SELF ASSESSMENT TERM 1 MODEL PAPER - 2025 - 2026

CLASS 10 MATHEMATICS KEY (2025-26)

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SECTION - I

1. Answer all questions in one WORD or PHRASE.
2. Each question carries one mark. 12x1=12

1. The HCF 0f $\mathbf{2^5 \times 3}$ and $\mathbf{2^2}$ x 101 is [C]

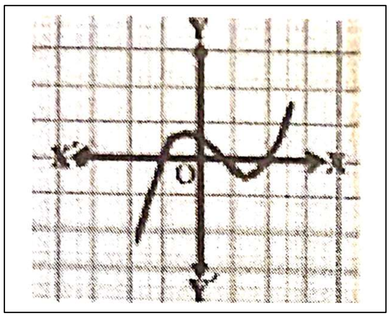
A) 9696 B) 32 C) 4 D) 2

Sol. Common Prime factor = 2

Smallest power of common Prime factor = 2

So HCF = $\mathbf{2^2}$ = 4

2. From the given graph of y = P(x), find the number of zeroes of the polynomial P(x).



Sol. Points where graph crosses or touches the x-axis are 3

So the number of Zeros of the polynomial are three.

3. If P(E) = 0.95, what is the probability of 'not E' ___________

Sol. P(not E) $= 1 - P(E) = 1 - 0.95 = 0.05$

4. Write the general form of a-quadratic polynomial in a variable x.

Sol. General form of a quadratic polynomial is $\boldsymbol{ax^2 + bx + c, a, b, c \in R}$ and $\boldsymbol{a \neq 0}$

5. If a, b are two positive integers then which of the following relation between their HCF and LCM is always true [B]

A) HCF (a, b) × LCM (a, b) = a + b B) HCF (a, b) x LCM (a, b) = a × b

C) HCF (a, b) + LCM (a, b) = b D) HCF (a, b) + LCM (a, b) = a + b

6. Generate a pair of linear equations which are Consistant.

Sol. $\boldsymbol{x + 3y = 5,}$ $\boldsymbol{2x + 2y = 4}$

7. Statement (1): 4, 8,12, 16 ………. is an A.P.

Statement (II): 5, 5, 5, 5……….. is not an A.P. Now, choose the correct answer. [B]

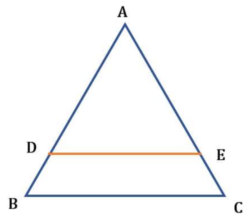
A) Both Statements are True. B) Statement I is true. Statement II is False.

C) Statement I is false. Statement II is true. D) Both Statements are false

8. In $\Delta \boldsymbol{ABC, DE \parallel BC\ AND}$ AD : DB = 2 : 3. Then AE : EC = [A]

A) 2 : 3 B) 3 : 2 C) 2 : 5 D) 3 : 5

Sol.



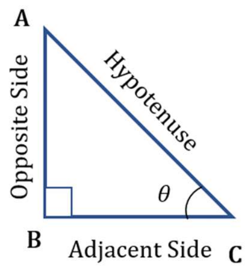
By Basic proportionality Theorem $\frac{AD}{DB} = \frac{AE}{EC}$

$$\Rightarrow \frac{2}{3} = \frac{AE}{EC}$$

$$\Rightarrow AE : EC = 2 : 3$$

9. Using any two trigonometric ratios, create a valid trigonometric identity.

Sol.



$$Sin\ \theta = \frac{Opposite\ Side}{Hypotenuse} = \frac{AB}{AC}$$

$$Cos\ \theta = \frac{Adjecent\ side}{Hypotenuse} = \frac{BC}{AC}$$

$$Sin^2\theta + Cos^2\theta = \left(\frac{AB}{AC}\right)^2 + \left(\frac{BC}{AC}\right)^2$$

$$= \frac{AB^2}{AC^2} + \frac{BC^2}{AC^2}$$

$$= \frac{AB^2+B\ \ ^2}{AC^2}$$ (By Pythagoras theorem)

