Provincial Department of Education - NWP

වයඹ පළාත් අධ්‍යාපන දෙපාර්තමේන්තුව

| 32 | E | I |

පළමු වාර පරීක්ෂණය - 10 ශ්‍රේණිය - 2018

First Term Test - Grade 10 - 2018

Index No .... **Mathematics I** Time : One Hour

- **Answer all questions on this paper itself.**
- **Each question carries 2 marks in part A and 10 marks for each question in part B**

Part - A

01. In between which whole numbers does the value of $\sqrt{17}$ lie?

02. If $\frac{1}{3}$ of Rs. 900 was distributed among A and B equally find the amount received by B

03. Find the value of x

04. Write 2 elements belongs to A$\cap$B

05. Solve $\frac{x}{3} - 2 = 5$

06. In the diagram, AB is a straight line. According to the data given find the value of a

07. The perimeter of this sector is 86cm. Its arc length is 44cm. Find the radius

08. Write in index from $lg\,1000 = 3$

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09. Fill in the blanks

$(x - \text{.........})^2 = x^2 - \text{..........} + 9$

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10. ABD and ADC are two congruent triangles. Fill in the blanks given.

$A\hat{D}C$ = ...

AD = ...

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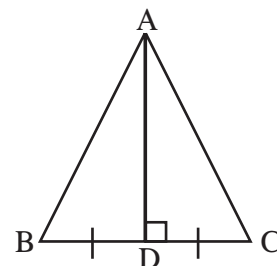
11. In a vessel there are 5 pens in same shape and size. Out of them 3 are red colour pens and 2 are blue colour pens. A pen is taken out at random. Find the probability of obtaining a blue pen.
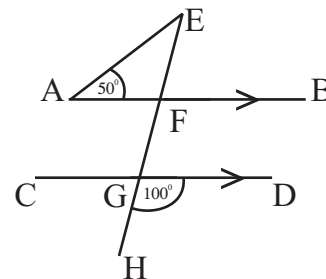
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12. Find the value of x^0

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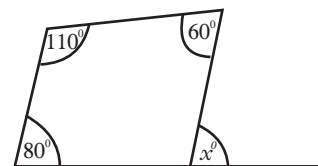
13. In the continuous data class interval 20 - 26
    i.   Find the class size   ii. Find the mid value
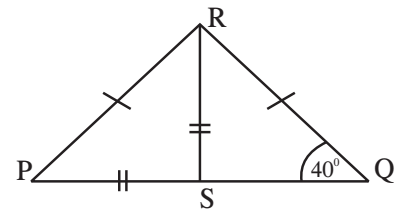
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14. Simplify $5 - 2(x - 3)$

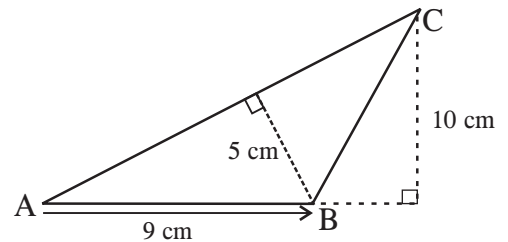15. According to the data given in the figure find the value of $A\hat{E}F$

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16) Factorize. $x^2 - x - 12$

17. In the triangle PQR, PR = QR and in the triangle PSR, PS=RS
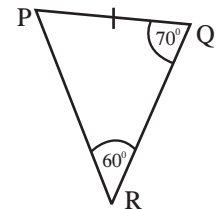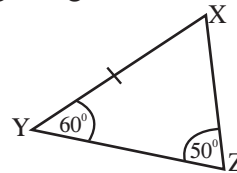   If $R\hat{Q}S = 40^0$ Find the value of $Q\hat{R}S$

18. A trader obtained a profit of Rs. 40 by selling a dress for Rs. 540. Find the profit percentage obtained by him.

19. In the ABC, AB = 9cm. Find the length of AC

20. Select and write a pair of congruent triangles from the following triangles
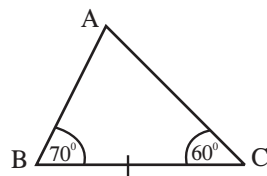
21. The base area of a cuboid shaped vessel is 210cm^2 and height is 7cm. Find its capacity.

