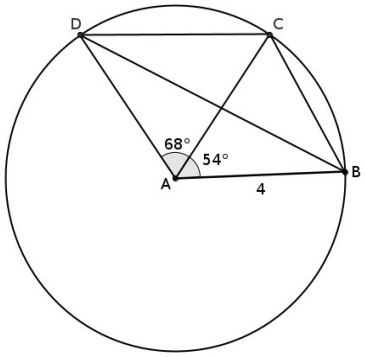
S S L C MODEL QUESTION PAPER 2021
SCHEME OF VALUATION
MATHEMATICS SET 1

General instructions

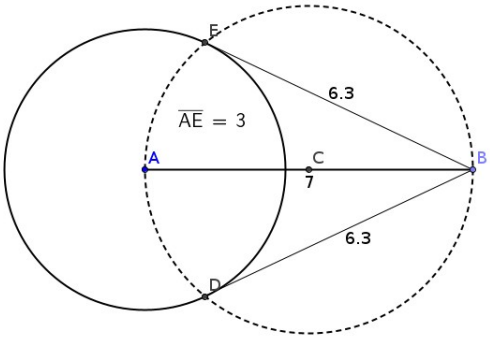
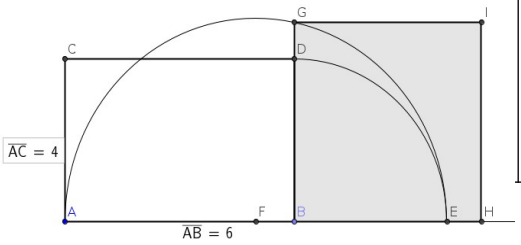
1 **Detailed steps are required as suggested in this scheme, But if a candidate has skipped over some steges and arrived at correct stage, the score up to that stage can be given if the examiner is convinced that the pupil knows the intermediary steps.**

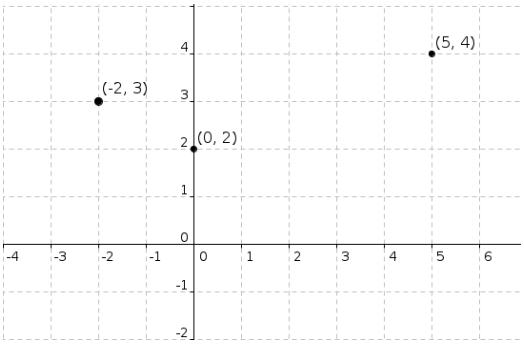
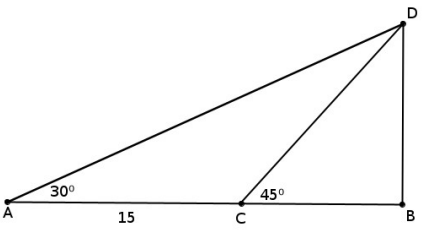
2 **Equivalent answers may be accepted and give full credit and for alternate methods give proportionate score for the stages**

3 **precision of statements need not be insisted on ,Omission of units like degree,metre, etc., may be overlooked.**

Qn No	SCHEME FOR VALUATION	score	Total score
1	20 x 7 =140	1	1
2	88^0	1	1
3	9	1	1
4	25 cm^2	1	1
5	(8 ,0)	1	1
6	(a) 45^0 (b) $8\sqrt{2}$	1 1	2
7	Arranging in ascending order 18,25,28,37,42 to find median =28	1 1	2
8	P(1) = 3 $(1)^2$ – 2(1) +5 = 3 – 2 +5 = 6	1 1	2
9	(a) (2,3) (b) 5	1 1	2
10	(a) 90^0 (b) 102^0	1 1	2
11	(a) remainder of 4/7 is 4 remainder of 2021/7 is 5 , so not a term (b) 2021 is not a multiple of 7, so 2021 is not difference of two term	1 1 1	3
12	To draw circle with 4 centimeter radius To mark two angles To complete the triangle 	1 1 1	

