MATHEMATIC (STANDARD)

SET I

SECTION – A

Question numbers 1 to 10 are multiple choice questions of 1 mark each

Select the correct option.

4. The values of k for which the system of linear equation $x + 2y = 3$, $5x + ky + 7 = 0$ is inconsistent is

(a) $-\frac{14}{3}$ (b) $\frac{2}{5}$ (c) 5 (d) 10

k का वह मान जिसके लिए रैखिक समीकरण निकाय $x + 2y = 3$, $5x + ky + 7 = 0$ असंगत है

(a) $-\frac{14}{3}$ (b) $\frac{2}{5}$ (c) 5 (d) 10

Solution $x + 2y = 3$

$5x + ky + 7 = 0$

For linear equations to be inconsistent

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

$$\frac{1}{5} = \frac{2}{k} \neq \frac{-3}{7}$$

$$\frac{1}{5} = \frac{2}{k} \Rightarrow k = 10$$

(d)

(3) The zeroes of polynomial

$x^2 - 3x - m(m+3)$ are

(a) $m, m+3$ (b) $-m, m+3$ (c) $m, -(m+3)$

(d) $-m, -(m+3)$

बहुपद $x^2 - 3x - m(m+3)$ के शून्यक हैं

(a) $m, m+3$ (b) $-m, m+3$ (c) $m, -(m+3)$

(d) $-m, -(m+3)$

Solution :-

$x^2 - 3x - m(m+3)$

$x^2 - 3x - m^2 - 3m$

$x^2 - m^2 - 3x - 3m$

$(x+m)(x-m) - 3(x+m)$

$(x+m)(x-m-3)$

For zeroes

$(x+m)(x-m-3) = 0$

$x+m=0 \qquad x-m-3=0$

$x = -m \qquad x = m+3$

So zeroes are $-m, m+3$

(c)

9

(8) Euclid's division Lemma states that for two positive integers a and b there exists unique integers q and r satisfying $a = bq + r$ and

(a) $0 < r < b$ (b) $0 < r \leq b$

(c) $0 \leq r < b$ (d) $0 \leq r \leq b$.

यूक्लिड विभाजन प्रमेयिका के अनुसार दो धनात्मक पूर्णांक a and b के लिए ऐसा अद्वितीय पूर्ण संख्याएं q और r विद्यमान है कि $a = bq + r$ है तथा

(a) $0 < r < b$ (b) $0 < r \leq b$

(c) $0 \leq r < b$ (d) $0 \leq r \leq b$

Solution $0 \leq r < b$

(c)

4. The sum of exponenti
factors in the prime
of 196 is

(a) 3 (b) 4 (c) 5 (d

1. संख्या 196 के अभाज्य
में अभाज्य गुणनखंडों
योग है

(a) 3 (b) 4 (c) 5 (d)

Solution: $196 = 2^2 \times 7^2$

$2 + 2 = 4$

(b)

5 If the point $P(6, 2)$ divides the line segment joining $A(6, 5)$ & $B(4, y)$ in the ratio $3:1$ Then the value of y is

(a) 4 (b) 3 (c) 2 (d) 1

यदि बिन्दु $P(6, 2)$ बिन्दुओं $A(6, 5)$ तथा $B(4, y)$ को मिलाने वाले रेखाखण्ड को $3:1$ के अनुपात में बाँटता है तो y का मान है