22. Find the least common multiple of $2a(x+1)$ and $a^2(x+1)$

23. A sketch of a rectangular shaped land drawn to the scale 1 : 200 is given below. Find the actual length of the land
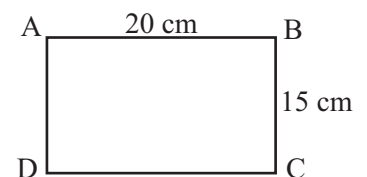
24. Simplify $\dfrac{4}{5} - \dfrac{x-1}{5}$

25. Sketch the location of the point which is equidistant from the points A and C, and equidistant from the lines AB and AC

Part - B

01. Out of tickets sold for a staging of stage drama $\frac{1}{6}$ was Rs. 200 tickets and $\frac{7}{12}$ was Rs. 500 tickets. The remaining tickets of Rs. 1000 and Rs. 2000 were sold equal quantities.

   i)   Write the total number of Rs. 200 and Rs. 500 as a fraction of total number of tickets sold.

   ii) Find the number of Rs. 1000 tickets as a fraction of total number of tickets.

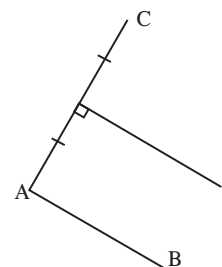   iii) If the number of Rs. 1000 tickets is 120, Find the total income gained by Rs. 500 tickets.

02) A sketch of a land plan prepared for a model of cultivation in an agricultural exhibition is given below. It consists with a rectangular part, a semi circular part and a sector part. Here "Gotukola" is grown in the shaded part, Vegetables are grown in the rectangular part and Flowers are in the semi circular part.

   i)   Find the radius of the sector BCD
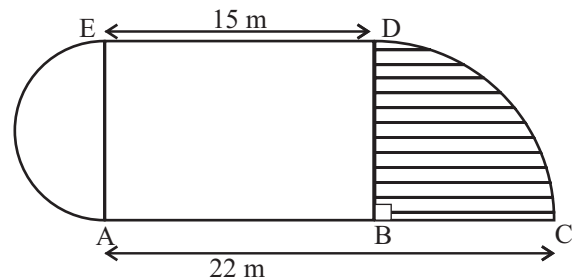
   ii) Find the perimeter of the model of Land

   iii) Find the area of the part which is grown "Gotukola"

03) In a certain school, for a inter house meet, the houses were divided according to colours. While conducting the games marks were calculated until a certain day. Using the above results, the pie chart drawn by a student is given below.

i) Find the angle of the sector relevant to the 'Blue' House.

ii) If the marks obtained by 'Red' house was 180, find the total marks obtained by four houses.
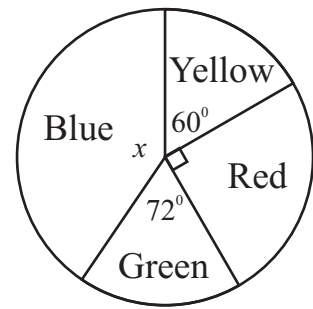
iii) Write the marks obtained by the 'Green' house as a percentage of total marks.

iv) The marks obtained by all the events conducted only in the next day is 180. If on that day all games were won by only 'Blue' and 'Red' houses, find the angle of the sector relevant to the 'Yellow' houses at the end of this day.

04. In an institute of vehicle assembly, 50 persons take 8 days to assemble 100 vehicle. After working 2 days, 10 more people were joined for service.

i) What is the man hours needed to assemble 100 vehicles.

ii) How many man hours were remained at all the end of first two days.

iii) Because new employees were joined, Find the number of days needed to assemble 100 vehicles.

iv) Now, find the total number of vehicles that can be assembled within 8 days.