			3
13	**(a) 90** **(b) 9/90** **(c) 81/90**	**1** **1** **1**	**3**
14	**Take breadth = x and then find length = x +4** **x(x + 4) =60** **To find breadth = 6 cm , length = 10 cm**	**1** **1** **1**	**3**
15	**To find height of triangle is $4\sqrt{3}$** **To find area = $20\sqrt{3}$ cm^2**	**2** **1**	**3**
16	**(-2,6)** **(5,-4)**	**2** **1**	**3**
17	**(a) 15 cm** **(b) $\sqrt{15^2 - 9^2}$ = 12 cm**	**1** **2**	**3**
18	**(a) x =4** **(b) y =9** **(c) Q (8,7)**	**1** **1** **1**	**3**
19	**(a) area = (1/2)6 x 8 =24 cm^2** **(b) Circumradius of the triangle = 5cm** **(c) In radius = 24/12 = 2 cm**	**1** **1** **1**	**3**
20	**(a) To find mean = (100 + 110 +96 + 120 + 104 + 106)/6** **= 106** **(b) To arrange in sequence 96,100,104,106,110,120** **median =(104 +106) /2 =105**	**1** **1** **1**	**3**
21	**(a) $P(2) = (2)^2 - 2x2 + 5$** **= 4-4+5 = 5** **(b) $P(x) - P(2) = x^2 - 2x + 5 - 5 = x^2 - 2x$** **(c) x - 2**	**1** **1** **1** **1**	**4**
22	**(a) 3/5** **(b) (3/5) x50 = 30** **(c) 30 -20 = 10**	**1** **2** **1**	**4**
23	**(a) 1000** **(b) 1000/2 = 500** **(c) 2n + 478**	**1** **1** **2**	**4**
24	**(a) $360^0 - (60^0 + 110^0 + 100^0) = 90^0$** **(b) $(110^0 + 90^0) > 180^0$** **inside the circle** **(c) On the circle**	**1** **1** **1** **1**	**4**
25	**(a) One side = 25** **Area = 625** **(b) (25 + x) (25 – x)> 625** **625 $-x^2 > 625$** **-x2 > 0 is not possible , there is no such rectangle**	**1** **1** **1** **1**	**4**

26	**Distance between (2,3) and (8,3) is 8 -2 =6** **Distance between (8,11) and (8,3) is 11 -3 =8** **Distance between (2,3) and (8,11) is $\sqrt{}$ $8^2 + 6^2$ =10**	**1** **1** **2**	**4**
27	**(a) $360^0/5 = 72^0$** **(b) 15** **(c) 15/5 = 3** **(d) ∏x3x15 =45 ∏**	**1** **1** **1** **1**	**4**
28	**To draw circle** **To mark point and draw circle with diameter 7** **To draw tangent** **To measure tangent** 	**1** **1** **1** **1**	**4**
29	<table><tr><td>wages</td><td>Number of employee</td><td>cumulative</td></tr><tr><td>500</td><td>3</td><td>3</td></tr><tr><td>600</td><td>7</td><td>10</td></tr><tr><td>700</td><td>9</td><td>19</td></tr><tr><td>√800</td><td>8</td><td>27</td></tr><tr><td>900</td><td>5</td><td>32</td></tr><tr><td>1000</td><td>3</td><td>35</td></tr></table>**(a) 36/2 = 18** **(b) 700**	**2** **1** **1**	**4**
30	**AD = 5 AC = 5√2** **BD = 5√3 , BC = 10** **Perimeter =5 + 5√ 3 +10 +5√2 = 15 +5√2 +5√3**	**1** **2** **1**	**4**
31	**(a) (100x101)/2** **5050** **(b) 5050 x 2 =10100** **(c) 10100 x2 = 20200** **(d) 20200 +200 =20400**	**1** **1** **1** **1** **1**	**5**
32	**To draw rectangle** **extend length** **to draw semi circle** **To find one side of square** **To complete the square** 	**1** **1** **1** **1**	