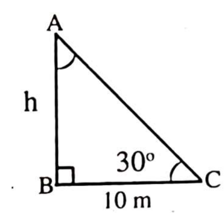
$$= \frac{AC^2}{AC^2} = 1$$

$$Sin^2\theta + Cos^2\theta = 1$$

10. The product of two consecutive positive integers is 506. Frame a quadratic equation to find that positive integers.

Sol. $\boldsymbol{x(x+1) = 506} \Rightarrow x^2 + x - 506 = 0$

I l. From the figure, find the value of 'h'



Sol. $\boldsymbol{tan\ 30^0 = \frac{h}{10}}$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{\boldsymbol{h}}{\boldsymbol{10}} \Rightarrow \boldsymbol{h} = \frac{\boldsymbol{10}}{\sqrt{3}}$$

12. sin 2A = 2 sin A is true when A = ________ [A]

A) $\mathbf{0^0}$ B) $\mathbf{30^0}$ C) $\mathbf{45^0}$ D) $\mathbf{60^0}$

SECTION – II

1. Answer all the questions.
2. Each question carries 2 marks. 8x2=16

13. Create a quadratic polynomial whose sum and product of zeroes are — 5 and 3 respectively.

Sol. Sum of the zeros = $\alpha + \beta = -5$ Product of the zeros = $\alpha\,\beta = 3$

then the quadratic polynomial = $k[x^2 - (\alpha + \boldsymbol{\beta})\boldsymbol{x} + \alpha\,\boldsymbol{\beta}]$

$= k[x^2 - (-5)\boldsymbol{x} + 3]$

$= k[x^2 + 5\boldsymbol{x} + 3]$

One quadratic polynomial when k = 1, is $x^2 + 5\boldsymbol{x} + 3$

14. Give the nature of roots of quadratic equation $2x^2 - 6x + 3 = 0$

Sol. Given Quadratic equation is $2x^2 - 6x + 3 = 0$

Here $a = 2$, $b = -6$, $c = 3$ Discriminant $D = b^2 - 4ac$

$= (-6)^2 - 4 \times 2 \times 3$

$= 36 - 24 = 12 > 0$

So, the given equation has Two distinct real roots.

15. State SSS criteria in similarities of triangles.

Sol. If in two triangles, three sides of one triangle are proportional to corresponding sides of other triangle, then two are Triangles are similar.

16. A student simplified $\sin 60^0 \cos 30^0 + \sin 30^0 \cos 60^0$ as $\sin 60^0 \cos 30^0$ $= \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} = \frac{3}{4}$ DO you agree with this solution? Give reasons for your answer.

Sol. No.

$\sin(A+B) = \sin A \cos B + \sin B \cos A$

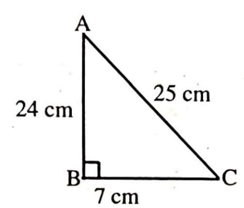
From the above formula

$\sin 60^0 \cos 30^0 + \sin 30^0 \cos 60^0 = \sin(60^0 + 30^0) = \sin 90^0 = 1$

Not $\sin 60^0 \cos 30^0$

Therefore, the student's simplification is not valid, and it ignores the proper use of the trigonometrical identities for sum of angles.

17. From the given figure write the values of sin A and cos A



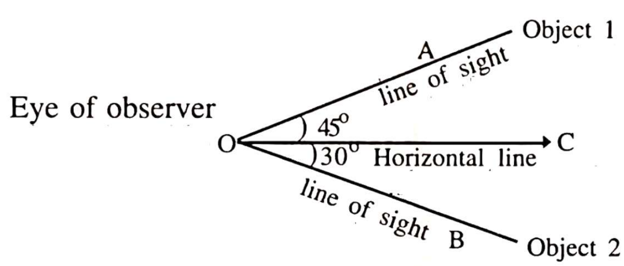
Sol. $\text{Sin A} = \frac{Opposite\ Side}{Hypotenuse} = \frac{BC}{AC} = \frac{7}{25}$

$\text{Cos A} = \frac{Adjecent\ side}{Hypotenuse} = \frac{AB}{AC} = \frac{24}{25}$

18. From the given figure write the values of angle of elevation and angle of depression.

Sol. Angle of elevation = 45^0

Angle of depression = 30^0



19. Find the zeroes of the polynomial $x^2 - 2x - 8$ and explain what these values represent.

Sol. $P(x) = x^2 - 2x - 8$

$= x^2 - 4x + 2x - 8$

$= x(x - 4) + 2(x - 4)$

$= (x - 4)(x+2)$

To find zeros let P(x) = 0

$\Longrightarrow (x - 4)(x+2) = 0$

$\Longrightarrow (x - 4) = 0 \; or \; (x+2) = 0$

$\Longrightarrow x = 4 \quad or \quad x = -2$

At $x = 4$, the polynomial's value is zero,

So the graph crosses the x-axis at (4, 0).