05. e = {1, 2, 3, 4, 5, 6, 7, 8, 9}

   A = {2,4,6,8}

   B = {Square numbers less than 10}

   i) Write the set B with elements.
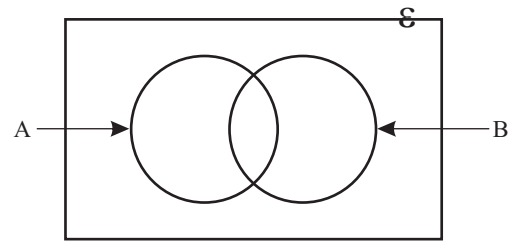
   ii) According to the above sets complete the following venn diagram,

   iii) Find   n(A∩B)

   iv) Write two elements which are not belong to A∪B

05. e = {1, 2, 3, 4, 5, 6, 7, 8, 9}

   A = {2,4,6,8}

   B = {Square numbers less than 10}

පළමු වාර පරීක්ෂණය - 10 ශ්‍රේණිය - 2018
First Term Test - Grade 10 - 2018

Index No .... **Mathematics II** Time : Three Hours

* **Answer ten questions selecting five questions from part A and five questions from part B.**
* **Each question carries 10 marks.**

Part A

01. Mr. Sirisaman who borrowed Rs. 45 000 at 6% annual simple interest pays back the loan with the interest after 2 years. He bought a refrigerator by paying the total amount of loan.

    (i)   Find the interest he has to pay at the end of 2 years.
    (ii) When 10% discount was given for the cash payments, find the marked price of the refrigerator.
    (iii) Find the amount of discount he received.
    (iv) If the discount was 11% show that buying refrigerator is most profitable using this loan amount.
    (v)   By selling this refrigerator the trader made a profit of 12%. Find his buying price to the nearest Rupee.

02. An incomplete table of values to draw the graph of the function $y = 2x - 1$ is given below.

x	-1	0	1	2	3	4
y	-3	....	1	3	....	7

    (i)   Copy the table on your answer sheet and fill in the blanks.
    (ii) Draw the graph of the function $y = 2x - 1$ using a suitable cartesian plane.
    (iii) Write the 'y' value of the point which intersects the 'y' axis and the above graph.
    (iv) Draw the line $y = 3$ on the same cartesian plane and write the co-ordinates of the intersection point of the lines $y = 3$ and $y = 2x - 1$
    (v)   Show that the point (10, 19) is on the line $y = 2x - 1$

03. The amount of money with Sumith is Rs. x and Sarath is three times of the money with Sumith. After giving Rs. 8 to Sarath by his father, Sarath gave Rs. 10 to Sumith.

    (i)   Write an algebraic expression for the amount of money Sumith has.
    (ii) Write an algebraic expression for the amount of money Sarath has.
    (iii) Write the product of amount of money with both of them as a binomical expression. Then expand it and simplify.
    (iv) If the amount of money with both of them is equal, find the amount of money Sumith has.

04. (a)

    A and B are two square shaped laminas. The length of the square A is x units and the length of the square B is 5 units greater than the length of a side of square A. The length of the rectangle C is 'a' units and breath is x units.
    (i)   Write an algebraic expression for the length of a side of square B.

(ii) Write an algebraic expression for the area of a side of square B.

(iii) If the different of the areas of two squares A and B is equal to the area of C, show that $a = 10 + \dfrac{25}{x}$

(b) Solve.

$a + 3b = 12$
$2a - 3b = 6$

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05. From a certain 'Tibbatu' cultivation, the amount of Tibbatu picked in several days is given in the following table. (6- 8 in the table indicates the values greater than or equal to 6 and less than 8)

Amount of Tibbatu(kg)	6 - 8	8 - 10	10 - 12	12 - 14	14 - 16	16 - 18
No. of days	2	6	10	5	4	3

(i) Write the modal class.