		1	5
33	(a) number of even number is 25 probability if getting even number 25/50 (b) square numbers between 1 to 50 are 1,4,9,16,25,36,49 probability of getting square number 7/50 (c) numbers whose digital sum is 9 are 9,1+8,2+7,3+6,4+5 probability is 5/50	 1 1 1 1 1	 5
34	(a) length is 2x + 2 (b) Diagonal 2x + 3 (c) $x^2 + (2x + 2)^2 = (2x + 3)^2$ $x^2 - 4x = 5$ breadth = 5 , length = 12	1 1 1 1 1	 5
35	To draw axis of coordinate To mark points 	2 3	 5
36	(a) To draw approximate diagram (b) To find CB = BD To find AB = 15 +BC = √3BD flag post height = 15/(√3 -1) (c) width of river =15/(√3 -1) 	1 1 1 1 1	 5
37	(a) Radius of the circle = $\sqrt{17^2 - 15^2}$ = 8 cm (b) OA = OS =8 cm PS = $\sqrt{10^2 - 8^2}$ = 6cm perimeter = 6 + 8 +10 =24 cm	1 1 1 1 1	 5
38	(a) Slope = (4 – 2) /(6 -3) = 2/3 (b) slope between (3,2) and (x,12) is 2/3 (12 – 2)/(x – 3) = 2/3 x = 18 (c) (9,6) , (12,8) or any other two points on the line	1 1 1 1 1	 5

<table>
<tr><td>39</td><td>(a) ratio between height 4:1

(b) height = $\sqrt{13^2 - 5^2}$ =12

height of second cone 3cm</td><td>2
2

1</td><td>5</td></tr>
<tr><td>40</td><td>(a) P(1) =(1 +1)(1 +2) +k =0
k = -6

(b) P(3) =(3 +1) (3 +2) + -6 = 14, not factor

(c) x -3</td><td>1
1

1+1

1</td><td>5</td></tr>
<tr><td>41</td><td><table><tr><td>height</td><td>No of students</td><td>cumulative</td></tr><tr><td>120</td><td>3</td><td>3</td></tr><tr><td>125</td><td>8</td><td>11</td></tr><tr><td>130</td><td>6</td><td>17</td></tr><tr><td>135</td><td>5</td><td>22</td></tr><tr><td>140</td><td>6</td><td>28</td></tr><tr><td>145</td><td>4</td><td>32</td></tr><tr><td>150</td><td>2</td><td>34</td></tr></table>Cumulative frequency
(a) Height of 17th boy is 130
(b) height of 18th boy is 135
Median age = 132.5</td><td>1
1
1
2</td><td>5</td></tr>
<tr><td>42</td><td>(a) 11th term = 5 +10x3 =35
(b) 3n +2
(c) to prove (3n +2)2 is not in the form 3n +2</td><td>2
1
2</td><td>5</td></tr>
<tr><td>43</td><td>(a) 124^0
(b) 118^0
(c) 132^0
(d) 31^0</td><td>2
1
1
1</td><td>5</td></tr>
<tr><td>44</td><td>(a) (4,6)
(b) radius = 5
distance between (0,3) and (4,6) is 5, on the circle
(c) ((7, 2)</td><td>1
1
1+1
1</td><td>5</td></tr>
<tr><td>45</td><td>(a) 10cm
(b) radius 10x (3/5) = 6 cm
(c) height = $\sqrt{10^2 - 6^2}$ = 8cm
(d) volume (1/3) $\prod(6)^2$x8 = 96$\prod$cm^3</td><td>1
1
1
2</td><td>5</td></tr>
</table>

Maximum Mark :80

MATHEMATICS - ANSWER KEY

GENERAL INSTRUCTION

1. Details steps are required as suggested in this scheme, But if a candidate has skipped over some stages and arrived at correct stage, the score up to that stage can be given if the examiner is convinced that the pupil knows the intermediary steps.
2. Equivalent answers may be accepted and give full credit and for alternate methods give proportionate score for the stages.
3. Precision of statements need not be insisted on, Omission of units like degree, metre, etc, may be overlooked.