At $x = -2$, the polynomial's value is zero,

So the graph crosses the x-axis at (—2, 0).

20. Write the formulae to find

i) The distance between two points (x_1, y_1) and (x_2, y_2).

ii) The mid-point of the line segment joining the points (x_1, y_1) and (x_2, y_2).

Sol. i) The distance between two points (x_1, y_1) and (x_2, y_2)

$$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

ii) The mid-point of the line segment joining the points (x_1, y_1) and (x_2, y_2).

$$= \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

SECTION – III

1. Answer all the questions.
2. Each question carries 2 marks. 8x4=32

21. What is the probability of getting an even number when a die is thrown once? Now create 2 such type of questions.

Sol. Probability of an event E = $P(E) = \frac{Number\ of\ outcomes\ favourable\ to\ E}{Number\ of\ all\ possible\ outcomes} = \frac{n(E)}{n(S)}$

A die is thrown once then S = {1, 2, 3, 4, 5, 6} n(S) = 6

(i) Let E be an event getting an even number.

Even number = {2, 4, 6} n(E) = 3

P(Even number) = $\frac{3}{6} = \frac{1}{2}$

ii) What is the probability of getting an Prime number when a die is thrown once?

What is the probability of getting an Odd number when a die is thrown once?

22. Write the formula to find mode of a grouped data and explain the terms in it.

Sol. Mode for Grouped data :

$$\text{Mode } = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$$

where l = lower boundary of the modal class

f_1 = frequency of the modal class

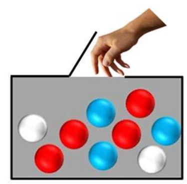
f_0 = frequency of the class preceding the modal class

f_2 = frequency of the class succeeding the modal class

h = size of the modal class

23. A box contains 3 blue, 2 white, and 4 red marbles. If a marble is drawn at random from the box, what is the probability that it will be (i) white? (ii) blue?

Sol. Blue marbles = 3, White marbles = 2, Red marbles = 4,



The number of possible outcomes = 3+2+4=9

So, n(S) = 9

(i)Let W be the event 'the marble is White

The number of outcomes favourable to W = 2

So, n(W) = 2

Probability of an event E = $P(E) = \frac{\textit{Number outcomes favourable to E}}{\textit{Number of all possible out comes}} = \frac{n(E)}{n(S)}$

$\Rightarrow \quad P(W) = \frac{n(W)}{n(S)} = \frac{2}{9}$

(ii)Let B be the event 'the marble is Blue.

The number of outcomes favourable to B = 3

So, n(B) = 3

$\therefore \; P(B) = \frac{n(B)}{n(S)} = \frac{3}{9} = \frac{1}{3}$

24. State the conditions under which a quadratic equation will have i) two real and distinct roots ii) two equal roots.

Sol. The nature of the roots of the equation depends upon the value of discriminant D=$b^2 - 4ac$,

The quadratic equations $ax^2 + bx + c$ has

Two distinct real roots, if $b^2 - 4ac > 0$ and

Two equal real roots, if $b^2 - 4ac = 0$

25. Write the trigonometric ratios sin A, sec A in terms of cot A.

Sol. $cosec^2 A = 1 + cot^2 A$

$\Rightarrow cosec A = \sqrt{1 + cot^2 A}$

We know that $sin\ A = \frac{1}{Cosec A} = \frac{1}{\sqrt{1 + cot^2 A}}$

$\therefore sin\ A = \frac{1}{\sqrt{1 + cot^2 A}}$

$$sec^2 A = 1 + tan^2 A$$

$$\Rightarrow secA = \sqrt{1 + tan^2 A}$$

$$= \sqrt{1 + \frac{1}{cot^2 A}}$$

$$= \sqrt{\frac{cot^2 A + 1}{cot^2 A}}$$

$$= \sqrt{\frac{1 + cot^2 A}{cot^2 A}}$$

$$\therefore secA = \sqrt{\frac{1 + cot^2 A}{cot^2 A}}$$

26. Write the following formulae of A.P. a_1, a_2, a_3 ……… and name the terms in each

i) n^{th} Term (a_n) ii) Sum of first n terms (S_n)