(ii) Write the No. of days that picked 'Tibbatu'

(iii) Find the mean amount of 'Tibbatu' picked in a day to the nearest killogram.

(iv) If 1kg of 'Tibbatu' was sold at Rs. 120, show that the maximum income that can be obtained in this few days is Rs. 46080

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06. A child in the level ground is observed a bird on the top of a vertical building with a angle of elevation of 50^0. The child is in 20m away from the building. (Neglect the height of the child)

(i) Represent the above information in a sketch.

(ii) Using the scale of 4 m   1 cm, Draw the scale diagram of the above sketch.

(iii) Using the scale diagram, find the height of the building.

(iv) If the child is moved 8m, away from the building mark the new position of the child on the above scale diagram and the angle of depression that the bird sees the child.

Part B

07. Using the *cm/mm* scale and a pair of compasses. Do the following construction.

(i) Construct the triangle ABC such that AB = BC = 6cm and $A\hat{B}C = 90^0$

(ii) Construct the perpendicular bisector of AB and mark the intersection point of the above perpendicular bisector and AC as X, and AB as Y.

(iii) Construct a perpendicular from X to BC and mark the intersection point of it and BC as Z.

(iv) Draw the circle by taking X as the center and XZ as the radius. Measure and write the radius.

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08. The general term of a number pattern is 4*n - 1*.

(i) Write the first three terms of this pattern.

(ii) Find the 20th term.
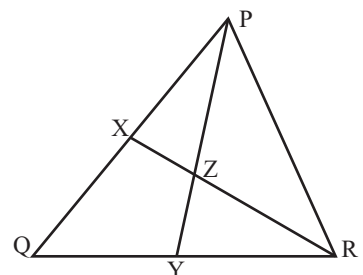
(iii) Which term is 103, of this pattern.

(iv) By finding the general term of the number pattern 2, 3, 4, 5, ..., Find the general term of the multiple of 5 number pattern using the general terms of the above two patterns.

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09. In the triangle PQR, PQ = QR. X and Y are situated as QX = QY. XR and PY are intersected at Z.
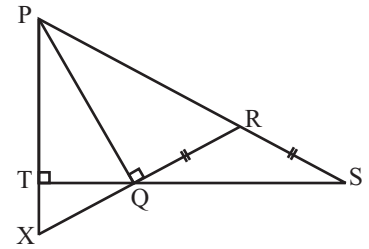
(i) Show that XR = PY

(ii) Show that $Z\hat{P}R = Z\hat{R}P$

(iii) If $Q\hat{P}Y = 40^0$ and $P\hat{R}X = 30^0$ find the value of $X\hat{Q}Z$

10. In the triangle PQR, PR is produce to S, such that QR = RS. Produced PT and RQ are intersected at X

(i) If $R\hat{S}Q = a$ and $Q\hat{P}R = b$, show that $T\hat{X}Q = a + b$
(ii) Show that triangle PRX is an isosceles triangle

11. There are 8 cards in a box equal in size and shape. They are numbered as 1, 2, 3, 4, 5, 9, 10, 12. A card is taken at random from the box.

(i) Write the sample space of all possible outcomes.
(ii) Find the probability of obtaining a card with a multiple of two.
(iii) Show that the probabilities of obtaining a card with an odd number and a card with a prime number are equal.
(iv) Find the probability of obtaining a card with a square number. Hence find the probability of not obtaining a card with a square number

12. The length of a triangular prism made by metals is x cm. and its base is $18cm$ and height is $8cm$.
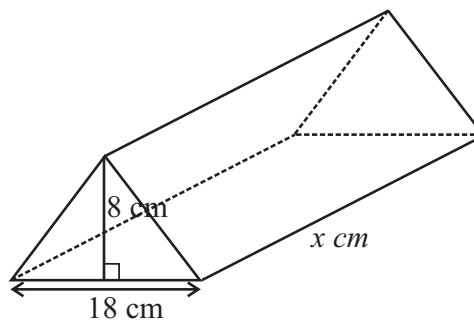
(i) Write the volume of prism in term of x.