	Qn.No.	SCHEME FOR VALUATION	SCORE
Part I	1	3	1
	2	50	1
	3	15	1
	4	23	1
	5	5	1
Part II			
	6	When 2021 is divided by the (c-d = 9 - 5 = 4)	1
		common difference remainder is 1	1
		$\Rightarrow$2021 is a term of the sequence	
	7. a)	$\angle QRO = 40$	1
	b)	$\angle P = 50$	1
	8. a)	$x + 1$	1
	b)	$x\ (x+1) = 156$	1
	9. a)	Any point whose y co-ordinate is 3	1
	b)	Distance = 6 - 4 = 2 units	1
	10.	Diagonal of a square , $a\sqrt{2} = 20$	
		one side, $a = 20$	2
		$= \frac{\sqrt{2}}{20\sqrt{2}}$ or	
		$= \frac{2}{10\sqrt{2}}$	
Part III			
	11. a)	No to be added $= \left(\frac{10}{2}\right)^2 = 25$	1
	b)	$x^2 + 10x = 75$	
		$x^2 + 10x + 25 = 75+25$	1
		$(x+5)^2 = 100$	
		$x + 5 = \pm 10$	
		$x - 5 = 15$	1

12. a) Common difference = $\frac{\text{Difference of terms}}{\text{Difference of places}}$

$= \frac{162 - 53}{15 - 8}$ 1

$= \underline{\underline{7}}$

b) First term + 7 x c d = 53

First term = 53 - 49 = $\underline{\underline{4}}$ 1

c) 4, 11, 18 1

13. $\angle EDB = 60$ 1

$\angle ECB = 60$ 1

$\angle DBC = 20$ 1

14. a) 60^0 1

b) Radius = $2\sqrt{3}$ cm 2

15. a) Centre (2, 6) 1

b) Midpoint of CD is (1, 2) not the centre 1

So CD cannot be the diameter 1

16. a) $\angle OBA = 90$ 1

b) $\angle AOB = 60$ 1

c) $\angle AB = 12\sqrt{3}$ cm 1

17. a) 12 cm

b) 2 cm $\left(\frac{60}{360} \times 12 = 2 \text{ cm}\right)$ 2

18. a) 0 (0, 0) 1

b) (6, 3) 1

c) C (0, 3) 1

19. Drawing the circle with radius 3.5 cm 1

Dividing the central angle 1

Drawing the triangle 1

20. Perimeter = 4x, Area = x^2 1

Side of the square = x

$x^2 + 4x + 4 = 100$ 1

$(x + 2)^2 = 100$

$x + 2 = 10$

$x = 8$ 1

IV

21. a) 36 $\longrightarrow$

(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)	(2, 6)
(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)	(4, 6)
(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)	(5, 6)
(6, 1)	(6, 2)	(6, 3)	(6, 4)	(6, 5)	(6, 6)

1

b) $\frac{9}{36} = \frac{1}{4}$ 2

c) $\frac{17}{36}$ 1

22. For finding the central angle 1

a) $\angle P = 20$ 1

b) $\angle Q = 60$ 1

c) $\angle R = 100$ 1

23 a) 19 1

b) $19 - 3 \times 5 = 4$ 1

c) $x_n = dn + f - d =$

$\underline{\underline{5n - 1}}$ 1

d) 2020 is a multiple of 5 (cd)

$\therefore$ 2020 can be the difference of any two terms. 1

24. For preparing the table 1

For finding 20^{th} term is the median 2

Median = 400 1

25 a) $x + 6$ 1

b) $x(x + 6)$ 1

c) $x(x + 6) = 91$

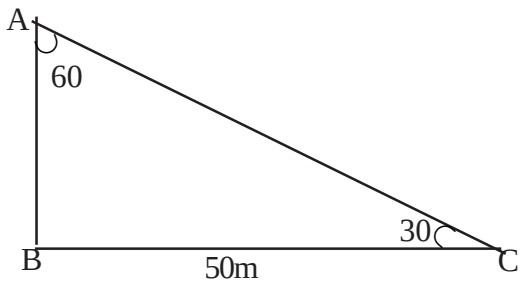
$x^2 + 6x = 91$

$x^2 + 6x + 9 = 100$

$x + 3 = 10$

$\underline{\underline{x = 7}}$ 2

26. a)