Sol. i) n^{th} Term $a_n = a + (n-1)d$

Here, $a = first\ terms\ of\ AP$

$n = Number\ of\ terms$

$d = Common\ difference$

ii) Sum of first n terms $S_n = \frac{n}{2}(2a + (n-1)d$

Here, $a = first\ terms\ of\ AP$

$n = Number\ of\ terms$

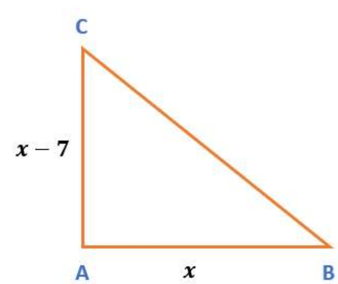
$d = Common\ difference$

13

27. In a right triangle, the length Of the hypotenuse is 13 cm. The difference between the base and the altitude is 7 cm. Write the quadratic equation using these conditions.

Sol. . Let the base of the right triangle (AB) = x cm.

Then altitude (AC) = base – 7 cm = (x – 7) cm.



By Pythagoras theorem,

$x^2 + (x-7)^2 = 13^2$

$x^2 + x^2 - 14x + 49 = 169$

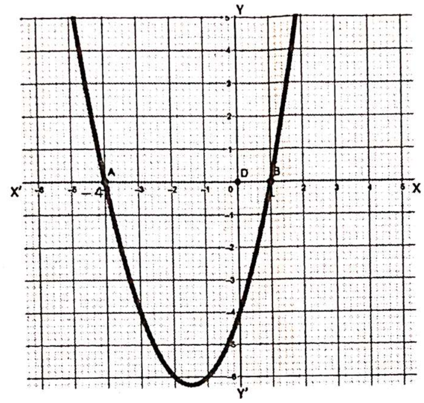
$2x^2 - 14x + 49 - 169 = 0$

$2x^2 - 14x - 120 = 0$

$x^2 - 7x - 60 = 0$

Required quadratic equation is $x^2 - 7x - 60 = 0$

28. Observe the graph and answer the following Questions.



i) Write the zeroes of the polynomial.

Sol. -4 *and* 1

ii) Find the sum of the zeroes of the polynomial.

Sol. Sum of the zeros = $\mathbf{-4+1=-3}$

iii) Find the product of the zeroes of the polynomial.

Sol. Product of the zeros $= -4 \times 1 = -4$

iv) What is the shape of the graph representing by the polynomial

Sol. Parabola

SECTION – IV

1. Answer all the questions.
2. Each question carries 2 marks.
3. There is an internal choice for each question. 5 x 8=40

29. a) Is $\sqrt{3}$ irrational? Justify your answer.

Sol. . Let $\sqrt{3}$ is a rational number

$\Rightarrow \sqrt{3} = \frac{a}{b}$ here (a, b are coprimes)

$\Rightarrow \sqrt{3}$ b $= a$

Squaring on both sides $\Rightarrow (\sqrt{3}\ \text{b})^2 = (a)^2$

$\Rightarrow 3b^2 = a^2$ .... (1)

$\Rightarrow b^2 = \frac{a^2}{3} \Rightarrow$ 3 divides a^2

$\Rightarrow$ 3 divides 'a' also

$\therefore$ Let $a = 3$k

$3b^2 = a^2$ [From equation (1)]

$\Rightarrow 3b^2 = (3k)^2$

$\Rightarrow 3b^2 = 9\,k^2$

$\Rightarrow b^2 = 3k^2$

3 divides $b^2 \Rightarrow$ 3 divides 'b' also

$\therefore$ Both 'a' and 'b' have 3 as a common factor.