(ii) This prism and a solid metal cube of side x cm were melted
and a solid metal cuboid was made without any waste of metal.
The cuboid is with a square base of side x cm. Its height is twice of
the base length. Find the length of the prism

Mathematics I - Answers

Part - A

01) 4.5	1		
	2	2	
02) Rs. 150		2	
300	1		
03) 70^0		2	
$140 \div 2$	1		
04) 3.5	1		
	1	2	
05) $x = 21$		2	
$\dfrac{x}{3} = 7$	1		
06) $a = 60^0$		2	
$a = 180 - 120$	1		
07) 21cm		2	
42	1		
08) $10^3 = 1000$		2	
09) 3	1		
$6x$	1	2	
10) $A\hat{D}B$	1		
AD	1	2	
11) $\dfrac{2}{5}$		2	
12) $x = 70^0$		2	
110^0	1		
13) (I) 6	1		
(ii) 23	1	2	
14) $5 - 2x + 6$	1		
$11 - 2x$	1	2	
15) 30^0		2	
16) $(x + 3)(x - 4)$	1		
	1	2	
17) 60^0		2	
18) 8%		2	
$\dfrac{100 \times 40}{500}$	1		
19) $18cm$		2	
$\dfrac{1}{2} \times 9 \times 10 = \dfrac{1}{2} AC \times 5$	1		

20) Triangle ABC & XYZ	2		
21) $1470ml$		2	
210×7	1		
22) $2a^2(x + 1)$		2	
23) $40m$		2	
$1cm \rightarrow 2cm$	1		
24) $\dfrac{5 + x}{5}$		2	
$\dfrac{4 - x + 1}{5}$	1		
25) Drawing angular bisector		2	

Part - B

(01) I. $\dfrac{1}{6} + \dfrac{7}{12}$	1		
$\dfrac{9}{12}$	1		
$\dfrac{3}{4}$	1	3	
ii. $1 - \dfrac{3}{4}$	1		
$\dfrac{1}{4} \div 2$	1		
$\dfrac{1}{8}$	1	3	
iii. $120 \times 8 = 960$	1		
960 $\dfrac{7}{12}$	1		
560	1		
$560 \times 500 = $ Rs.. 280000	1	4	
		10	
(02) i. 7m		1	
ii. $2 \times \dfrac{22}{7} \times 7 \times \dfrac{1}{4}$	1		
11m	1		
$2 \times \dfrac{22}{7} \times \dfrac{7}{2} \times \dfrac{1}{2} = 11m$	1		
$22 + 11 + 11 + 15 = 59m$	1	4	
iii. $\dfrac{22}{7} \times 7 \times 7 \times \dfrac{1}{4}$	1		
$38.5m^2$	1	2	
iv. $\dfrac{22}{7} \times \dfrac{7}{2} \times \dfrac{7}{2} \times \dfrac{1}{2}$	1		
$= 19.25\,m^2$	1		
v. $15 \times 7 = 105m^2$	1		
$19.25 + 38.5 + 105 = 162.75$	1	3	
		10	

(03) i. $360^0 - (90 + 72 + 60)$	1		
138^0	1	2	
ii. $\dfrac{180}{90} \times 360$	1		
720^0	1	2	
iii. $\dfrac{72}{360} \times 360$	1		
20%	1	2	
iv. $720 + 180 = 900$	1		
$60 \times 2 = 120$	1		
$\dfrac{120}{900} \times 360$	1		
48^0	1	4	
		10	
(04) i. 50×8	1		
men days 400	1	2	
ii. $50 \times 2 = 100$	1		
$400 - 100 = 300$ men days	1	2	
iii. $\dfrac{300}{60}$	1		
5 days	1		
$5 + 2 = 7$ days	1	3	
iv. $\dfrac{400}{100} = 4$ men days	1		
$\dfrac{60}{4} = 15$	1		
$100 + 15 = 115$	1	3	
		10	
(05) i. $B = \{1, 4, 9\}$		2	
ii. for 4 regions		4	
iii. 1		2	
iv. Two out of 3, 5, 7	1		
	1	2	
		10	

