RR+PR

ಕರ್ನಾಟಕ ಪ್ರೌಢ ಶಿಕ್ಷಣ ಪರೀಕ್ಷಾ ಮಂಡಳಿ, ಮಲ್ಲೇಶ್ವರಂ, ಬೆಂಗಳೂರು – 560 003

KARNATAKA SECONDARY EDUCATION EXAMINATION BOARD, MALLESWARAM, BANGALORE – 560 003

ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಪರೀಕ್ಷೆ, ಮಾರ್ಚ್ / ಏಪ್ರಿಲ್ — 2015

S. S. L. C. EXAMINATION, MARCH/APRIL, 2015

ಮಾದರಿ ಉತ್ತರಗಳು

MODEL ANSWERS

ದಿನಾಂಕ : 06. 04. 2015]

ಸಂಕೇತ ಸಂಖ್ಯೆ : **81-E**

Date : 06. 04. 2015]

CODE NO. : 81-E

ವಿಷಯ : ಗಣಿತ

Subject : MATHEMATICS

(ಹಳೆ ಪಠ್ಯಕ್ರಮ / Old Syllabus)

(ಪುನರಾವರ್ತಿತ ಅಭ್ಯರ್ಥಿ + ಪುನರಾವರ್ತಿತ ಖಾಸಗಿ ಅಭ್ಯರ್ಥಿ / Regular Repeater + Private Repeater)

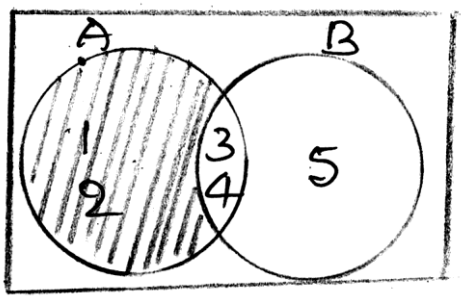
(ಇಂಗ್ಲಿಷ್ ಭಾಷಾಂತರ / English Version)

[ಪರಮಾವಧಿ ಅಂಕಗಳು : **100**

[Max. Marks : 100

Qn. Nos.	Ans. Key	Value Points	Marks allotted
I. 1.	B	$\{c\}$	1
2.	A	5	1
3.	D	$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$	1
4.	A	4	1
5.	B	$A \times B = H \times L$	1
6.	B	$(a - b)$	1

Qn. Nos.	Ans. Key	Value Points	Marks allotted
7.	B	0	1
8.	C	$(a+b)(a^2-ab+b^2)$	1
9.	C	$\sqrt[6]{72}$	1
10.	C	$x+\frac{1}{x}=0$	1
11.	C	$a^2+3a=28$	1
12.	A	0	1
13.	A	real and equal	1
14.	A	concentric circles	1
15.	A	Thales	1
16.	A	60°	1
17.	C	120°	1
18.	D	440 cm^2	1
19.	B	$\pi r(r+l)$	1
20.	A	square	1