But this contradicts the fact that 'a' and 'b' are co-prime.

So, our assumption is wrong.

$\therefore \sqrt{3}$ is an irrational.

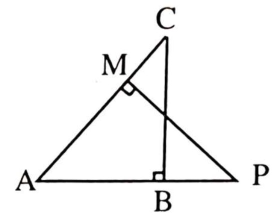
b) In the adjacent Fig. ABC and AMP are two right triangles, right angled at B and M respectively. Prove that: i) ΔABC $\sim \Delta$AMP ii) $\frac{CA}{PA} = \frac{BC}{MP}$

Sol. i) In ΔABC and ΔAMP

$\angle BAC = \angle MAP$ (common angles)

$\angle ABC = \angle AMP = \mathbf{90^0}$

$\therefore \Delta ABC \sim \Delta AMP$ (AA similarity criterion)



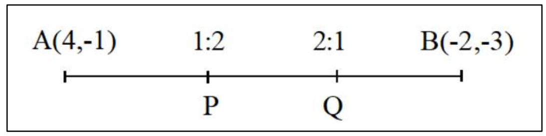
(ii) $\Delta ABC \sim \Delta AMP$ [from(i)]

$\frac{CA}{PA} = \frac{BC}{MP}$ (Ratio of corresponding sides are equal in similar triangles)

30. a) Two students, Rahul and Vinay solved the problem of finding the trisection points of the line segment joining A(4, —l) and B(—2, —3). Rahul got the points as $(2,\frac{-5}{3})$ and $(0, \frac{-7}{3})$, while Vinay got (2, —2) and (0, —3). Evaluate both answers and decide which one is correct, by giving suitable reasons.

Sol. Given points A (4,-1), and B (-2,-3)

Let P and Q be the points of trisection of AB.



$A(4,-1) = (x_1, y_1), \quad B(-2,-3)) = (x_2, y_2)$

P divides AB in the ratio $1{:}2 = m_1 : m_2$

$P(x, y) = \left(\frac{m_1 x_2 + m_2 x_1}{m_1 + m_2}, \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2}\right)$

$P(x, y) = \left(\frac{1(-2)+2\times4}{1+2}, \frac{1\times(-3)+2\times(-1)}{1+2}\right)$

$= \left(\frac{-2+8}{1+2}, \frac{-3-2}{1+2}\right)$

$= \left(\frac{6}{3}, \frac{-5}{3}\right) = \left(2, \frac{-5}{3}\right)$

Q divides AB in the ratio $2{:}1 = m_1 : m_2$

$Q(x, y) = \left(\frac{2(-2)+1\times4}{2+1}, \frac{2\times(-3)+1\times(-1)}{2+1}\right)$

$= \left(\frac{-4+4}{2+1}, \frac{-6-1}{2+1}\right)$

$= \left(\frac{0}{3}, \frac{-7}{3}\right) = \left(0, \frac{-7}{3}\right)$

The trisection points are $\left(2, \frac{-5}{3}\right)$ and $\left(0, \frac{-7}{3}\right)$

Hence Rahul is correct.

b) Reena and Meena solved the problem of dividing the line segment joining A(—2, 2) and B(2, 8) into four equal parts. Reena's answer is (-1, 7/2), (0, 5), (1, 13/2). Meena's answer is (-1, 4), (0, 6), (1, 7). Who is correct? Give reasons.

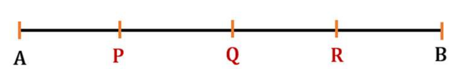
Sol. Given points: A (— 2, 2) and B (2, 8)

Let P, Q and R divides the line segment AB into 4 equal parts.

$Q = \text{Midpoint of } AB = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$= \left(\frac{-2+2}{2}, \frac{2+8}{2}\right)$

$= \left(\frac{0}{2}, \frac{10}{2}\right) = (0, 5)$



P = Midpoint of AQ = $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right) = \left(\frac{-2+0}{2}, \frac{2+5}{2}\right) = \left(\frac{-2}{2}, \frac{7}{2}\right) = (-1, \frac{7}{2})$

R = Midpoint of QB = $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right) = \left(\frac{0+2}{2}, \frac{5+8}{2}\right) = \left(\frac{2}{2}, \frac{13}{2}\right) = (1, \frac{13}{2})$

∴The required points are $(-1, \frac{7}{2})$, $(0, 5)$, $(1, \frac{13}{2})$

So, Reena's answer is correct.