AB is the tower C is position of the boy 1

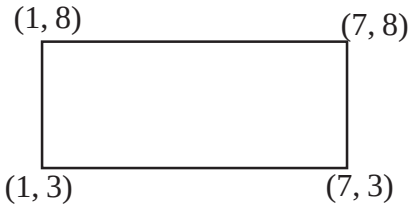
b) Sides are in the ratio $1 : \sqrt{3} : 2$

$x \sqrt{3} = 50$

$x = \frac{50}{\sqrt{3}} = \frac{50\sqrt{3}}{3}$ m

Height of the tower $= \frac{50\sqrt{3}}{3}$ m 3

27. a)



2

other vertices (7, 3) 1, 8)

b) Sides are 6 units and 5 units 2

28. For drawing the circle with radius 3cm 1

Marking a point 7cm away from centre 1

Marking two points on the circle 1

Drawing tangents and measurment 1

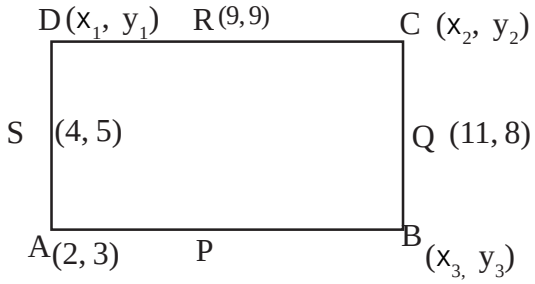
29. Radius of the sector = 20cm 1

central angle of the sector = x

$\frac{x}{360} \times 20 = 10$ 2

$x = 180$ 1

30.



$\frac{2 + x1}{2} = 4 \Rightarrow x_1 = 6, \quad \frac{3 + y1}{2} = 5, \quad y1 = 7$

D (6, 7) 1

$\frac{6 + x2}{2} = 9 \Rightarrow x2 = 12 \qquad \frac{7 + y2}{2} = 9, \; y = 11$

C (12, 11) 1

$\frac{12 + x3}{2} = 11 \Rightarrow x3 = 10, \quad \frac{11 + y3}{2} = 8 \Rightarrow y3 = 5$