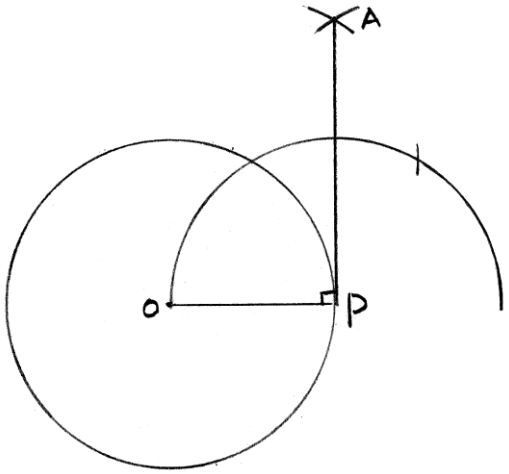
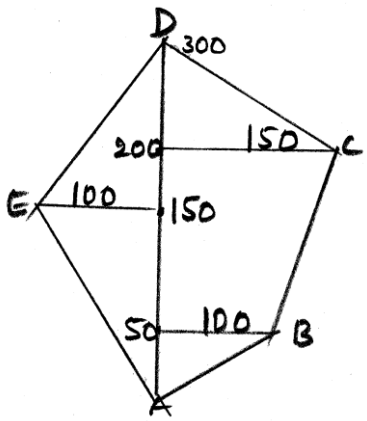
Qn. Nos.		Value Points		Marks allotted	
II.					
	21.	2		1	
	22.	G or Geometric mean (G.M.)		1	
	23.	$\frac{\sigma}{\bar{x}} \times 100$ OR $\frac{\text{S.D.}}{\text{Mean}} \times 100$		1	
	24.	Hypotenuse		1	
	25.	Cylinder		1	
	26.	$\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$		1	
	27.	$3\,abc$		1	
	28.	a^3b^3		1	
	29.	7·5		1	
	30.	2 cm		1	
III.	31.	$A - B = \{1, 2, 3, 4\} - \{3, 4, 5\}$		$\frac{1}{2}$	
		$A - B = \{1, 2\}$		$\frac{1}{2}$	
			Venn diagram Shading	$\frac{1}{2}$ $\frac{1}{2}$	2
	32.	$n(A \cup B) + n(A \cap B) = n(A) + n(B)$		$\frac{1}{2}$	
		$n(A \cup B) + 30 = 120 + 60$		$\frac{1}{2}$	
		$n(A \cup B) = 180 - 30$		$\frac{1}{2}$	
		$n(A \cup B) = 150$		$\frac{1}{2}$	2

Qn. Nos.	Value Points	Marks allotted
33	Let $a,\ ar$ and ar^2 are the three terms in geometric progression.	$\frac{1}{2}$
	By the data,	
	$a \times ar \times ar^2 = 8$	$\frac{1}{2}$
	$a^3 \times r^3 = 8$	$\frac{1}{2}$
	$a^3 \times 2^3 = 2^3$ ($r = 2$ is given)	$\frac{1}{2}$
	$a^3 = 1$	$\frac{1}{2}$ 2
	$a = 1$	
34.	$\frac{1}{2}, \frac{1}{5}, \frac{1}{8}$ .... are in H.P.	
	2, 5, 8 ..... are in A.P.	
	Now, $a = 2,\ d = 3,\ n = 10,\ T_{10} = ?$	$\frac{1}{2}$
	We know that	
	$T_n = a + (n-1)\,d$	$\frac{1}{2}$
	$T_{10} = 2 + (10-1)\,3$	
	$T_{10} = 2 + (9)\,3$	$\frac{1}{2}$
	$T_{10} = 29$ is in A.P.	
	$T_{10} = \frac{1}{29}$ is in H.P.	$\frac{1}{2}$ 2
35.	$AB = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 2 & 0 \\ -1 & 3 \end{bmatrix}$	
	$AB = \begin{bmatrix} 2-2 & 0+6 \\ 6-4 & 0+12 \end{bmatrix}$	1
	$AB = \begin{bmatrix} 0 & 6 \\ 2 & 12 \end{bmatrix}$	1 2
36.	a) 1	$\frac{1}{2}$
	b) 10	$\frac{1}{2}$
	c) 1	$\frac{1}{2}$
	d) 1	$\frac{1}{2}$ 2