(01) i. $\dfrac{45000 \times 2 \times 6}{100}$ ---------------- 01

Rs. 5400 --------------------- 01   02

ii. $\dfrac{100 \times 45000}{90}$ ---------------- 01

Rs. 50000 ------------------- 01   02

iii. 50000 - 45000 --------------- 01

Rs. 5000 --------------------- 01   02

iv. $\dfrac{11 \times 50000}{100}$

Rs. 5500 --------------------- 01

5500 > 5400 ------------------ 01   02

v. $\dfrac{100 \times 45000}{112}$ 01

Rs. 40179 ------------------- 01   02

10

(02) i. -1, 5   1+1   02

ii. axises   01
points   01
line   01   03

iii. -1   01

iv. (2, 3)   02

v. $19 = 2 \times 10 - 1$ ----------------- 01
$19 = 19$ ------------------ 01   02

10

(03) i. Rs. $x + 10$ ---------------- 01

ii. $3x - 2$ ------------ 02
$3x + 8 - 10$ -------------------- 01

iii. $(x+10)(3x-2)$----------------- 01
$3x^2 - 2x + 30x - 20$ ------------ 01
$3x^2 + 28x - 20$ ----------------- 01   03

iv. $3x - 2 = x + 10$ -------------- 01
$32x = 12$ -------------- 01
$x = 6$ ----------------- 01

Sumith - Rs.6 ------------ 01   04

10

(04) a.
i. $x + 5$ --------------------- 01

ii. $(x-2)(x-2)$ or ------------
$x^2 + 10x + 25$ ----------- 01

iii. $x^2 + 10x + 25 - x^2$ ------------ 01
$x^2 + 10x + 25 - x^2 = ax$ -------- 01
$10x + 25 = ax$ ------------ 01
$\left. \begin{array}{l} a = 10x + 25 \\ a = 10 + \dfrac{25}{x} \end{array} \right\}$ 01   04

b. $2a + 4b = 20$ --------------- 01
$7b = 14$ -------------- 01
$b = 2$ ------------- 01
$a = 6$ -------------- 01   04

10

(05) i. 10 - 12 ------------------ 01

ii. 30 --------------------------- 01

iii.

mid value	fx
7	14
9	54
11	110
13	65
15	60
17	51

mid value column   01
fx column ----   01
εfx column ----   01

$\varepsilon fx = 354$

Mean = $\dfrac{354}{30}$ --------------- 01

11.8 Kg --------------- 01
12 Kg --------------- 01   06

iv. $\dfrac{(8\times2)+(10\times6)+(12\times10)+(14\times5)+(16\times4)+(18\times3)}{384\times120}$ 01
Rs. 46080   01   02

10

(06) i. rough diagram--------------------   02

ii. 5cm ----------------------- 01
50^0 ----------------------- 01
90^0 ----------------------- 01
diagram ------------------ 01   04

iii. obtaining 6cm ($\pm$0.1) -------- 01
24m / correct value according to the scale   01   02

iv. obtaining 8m $\rightarrow$ 2cm ------ 01
40^0 ------------------------- 01   02

10

(07) i.   AB / BC ---------------------- | 01

     90^0 ---------------------- | 01

     completing the triangle | 01 | 03

ii.   perpendicular bisector ----------- | 01

    marking the points X and Y correctly | 02 | 03

iii.   perpendicular ------------------- | 01

    marking Z -------------- | 01 | 02

iv.   circle ---------------------- | 01

    radius 3cm (± 0.1) ------------- | 01 | 02
                  | | 10

---

(08) i. $4 \times 1 - 1 = 3$
       $4 \times 2 - 1 = 7$ }-------------- | | 03
       $\mathbf{4 \times 3 - 1 = 11}$

ii. $4 \times 20 - 1 = 79$ ------------- | 1 + 1 | 02

iii. $103 = 4n - 1$ -------------- | 01
     $4n = 104$ -------------- | 01
       $n = 26$ ----------------- | 01 | 03

iv. $n + 1$ -------------------- | 01
    $n + 1 \, 4n - 1 = 5n$ -------------- | 01 | 02
            | | 10