(a) 4 (b) 3 (c) 2 (d) 1

Solution

$A(6,5)$ —— 3 —— $P(6,2)$ —— 1 —— $B(4,y)$

$$2 = \frac{3y + 5}{3 + 1}$$

$$2 = \frac{3y + 5}{4}$$

$3y + 5 = 8$, $3y = 3$, $y = 1$

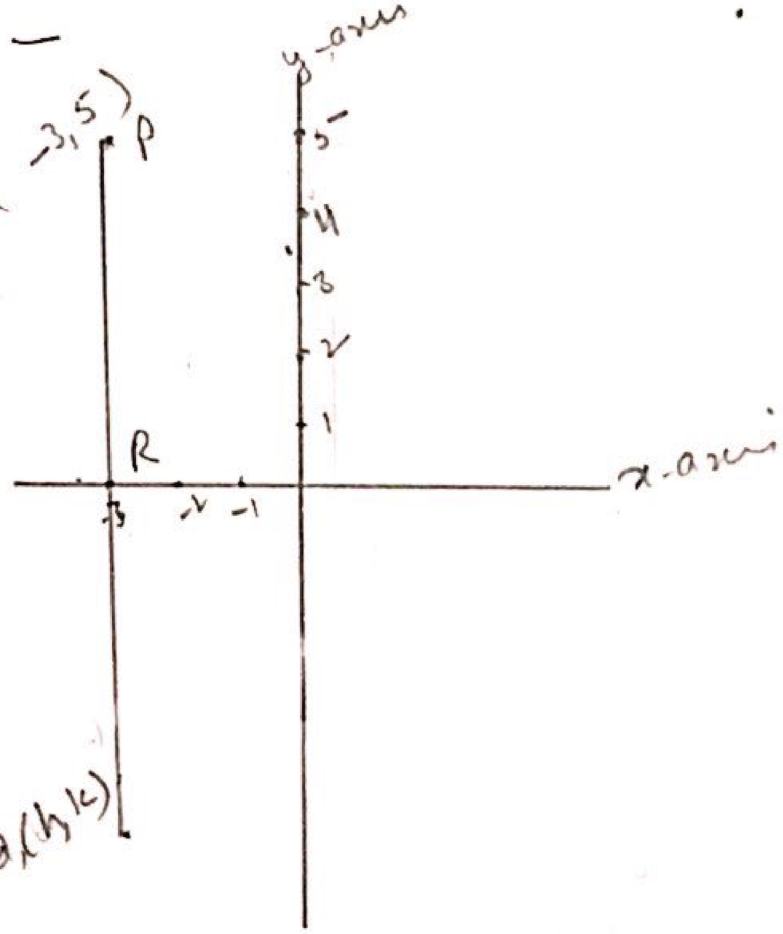
(d)

6 The co-ordinates of the point which is reflection of point $(-3, 5)$ in x-axis are

(a) $(3, 5)$ (b) $(3, -5)$ (c) $(-3, -5)$ (d) $(-3, 5)$

उस बिन्दु के निर्देशांक जो बिंदु $(-3, 5)$ का x-अक्ष में प्रतिबिंब (reflection) है, हैं —

Solution



Coordinate of P = $(-3, 5)$

Co-ordinate of R = $(-3, 0)$

Find co-ordinate of Q.

$\frac{h-3}{2} = -3$ $\quad h-3 = -6$ $\quad h = -3$

$\frac{k+5}{2} = 0$ $\quad k+5 = 0$ $\quad k = -5$

$(h, k) = (-3, -5)$

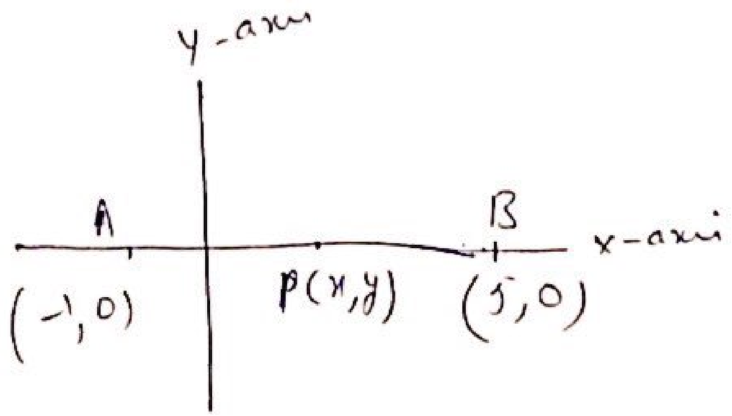
7 The point P on x-axis equidistant from the points $A(-1,0)$ and $B(5,0)$ is