Qn. Nos.	Value Points	Marks allotted
37.	Exponential form $\rightarrow 3\,(5)^{\frac{1}{2}}$	$\frac{1}{2}$
	Rational factor $\rightarrow 3$	$\frac{1}{2}$
	Order $\rightarrow 2$	$\frac{1}{2}$
	Radicand $\rightarrow 5$	$\frac{1}{2}$ 2
38.	$\frac{\sqrt{2}}{\sqrt{5}-\sqrt{3}} = \frac{\sqrt{2}}{\sqrt{5}-\sqrt{3}} \times \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}+\sqrt{3}}$	$\frac{1}{2}$
	$= \frac{\sqrt{2}\left(\sqrt{5}+\sqrt{3}\right)}{\left(\sqrt{5}\right)^2-\left(\sqrt{3}\right)^2}$	$\frac{1}{2}$
	$= \frac{\sqrt{10}+\sqrt{6}}{5-3}$	$\frac{1}{2}$
	$\frac{\sqrt{2}}{\sqrt{5}-\sqrt{3}} = \frac{\sqrt{10}+\sqrt{6}}{2}$	$\frac{1}{2}$ 2
39.	Standard form $\rightarrow 2x^2-5x+3 = 0$	$\frac{1}{2}$
	$a \rightarrow 2$	$\frac{1}{2}$
	$b \rightarrow -5$	$\frac{1}{2}$
	$c \rightarrow 3$	$\frac{1}{2}$ 2
40.	Let x and $(x+1)$ are the two consecutive integers.	
	By the data,	
	$x(x+1) = 12$	$\frac{1}{2}$
	$x^2+x-12 = 0$ $(x+4)(x-3) = 0$ x / $+4$ -3	$\frac{1}{2}$
	$x+4 = 0,\ x-3 = 0$	$\frac{1}{2}$
	$x = -4$ or $x = 3$.	
	The two consecutive numbers are	
	$x = -4$, $x+1 = -3$ OR $x = 3$, $x+1 = 4$	$\frac{1}{2}$ 2

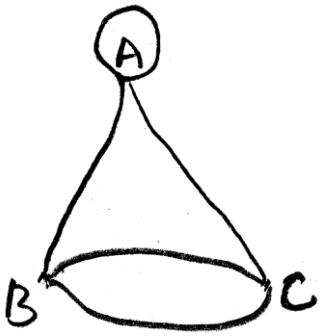
Qn. Nos.	Value Points	Marks allotted
41.	$x^2 + 2x - 1 = 0$ $\quad a = 1,\ b = 2,\ c = -1$	$\frac{1}{2}$
	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	
	$= \frac{-2 \pm \sqrt{2^2 - 4 \times 1 \times -1}}{2 \times 1}$	$\frac{1}{2}$
	$= \frac{-2 \pm \sqrt{8}}{2}$ $\quad \sqrt{8} = 2\sqrt{2}$	$\frac{1}{2}$
	$= \frac{-2 \pm 2\sqrt{2}}{2}$	
	$x = -1 \pm \sqrt{2}$	$\frac{1}{2}$ 2
42.	The required equation is x^2 – (sum of the roots) x + product of the roots = 0	$\frac{1}{2}$
	$x^2 - (3 + 2)\,x + 3 \times 2 = 0$	1
	$x^2 - 5x + 6 = 0$	$\frac{1}{2}$ 2
43.	$z_4 = \{0, 1, 2, 3\}$	

$\oplus_4$	0	1	2	3	
0	0	1	2	3	$\frac{1}{2}$
1	1	2	3	0	$\frac{1}{2}$
2	2	3	0	1	$\frac{1}{2}$
3	3	0	1	2	$\frac{1}{2}$ 2

Qn. Nos.	Value Points		Marks allotted
44.			
		For circle	$\frac{1}{2}$
	AP is the tange	For radius	$\frac{1}{2}$
		For semicircle	$\frac{1}{2}$
		For tangent	$\frac{1}{2}$ 2
45.	T.S.A. of cylinder = $2\pi r\ (r + h)$		1
	Volume of hemisphere = $\frac{2}{3}\pi r^3$		1 2
46.	Scale 50 m = 1 cm		
	$\frac{300}{50}$ = 6 cm		
	$\frac{200}{50}$ = 4 cm		
	$\frac{150}{50}$ = 3 cm	Calculation	$\frac{1}{2}$
	$\frac{100}{50}$ = 2 cm	Field drawing	$1\frac{1}{2}$ 2
			

Qn. Nos.	Value Points	Marks allotted
47.	$N + R = A + 2$	$\frac{1}{2}$
	$3 + 3 = 4 + 2$	1
	$6 = 6$	$\frac{1}{2}$ 2
48.		