B (10, 5) 1

P (6, 4) 1

31. $x_n = 4n + 7$

$x_1 = 4 \times 1 + 7 = 11$

$x_2 = 4 \times 2 + 7 = 15$

$x_3 = 4 \times 3 + 7 = 19$

11, 15, 19 1

$x_{50} = 4 \times 50 + 7 = 207$ 1

Common difference = 4 1

For justification 2

32. $P(x) = x^2 + 2x + 5$

$P(1) = 1^2 + 2 \times 1 + 5 = 8$ 2

$P(x) - P(1) = x^2 + 2x + 5 - 8 = x^2 + 2x - 3$ 1

$P(x) - P(1) = x^2 + 2x - 3$

$x^2 + 2x = 3$

$x^2 + 2x + 1 = 4$

$(x + 1)^2 = 4$

$x + 1 = + 2$

$x = 1, -3$ 2

factors are $(x - 1)(x + 3)$

33. a) $\angle D = 90$ 1

b) D is outside the circle 2

c) D is on the circle. 2

34. a) Form the second box 2

b) $\frac{11}{20}$ 1

c) $\frac{18}{33}$ 2

35. a) Hypotenuse = $x + 4$ 1

Other side = $x + 2$ 1

b) $x^2 + (x + 2)^2 = (x+4)^2$

$x^2 + x^2 + 4x + 4 = x^2 + 8x + 16$ 1

$x^2 + 4x - 12 = 0$

c) $x^2 - 4x = 12$

$x^2 - 4x + 4 = 16$

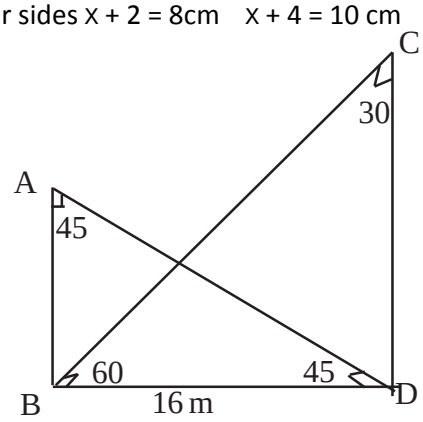
$(x - 2)^2 = 16$ 1

$x = 6$

smallest side = 6 cm

d) Other sides x + 2 = 8cm x + 4 = 10 cm 1

36



1

In ∇ ABD sides are in the ratio 1 : 1 : √2

∴ Hieght of small tower = 16 m 2

In ∇CBD sides are in the ratio

1 : √3 : 2 2

ST ⟹ side CD = 16 √3 m

37. a) Writing a co-ordinate with y = 0 1

b) Writing a co-ordinate with x = 0 1

c) For finding the length 1

d) For finding the midpoint 1

e) For justification 1

38. a) PB = 4cm 2

b) Radius = 6.5 cm 2

c) √22 cm 1

39. Curved surface area = πrl

a) =πx 8 x 10 1

= 80π cm² 1

b) Total surface area = πr²

= π x 8 x 8

= 64 πcm² 1

c) Volume = $\frac{1}{3}$ πr²h H = 6 C, 1

$\frac{1}{3}$ πX 8² X 6²

128 π cm3 2

40 AB = $\sqrt{(5-2)^2 + (4-3)^2}$ = $\sqrt{9+1}$ = $\sqrt{10}$ 1

BC = $\sqrt{(6-5)^2 + (7-4)^2}$ = $\sqrt{1^2 + 3^2}$ = $\sqrt{10}$ 1

AC = $\sqrt{(6-2)^2 + (7-3)^2}$ = $\sqrt{4^2 + 4^2}$ = $\sqrt{32}$ 1

AB = BC 1

$\Rightarrow \nabla$ ABC is an isoscles triangle 1

41. For the table 2

Median = $\frac{23^{rd} + 24^{th}\ obm}{2}$ 2

$= 10000$ 1

42 a) 203, 210, 217 .....497 1

$Xn = 497$

$dn + f - d = 497$

$7n + 203 - 7 = 497$

$7n + 196 = 497$

$n = 43$ 2

Sum $= \frac{n}{2}$ [first term + last term]

$= \frac{43}{2}[203 + 497]$ 2

$= 15050$

43. Construction of rectangle 1

Drawing semi circle 1

Drawing the length $\sqrt{20}$ 1

Drawing the square 2

44. Slope = Difference is y co-ordinate

Difference is x co-ordinate

$= \frac{6 - 3}{3 - -1}$ 1

$= \frac{3}{4}$

Let A (a, 0) lies on this & b (3, 6)

Slope = $\frac{3}{4} \Rightarrow \frac{6 - 0}{3 - a} = \frac{3}{4} \Rightarrow a = -5$ 2

(-5, 0) lies on this

let c (0, 6) lies on this

$\frac{6 - b}{3 - 0} = \frac{3}{4}$

$24 - 4b = 9$

$-46 = -15$

$b = 15$

$\left(o, +\frac{15}{4}\right)$ lies on this 1

proof

45.	Drawing Circle	1
	Dividing the central angle	2
	Drawing the tangluts.	2

Answer Key

1. 4
2. 80^0
3. 8
4. 15
5. (o, o)
6. Common difference = 7

   Next term = 24

   10th term = 66
7. $\angle ABC = 90^0$

   $\angle A = 30^0$
8. A(4,0)

   B(0,4)
9. i) 60^0

   ii) 8 cm
10. $(x+3)^2 = 64 = 8^2$

    $x = 8 - 3 = 5$
11. i) $x + 2$

    ii) $x(x+2) + 1 = 81$

    $x = 9 - 1 = 8$

    Length = 10 cm, breadth = 8 cm.

12. i) $\frac{20 \times 21}{2} = 210$

    ii) $2 \times 210 = 420$

    iii) $420 + 20 = 440$
13. i) AP x PB = CP x PD

    AP x 2 = 3 x 4 = 12

    $AP = \frac{12}{2} = 6$ cm.

ii) AB = 8 cm Radius $= \frac{8}{2} = 4$ cm.

