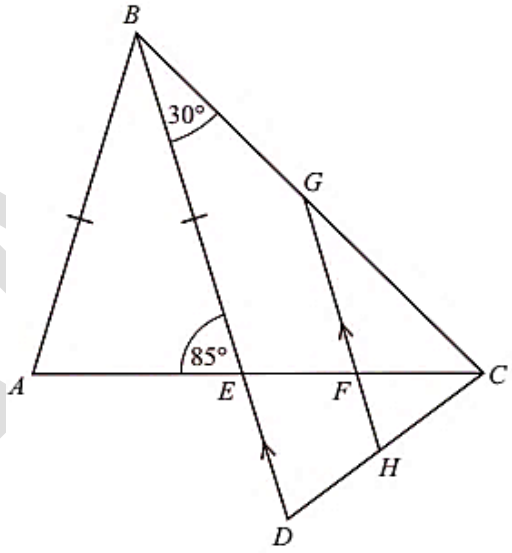


FIGURE 2: Diagram for Question 2(a)

In the diagram, ABC and DEC are triangles. AB = BE and BED is parallel to GFH. Angle AEB = 85° and angle CBE = 30°.
Find:

i. angle EAB.
ii. angle ABE
iii. reflex angle ABC
iv. angle BEC
v. angle EFH
vi. angle BCE

(6 marks)

(b) For a regular 12-sided polygon, find the size of

i. the exterior angle,

ii. the interior angle.

(4 marks)

3. The equation of a straight line l_1 is $3x + 4y - 18 = 0$

i) State the gradient.

(2 marks)

ii) Find the y - intercept.

(1 mark)

iii) Find the equation of a straight line l_2 which passes through the point $A(5,-2)$ and is perpendicular to l_1.

(3 marks)

4. (a) $A(5,24)$ and $B(-3,2)$ are two points.

i. Find the coordinates of the midpoint of the line *AB*.

(2 marks)

ii. Find the equation of the line *AB*.

(3 marks)

iii. Show that the point $(1,13)$ lies on the line *AB*.

(2 marks)

iv. The straight-line J is perpendicular to line *AB* and passes through the point (−4, 8). Find the equation of line J.

(3 marks)

5. The points P , Q and R are $(-3,2)$, $(1,6)$ and $(2,\mathbf{k})$ respectively.

i) Find the value of $\mathbf{k}$ if P , Q and R lie on one straight line.

(3 marks)

ii) Find the distance from P to R .

(2 marks)

6. Solve the following simultaneous equation below.

$$7x+5y+4z=23$$
$$21x-10y+6z=-4\,.$$
$$7x+15y-2z=-15$$

(5 marks)

7. The diagram below shows a 6-sided shape. All the corners are right angles. All the measurements are given in centimeters.

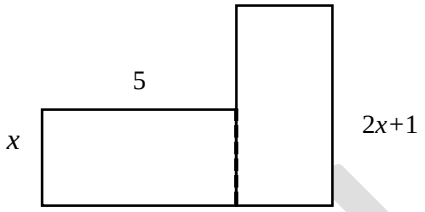


FIGURE 3: Diagram for Question 7

The total area of the shape is $95cm^2$. Show that $2x^2+6x-95=0$.
(**Hint**: Area of rectangular: length × width)

(3 marks)

8. Given $y=x^2-12x+35$ where *y* can be rewritten as $y=(x-p)^2-q$.

   i. Find the values of *p* and *q* by completing the square.

   (3 marks)

   ii. State the minimum value of *y*.

   (1 mark)

   iii. Find the roots of the equation. Hence sketch the graph.

   (6 marks)

9. Given that $\begin{pmatrix}4\\a\end{pmatrix}\begin{pmatrix}k & -1\end{pmatrix}=\begin{pmatrix}8 & -4\\10 & -a\end{pmatrix}$. Find the values of a and k.

(3 marks)

10. Write the following simultaneous linear equations as matrix equation:

$$-p+4q=13$$
$$2p+3q=7$$

Hence, using the matrix method, calculate the values of p and q.

(3 marks)

11. In Diagram 2, QRT is a straight line. Given $QR = RT$ and $\sin x = \frac{3}{4}$, find the value of $\sin y$.

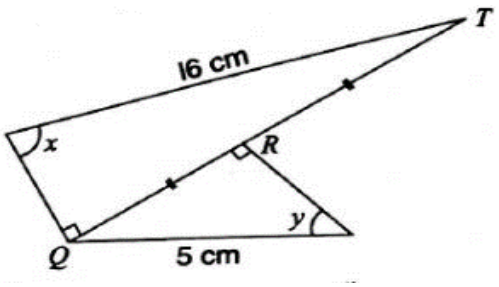


FIGURE 4: Diagram for Question 11

12. Show that $\frac{1}{2(1+\cos\theta)} + \frac{1}{2(1-\cos\theta)} = \text{cosec}^2\theta.$

(4 marks)

13. Solve the trigonometric equation $5\cos x + 3 = 2\cos x + 4$ for $0^\circ \le x \le 360^\circ$.

(5 marks)

14. The waiting times for 80 patients to see the dentist at a clinic are shown in the table below.

Waiting time (minutes)	Number of patients
1 – 5	2
6 – 10	10
11 – 15	20
16 – 20	30
21 – 25	8
26 – 30	6
31 – 35	4

i) Construct a frequency distribution table.

(4 marks)

ii) Based on table in (i), find the

a) Mean

(2 marks)

b) Median

(3 marks)

c) Mode

(3 marks)

END OF QUESTIONS PART B