31. a) One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting (i) a king of red colour (ii) a face card (iii) the jack of hearts (iv) a spade

Sol. Total number of cards = 52, n(S)=52

Probability of an event E = $P(E) = \frac{Number\ of\ outcomes\ favourable\ to\ E}{Number\ of\ all\ possible\ outcomes} = \frac{n(E)}{n(S)}$

(i) Number of favourable outcomes to the king of red colour = 2

P(a king of red colour) $= \frac{2}{52} == \frac{1}{26}$

(ii) Number of favourable outcomes to the face card = 12

P(a face card) $= \frac{12}{52} == \frac{3}{13}$

(iii) Number of favourable outcomes to the jack of hearts = 1

P(the jack of hearts) $= \frac{1}{52}$

(iv) Number of favourable outcomes to a spade card = 13

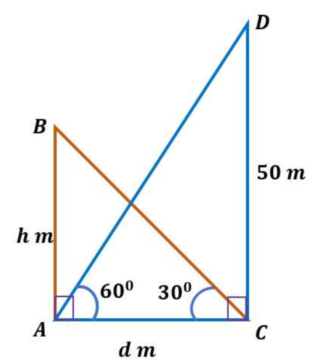
P(a spade card) $= \frac{13}{52} = \frac{1}{4}$

b) The angle of elevation of the top of a building from the foot of the tower is 30^0 and the angle of elevation of the top of the tower from the foot of the building is 60^0. If the tower is 50 m high, find the height of the building.

Sol. Let height of the building=AB=h m

The height of the tower=CD=50m

AC= d m



From ΔACD

$tan\ 60^0 = \frac{Opposite\ side}{Adjecent\ side} = \frac{50m}{d}$

$\Rightarrow \sqrt{3} = \frac{50}{d}$

$\Rightarrow d = \frac{50}{\sqrt{3}}$ ------ (i)

From ΔBAC

$tan\ 30^0 = \frac{Opposite\ side}{Adjecent\ side} = \frac{h}{d}$

$\Rightarrow \frac{1}{\sqrt{3}} = \frac{h}{d}$

$\Rightarrow d = h\sqrt{3}$ ------ (ii)

From (i) and (ii)

$$h\sqrt{3} = \frac{50}{\sqrt{3}} \Rightarrow h = \frac{50}{\sqrt{3}\times\sqrt{3}} = \frac{50}{3} = 16\frac{2}{3}$$

$\therefore$The height of the building $= 16\frac{2}{3}$ m.

32. a) The distribution below gives the weights of 30 students of a class, Find the median weight of the students.

Weight (in kg) బరువు (కి.గ్రాలలో)	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75
No. of students విద్యార్థులసంఖ్య	2	3	8	6	6	3	2

Weight (in Kg)	Number of students	Cumulative frequency
$40 - 45$	2	2
$45 - 50$	3	5
$50 - 55$	8	13
$55 - 60$	6	$19 \rightarrow cf$
$60 - 65$	$6 \rightarrow f$	25
$65 - 70$	3	28
$70 - 75$	2	30
	$n = \sum f_i = 30$	

$n = 30$, $\frac{n}{2} = \frac{30}{2} = 15$ So, Median class $55 - 60$

$l = 55$, $cf = 13$, $f = 6$, $h = 5$

$$\text{Median} = l + \left(\frac{\frac{n}{2} - cf}{f}\right) \times h$$

$$= 55 + \left(\frac{15-13}{6}\right) \times 5$$

$$= 55 + \left(\frac{2}{6}\right) \times 5$$

$$= 55 + \frac{5}{3}$$

$$= 55 + 1.66$$

$$= 56.66$$

Median weight=56.66 kg.

b) Find the 11th term from the last term (towards the first term) of the AP : 10, 7, 4, ……….. −62

Sol. Given AP is 10, 7, 4 ………..