	A	*B*	*C*
A	2	1	1
B	1	0	2
C	1	2	0



1 + 1

2

IV. 49. a) The number of straight lines $= {}^{7}C_{2} = \frac{7 \times 6}{2 \times 1}$ 1

$= 7 \times 3$

$= 21$ $\frac{1}{2}$

b) The number of triangles $= {}^{7}C_{3} = \frac{7 \times 6 \times 5}{3 \times 2 \times 1}$ 1

$= 7 \times 5$

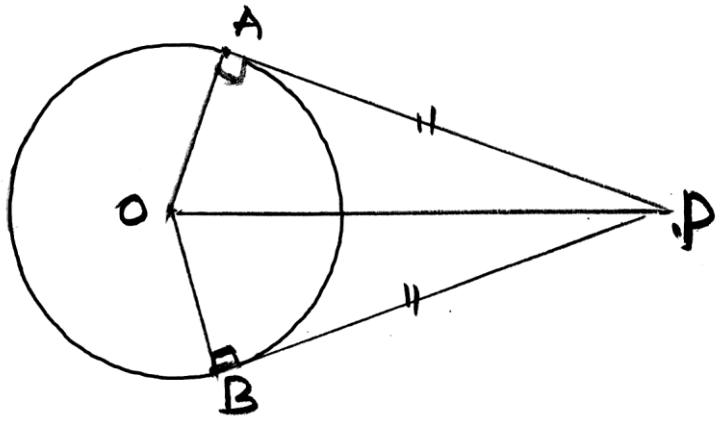
$= 35$ $\frac{1}{2}$ 3

50.

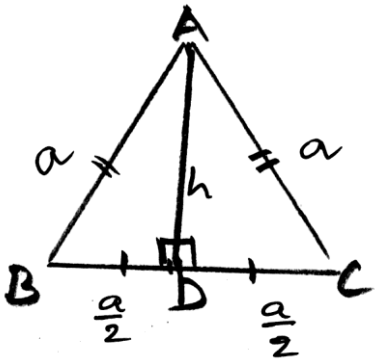
C.I	*x*	*f*	*fx*	$x - \bar{x} = D$	D^2	$f D^2$
1 – 5	3	2	06	3 – 10 = – 7	49	98
6 – 10	8	3	24	8 – 10 = – 2	04	12
11 – 15	13	4	52	13 – 10 = 3	09	36
16 – 20	18	1	18	18 – 10 = 8	64	64