---

(09) i. in the ΔPQY and QXR ,
       $PQ = QR$ (data) -------- | 01
       $QX = QY$ (data) -------- | 01
       $\hat{PQY} = \hat{XQR}$ (common) ---- | 01 | 03
   $\therefore PQY \Delta = QXR \Delta$ (SAS)

ii. $\hat{QPR} = \hat{QRP}$ ($QP = QR$) | 01
   $\hat{QPY} = \hat{XRQ}$ (corresponding elements
            of congruent Δ | 01 | 02
     $\therefore \hat{ZPR} = \hat{ZRP}$

iii. $\hat{QPY} = \hat{XRQ}$ (proved)
     $\therefore \hat{XRQ} = 40^0$ -------------- | 01
     $\hat{XPR} = \hat{ZRP}$ (proved)
     $\therefore \hat{ZRP} = 30^0$ -------------- | 01
     $\therefore \hat{QPR} = \hat{QRP} = 70^0$ ------- | 01
     $\therefore \hat{XQY} = 180 - 140 = 40^0$ ---- | 01
     $\therefore \hat{XQZ} = 20^0$ -------------- | 01 | 05
            | | 10

---

(10) I.   since $R\hat{S}Q = a$,
     $R\hat{Q}S = a$ ($RQ = RS$) -------- | 01
     $\therefore QRP = 2a$ (theorem of exterior angle) | 01

     since $PQR = 90^0$,
     $QRP + RPQ = 90^0$ ------------- | 01
       $2a + b = 90^0$ ------------- | 01
     $RQS = TQX$ (vertically opposite angles) | 01
     $\therefore TQX = a$

     $TQX + TXQ = 2a + b$ -------- | 01
       $a + TXQ = 2a + b$
     $\therefore TXQ = a + b$

ii.   since $RSQ = a, QPR = b$,
     $PQT = a + b$ ------------ | 01

     since $PQT + TPQ = 2a + b$
     $a + b + TPQ = 2a + b$
     $TPQ = 2a + b - a - b$
         $TPQ = a$ ------------ | 01

     $\therefore TPR = TXQ = a + b$ -------- | 01
     $\therefore PR = RX$ -------------------- | 01 | 10
     $\therefore PRX$ is and isosceles triangle | | 10

---

(11) i. $S = \{1,2,3,4,5,7,10,16\}$ | | 02

ii. $\dfrac{4}{8}$ ---------------------- | | 02

iii.   odd   1,3,5,7
     prime   2,3,5,7 ------------- | | 01
     being an odd number $\dfrac{4}{8}$ | 01
     being an prime number $\dfrac{4}{8}$ ---------- | 01

iv. $\dfrac{3}{8}$ -------------------- | 01
    $1 - \dfrac{3}{8}$ -------------------- | 01
    $\dfrac{5}{8}$ -------------------- | 01 | 03
          | | 10

---

(12) i. $\dfrac{1}{2} \times 9 \times 8x$ --------------------- | | 02

     $\dfrac{1}{2} \times 9 \times 8x + x^3$ ------------------ | 01
     obtaining the volume of cube as $2x^3$ -- | 01
     $\dfrac{1}{2} \times 9 \times 8x + x^3 = 2x^3$ ------------ | 01

     $36x + x^3 = 2x^3$ ---------------- | 01
       $x^3 = 36x$ --------------- | 01
       $x^2 = 36$ --------------- | 01
       $x = 6$ --------------- | 01
     length of the prism $= 6\text{cm}$ ------------- | 01 | 08
         | | 10