Here $a = 10$ and $d = 7 - 10 = -3$

Let $\boldsymbol{a_n} = \boldsymbol{-62}$ $\Rightarrow$ $a + (n - 1)d = -62$

$\Rightarrow$ $10 + (n - 1)(-3) = -61$

$\Rightarrow$ $(n - 1)(-3) = -62 - 10 = -72$

$\Rightarrow$ $(n - 1) = \frac{-7}{-3} = 24$

$\Rightarrow$ $n = 24 + 1 = 25$

$\therefore$ There are 25 terms in the given AP

The 11^{th} term from last $= (25 - 10)^{th}$ term $= 15^{th}$ term.

$\therefore a_{15} = a + (15 - 1)d = 10 + 14 \times (-3) = 10 - 42 = -32$

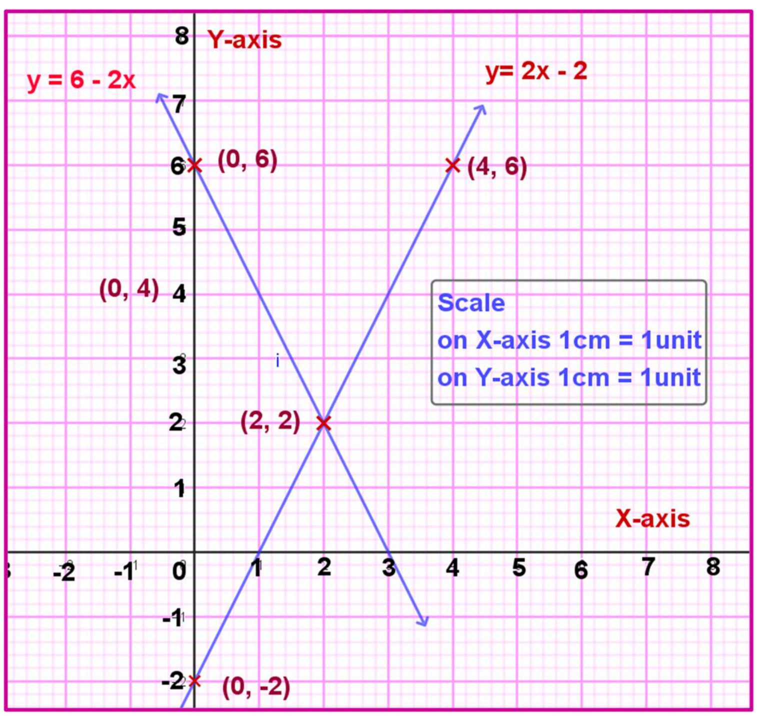
The 11^{th} term from the last of the AP is -32

33. a) Draw the graph of the following pair of linear equations and find the solution from the graph. $2x + y - 6 = 0$, and $4x - 2y - 4 = 0$

Sol.

$2x + y - 6 = 0 \Rightarrow y = 6 - 2x$		
x	$y = 6 - 2x$	$(x.y)$
0	$y = 6 - 2(0) = 6$	(0, 6)
2	$y = 6 - 2(2) = 2$	(2, 2)

$4x - 2y - 4 \Rightarrow y = \frac{4x-4}{2} \Rightarrow y = 2x - 2$		
x	$y = 2x - 2$	$(x.y)$
0	$y = 2(0) - 2 = -2$	(0, − 2)
4	$y = 2(4) - 2 = 6$	(4, 6)



Graph intersect at (2, 2). Solution x=2 and y=2

b) Form the pair of linear equations in the following problem. and find their solutions graphically. 5 pencils and 7 pens together cost Rs. 50, whereas 7 pencils and 5 pens together cost Rs. 46. Find the cost of one pencil and that of one pen.