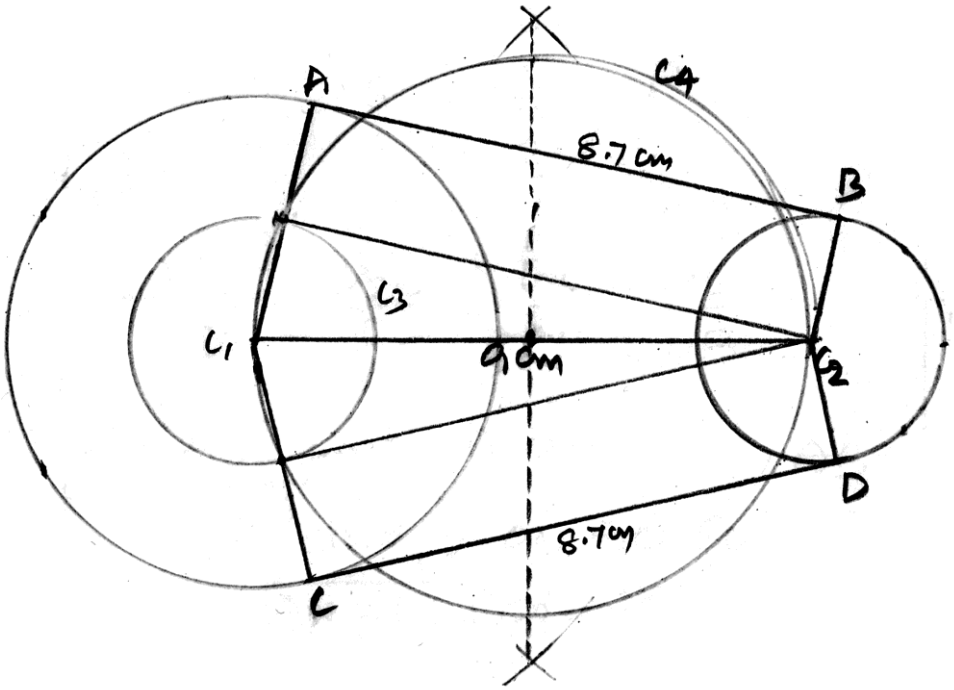
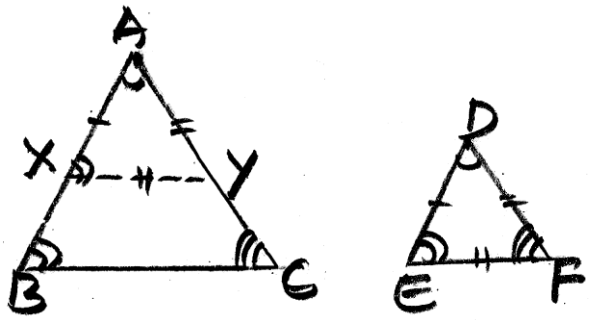
½ ½ ½

N = 10 $\sum fx = 100$ $\sum f D^2 = 210$

Qn. Nos.	Value Points	Marks allotted
	$\overline{X} = \frac{\Sigma f x}{N} = \frac{100}{10} = 10$	$\frac{1}{2}$
	S.D. = $\sigma = \sqrt{\frac{\Sigma f D^2}{N}}$	$\frac{1}{2}$
	$= \sqrt{\frac{210}{10}}$	
	$= \sqrt{21}$	
	$\sigma = 4{\cdot}5$	$\frac{1}{2}$ 3
51.	x | $4x^3 - 3x^2 - 24x - 9$ | $8x^3 - 2x^2 - 53x - 39$	2 1
	| $4x^3 - 5x^2 - 21x$ | $8x^3 - 6x^2 - 48x - 18$	
	| (–) (+) (+) | (–) (+) (+) (+)	
	$2x$ | $2x^2 - 3x - 9$ | $4x^2 - 5x - 21$	2
	| $2x^2 - 6x$ | $4x^2 - 6x - 18$	1
	| (–) (+) | (–) (+) (+)	
	3 | $3x - 9$ | $x - 3$	
	| $3x - 9$ |	1 3
	| (–) (+) |
	| 0 0 |
	$\therefore$ HCF = $(x - 3)$	
52.		$\frac{1}{2}$
	Data : *PA* and *PB* are the tangents drawn from *P* to the circle with centre *O*.	$\frac{1}{2}$

Qn. Nos.	Value Points	Marks allotted
	To prove : $PA = PB$	$\frac{1}{2}$
	Proof : In ΔAOP and ΔBOP	
	$O\hat{A}P = O\hat{B}P = 90°$ ($\because$ radii $\perp$ tangents)	
	$OP = OP$ ($\because$ common side)	$\frac{1}{2}$
	$OA = OB$ ($\because$ radii)	
	$\therefore \quad \Delta AOP \cong \Delta BOP$ ($\because$ RHS)	$\frac{1}{2}$
	$\therefore \quad PA = PB$ ($\because$ *C.P.C.T.*)	$\frac{1}{2}$ 3
53.	$x^2 - 3x + 1 = 0 \div x$	
	$x - 3 + \frac{1}{x} = 0$	
	$x + \frac{1}{x} = 3$ ..... (i)	$\frac{1}{2}$
	Squaring	
	$\left(x + \frac{1}{x}\right)^2 = 3^2$	
	$x^2 + \frac{1}{x^2} + 2 = 9$	
	$x^2 + \frac{1}{x^2} = 7$	$\frac{1}{2}$
	$x^2 + \frac{1}{x^2} - 2 = 7 - 2$	$\frac{1}{2}$
	$\left(x - \frac{1}{x}\right)^2 = 5$	
	$x - \frac{1}{x} = \pm\sqrt{5}$ ..... (ii)	$\frac{1}{2}$
	Multiplying (i) and (ii) we get	
	$\left(x + \frac{1}{x}\right)\left(x - \frac{1}{x}\right) = 3 \times \pm\sqrt{5}$	$\frac{1}{2}$
	$x^2 - \frac{1}{x^2} = \pm 3\sqrt{5}$	$\frac{1}{2}$ 3