14. i) 90^0

ii) PA = PB = $5\sqrt{3}$ cm.

15. B(3, -1), D(-1,2)

16. $\angle C = 70^0$

$\angle AOB = 2 \times 70^0 = 140^0$

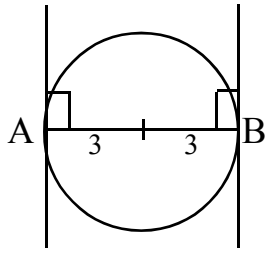
$\angle P = 180^0 - 140^0 = 40^0$

17. i) $\frac{8}{2} = 4$ cm.

ii) $\frac{1}{3} \pi r^2 h = \frac{1}{3} \times \pi \times 4^2 \times 10 = \frac{160}{3} \pi cm^3$

18. $\frac{9}{90} = \frac{1}{10}$

19.



20. Mean = 27

Median = 27

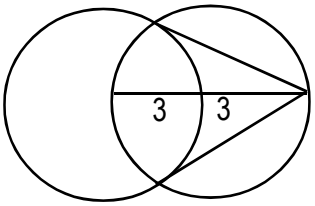
21. i) $\frac{10}{20} = \frac{1}{2}$

ii) $\frac{6}{20} = \frac{3}{10}$

iii) $\frac{4}{20} = \frac{1}{5}$

iv) $\frac{11}{20}$

22.



23. i) $x_2 + x_{19} = x_1 + x_{20} = 60$

ii) $S_{20} = 10 \times (x_1 + x_{20}) = 10 \times 60 = 600$

iii) $x_{11} = 60 - x_{10} = 60 - 28 = 32$

$\therefore$ common difference = 32 - 28 = 4

24. Median = Score of 11th student = 30

25. i) $\frac{60}{2} = 30$cm

ii) 30 - x cm

iii) x (30 - x) = 200

x = 20

length = 20 cm

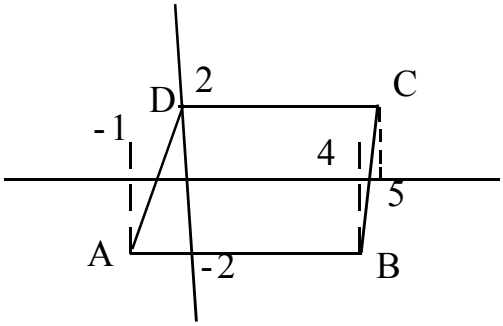
breadth = 30 - 20 = 10 cm.

26. i) AC = $\sqrt{6^2 + 8^2} = \sqrt{100} = 10$ cm.

ii) Sin A = $\frac{6}{10} = \frac{3}{5}$

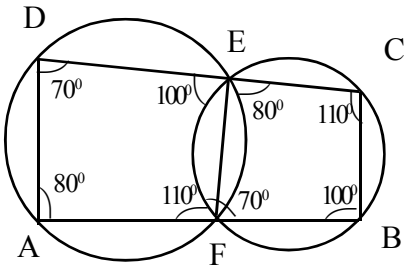
Cos A = $\frac{8}{10} = \frac{4}{5}$

27.



ABCD is a parallelogram.

28.



$\angle B = 100^0$

$\angle C = 100^0$

$\angle A + \angle B = 80^0 + 100^0 = 180^0$

$\therefore$ ABCD is a traperium.

29. i) $\frac{60^0}{360^0} = \frac{1}{6}$

ii) $12 \times \frac{1}{6} = 2$ cm

iii) $l = R = 12$ cm

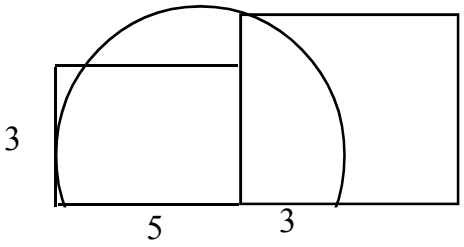
iv) $\pi rl = \pi \times 2 \times 12 = 24\ \pi$ cm^2

30. i) $P(1) = 1^2 + 2 \times 1 + 1 = 4$

ii) $P(x) - P(1) = x^2 + 2x - 3$

iii) $x - 1$

31.