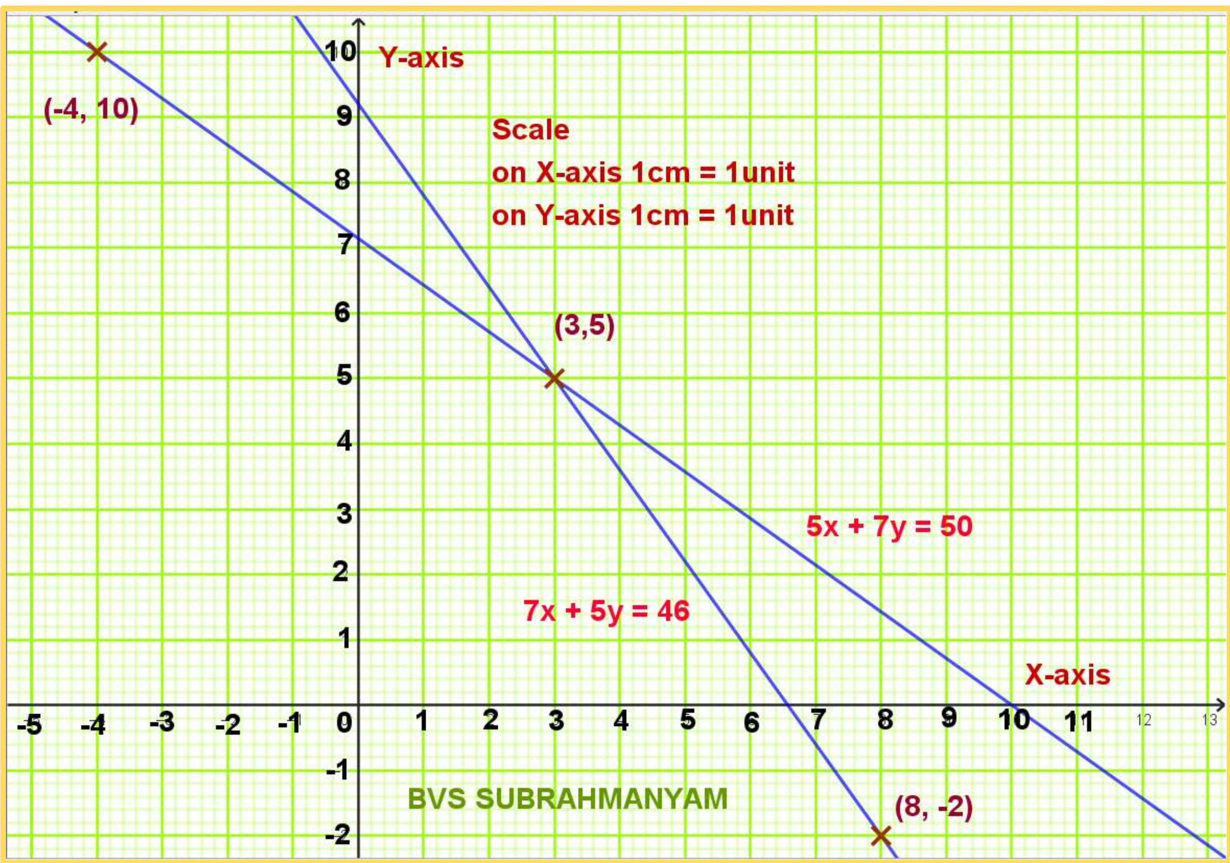
Sol. Let the cost of 1 pencil = ₹ x and the cost of 1 pen = ₹ y

5 pencils + 7 pens = ₹ 50 $\Rightarrow$ $5x + 7y = 50$ $\rightarrow$ (1)

7 pencils + 5 pens = ₹ 46 $\Rightarrow$ $7x + 5y = 46$ $\rightarrow$ (2)

$5x + 7y = 50 \Rightarrow y = \frac{50-5x}{7}$		
x	$y = \frac{50-5x}{7}$	$(x.y)$
3	$y = \frac{50-5(3)}{7} = \frac{35}{7} = 5$	(3, 5)
−4	$y = \frac{50-5(-4)}{7} = \frac{70}{7} = 10$	(−4, 10)

$7x + 5y = 46 \Rightarrow y = \frac{46-7x}{5}$		
x	$y = \frac{46-7x}{5}$	$(x.y)$
3	$y = \frac{46-7(3)}{5} = \frac{25}{5} = 5$	(3, 5)
8	$y = \frac{46-7(8)}{5} = \frac{-10}{5} = -2$	(8, −2)



The two lines intersect at the point (3, 5)

So, x=3, y=5 is the required solution of the pair of linear equations.

i.e. the cost of pencil = ₹ 3 and the cost of pen = ₹ 5

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