Qn. Nos.	Value Points	Marks allotted
54.		$\frac{1}{2}$
	In ΔABD, $A\hat{D}B = 90°$	
	$\therefore \quad AB^2 = AD^2 + BD^2$	$\frac{1}{2}$
	$a^2 = h^2 + \left(\frac{a}{2}\right)^2$	
	$a^2 - \frac{a^2}{4} = h^2$	$\frac{1}{2}$
	$\frac{3a^2}{4} = h^2$	
	$h = \sqrt{3} \cdot \frac{a}{2}$	$\frac{1}{2}$
	Area of $\Delta ABC = \frac{1}{2} \times b \times h$	
	$= \frac{1}{2} \times a \times \sqrt{3} \cdot \frac{a}{2}$	$\frac{1}{2}$
	Area of $\Delta ABC = \frac{\sqrt{3}}{4} \cdot a^2$	$\frac{1}{2}$ 3
V. 55.	Given $d = 9$ cm	
	$R = 4$ cm	
	$r = 2$ cm	
	$R - r = 2$ cm	$\frac{1}{2}$
	For C_1	$\frac{1}{2}$
	For C_2	$\frac{1}{2}$
	For C_3	$\frac{1}{2}$

Qn. Nos.	Value Points	Marks allotted
	For C_4	$\frac{1}{2}$
		
	AB and *CD* Construction of 90° at C_2	$\frac{1}{2}$
	are the direct common tangents Direct common tangents	$\frac{1}{2}$
	their lengths = 8·7 cm Measurement of direct common tangents	$\frac{1}{2}$
56.		4 $\frac{1}{2}$
	Data : In Δ *ABC* and Δ *DEF*	
	$\hat{A} = \hat{D}$	
	$\hat{B} = \hat{E}$ and	
	$\hat{C} = \hat{F}$	$\frac{1}{2}$

Qn. Nos.	Value Points	Marks allotted
	T.P.T. : $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$	$\frac{1}{2}$
	Construction : Mark X on AB and Y on AC such that $AX = DE$ and $AY = DF$ and join XY.	$\frac{1}{2}$
	Proof : In ΔAXY and ΔDEF	
	$\hat{A} = \hat{D}$ ($\because$ Data)	
	$AX = DE$	
	$AY = DF$ ($\because$ Construction)	
	$\therefore$ $\Delta AXY \cong \Delta DEF$ ($\because$ SAS)	
	$\therefore$ $XY = EF$ ..... (i)	
	$A\hat{X}Y = D\hat{E}F$ ($\because$ C.P.C.T.)	$\frac{1}{2}$
	But $A\hat{B}C = D\hat{E}F$	
	$\therefore$ $A\hat{X}Y = A\hat{B}C$	
	These are corresponding angles	
	$\therefore$ $XY \parallel BC$	$\frac{1}{2}$
	$\frac{AX}{AB} = \frac{AY}{AC} = \frac{XY}{BC}$ ($\because$ B.P.T.)	$\frac{1}{2}$
	$\frac{DE}{AB} = \frac{DF}{AC} = \frac{EF}{BC}$ [$\because$ Construction and (i)]	
	$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$ ($\because$ reciprocal)	$\frac{1}{2}$ 4