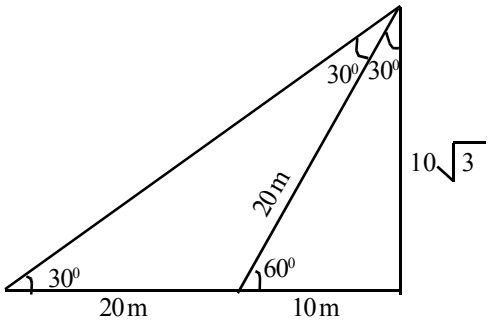
32. $AB = |9 - 1| = 8$ units.

$BC = \sqrt{(9-7)^2 + (2-4)^2} = \sqrt{8}$ units.

$CD = \sqrt{(7-4)^2 + (4-6)^2} = \sqrt{13}$ units.

$AD = \sqrt{(4-1)^2 + (6-2)^2} = 5$ units.

33.



Width of river = 10 m

Height of tree = $10\sqrt{3}$ = 17.3 m

34. i) 5 : 9

ii) 36 cm^3

35. i) 11

ii) 12

iii) 11n + 1

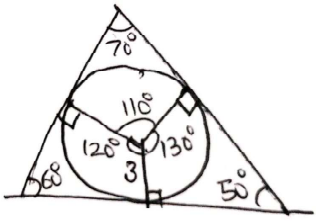
36. i) 10 cm

ii) $\pi r^2 + \pi rl$

= 942 cm^2

iii) Cost = Rs 188.4

37.



38. i) 30

ii) Daily wage of 15th worker = Rs 700

Daily wage of 16th worker = Rs 800

iii) Medium = $\frac{700 + 800}{2}$ = Rs 750

39.

i) $\frac{5}{12}$

ii) $\frac{7}{22}$

iii) $\frac{5}{12} > \frac{7}{22}$. So first box is best choice

iv) $\frac{12}{34} = \frac{6}{17}$

40 i) $x + 6$

ii) $x^2 + 6x$

iii) 9

iv) $x(x+6) = 112$

$x = 8$

Terms 8, 14

41. i) $P(3) = 0$

ii) $x - 3$

iii) $x - 4$

42. i) 6 units

ii) (11,0)

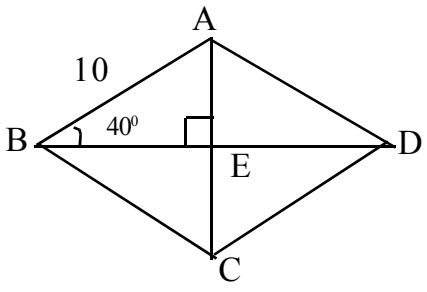
iii) $AD \times DB = CD^2$

$DB = 4$

B(15, 0)

iv) $\left(\frac{2 + 15}{2}, 0\right) = \left(\frac{17}{2}, 0\right)$

43.



$\text{Sin } 40^0 = \frac{AE}{10}$ $\quad AE = 6.4$ cm

$\therefore AC = 12.8$ cm

$\text{Cos } 40^0 = \frac{BE}{10}$ $\quad BE = 7.7$cm

$\therefore BD = 15.4$ cm

$\text{Area} = \frac{1}{2} \times AC \times BD = \frac{1}{2} \times 12.8 \times 15.4$

$= 98.56 \text{ cm}^2$

44. i) $\frac{12 - 4}{6 - 2} = 2$

ii) $(x, 2x)$

iii) $y = 2x$

iv) $(0,0)$

45. i) $\angle AOB = 100^0$

ii) $\angle C = \frac{100^0}{2} = 50^0$

iii) $\angle OAB + \angle C = 40^0 + 50^0 = 90^0$

iv) $\angle AOB = 180^0 - 2x$

$\angle C = \frac{180^0 - 2x}{2} = 90 - x$

$\therefore \angle OAB + \angle C = x + 90^0 - x = 90^0$