Qn. Nos.	Value Points	Marks allotted
57.	Let $a-d$, a and $a+d$ are the three terms in A.P.	$\frac{1}{2}$
	By the data,	
	Their sum is 6 means $a-d+a+a+d = 6$	$\frac{1}{2}$
	$3a = 6$	
	$a = 2$	$\frac{1}{2}$
	Again by the data, their product is 6 means	
	$(a-d)(a)(a+d) = 6$	$\frac{1}{2}$
	$(a^2-d^2)\times a = 6$	
	$(2^2-d^2)\times 2 = 6$	$\frac{1}{2}$
	$4-d^2 = 3$	
	$4-3 = d^2$	$\frac{1}{2}$
	$d^2 = 1$	
	$d = \pm 1$	$\frac{1}{2}$
	The three numbers of A.P. are	
	$a=2,\ d=1$ OR $a=2,\ d=-1$	
	$a-d = 1-1 = 1$ $\quad$ $a-d = 2-(-1) = 3$	$\frac{1}{2}$ 4
	$a = 2$ $\quad$ $a = 2$	
	$a+d = 3$ $\quad$ $a+d = 2-1 = 1$	
	$\therefore$ Those numbers are 1, 2, 3 or 3, 2, 1.	

Qn. Nos.	Value Points	Marks allotted

58. $y = x^2$

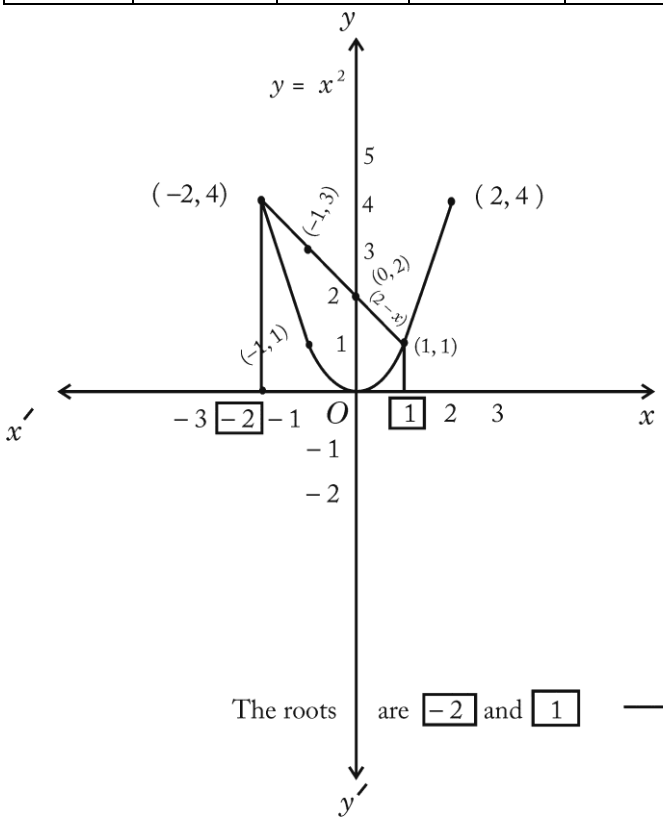
x	0	1	– 1	2	– 2
y	0	1	1	4	4
(x, y)	(0, 0)	(1, 1)	(– 1, 1)	(2, 4)	(– 2, 4)

1

$y = 2 - x$

x	0	1	– 1	– 2
y	2	1	3	4
(x, y)	(0, 2)	(1, 1)	(– 1, 3)	(– 2, 4)

1



Scale

On x-axis 1 cm = 1 unit $\frac{1}{2}$

On y-axis 1 cm = 1 unit

For Parabola $\frac{1}{2}$

For Straight line $\frac{1}{2}$

The roots are – 2 and 1 → $\frac{1}{2}$ 4