(a) $(2,0)$ (b) $(0,2)$ (c) $(3,0)$ (d) $(2,2)$

x-अक्ष पर स्थित बिंदु P जो बिंदुओं $A(-1,0)$ और $B(5,0)$ से समदूरस्थ है

(a) $(2,0)$ (b) $(0,2)$ (c) $(3,0)$ (d) $(2,2)$

Solution



$$AP = PB$$

$\Rightarrow$ P is the mid point

so mid point of AB is

$$\left(\frac{-1+5}{2}, \frac{0+0}{2}\right)$$

$$\left(\frac{4}{2}, 0\right)$$

$$(2, 0)$$

(a)

8 The n^{th} term of the A.P
$a, 3a, 5a \ldots$ is

(a) na (b) $(2n-1)a$ (c) $(2n+1)a$ (d) $2na$

समांतर श्रेढी $a, 3a, 5a \ldots$ का n वाँ पद है

(a) na (b) $(2n-1)a$ (c) $(2n+1)a$ (d) $2na$

Solution first term = a.

$d = 3a - a = 2a$.

$$a_n = a + (n-1)d$$
$$= a + (n-1)(2a)$$
$$= a + 2na - 2a$$
$$= 2na - a$$
$$= (2n-1)a$$

b

9. The common difference of the AP $\frac{1}{p}, \frac{1-p}{p}, \frac{1-2p}{p}, \ldots\ldots$ is

(a) 1 (b) $\frac{1}{p}$ (c) -1 (d) $-\frac{1}{p}$

समान्तर श्रेणी $\frac{1}{p}, \frac{1-p}{p}, \frac{1-2p}{p}, \ldots$ का सार्व अंतर है

(a) 1 (b) $\frac{1}{p}$ (c) -1 (d) $-\frac{1}{p}$

Solution

$$d = \frac{1-p}{p} - \frac{1}{p}$$

$$\frac{\cancel{1}-p-\cancel{1}}{p} = \frac{-\cancel{p}}{\cancel{p}} = -1$$

(c)

10. The roots of the quadratic equation $x^2 - 0.04 = 0$ are

(a) ± 0.2 (b) ± 0.02 (c) 0.4 (d) 2.

द्विघाती समीकरण $x^2 - 0.04 = 0$ के मूल

(a) ± 0.2 (b) ± 0.02 (c) 0.4 (d) 2

Solution

$$x^2 - 0.04 = 0$$

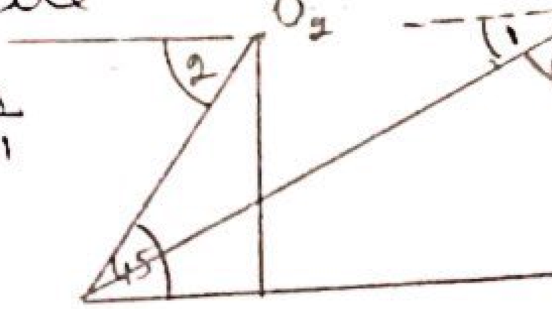
$$x^2 = 0.04$$

$$x = \pm 0.2$$

(a)

In Q. Nos 11 to 15 fill in the blanks
Each question is of 1 mark.

11. The angles of depression from the observing positions O_1 and O_2 re... of the object A are



आकृति में वस्तु A की क्षितिज O₁ तथा O₂ से प्रेक्षण स्थान पर से अवनमन कोण क्रमशः है ______

Solution $\angle 1$ = $\underset{\text{अवनमन कोण}}{\text{angle of depression}}$ O...

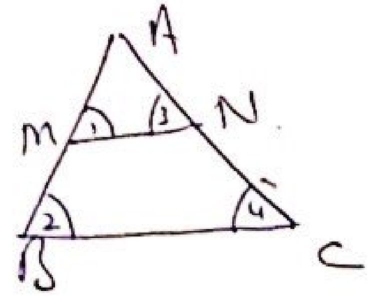
$= 90 - 60 = \ldots$

$\angle 2$ = $\underset{\text{अवनमन कोण}}{\text{angle of depression}}$ ...

$= 45$

So answer $= 30^\circ, 45^\circ$

2 In fig MN ∥ BC



AM : MB = 1 : 2

Then $\frac{ar(\Delta AMN)}{ar(\Delta ABC)} =$ ___

Solution AM : MB = 1 : 2

AM = k MB = 2k

MN ∥ BC ⇒ ∠1 = ∠2 , ∠3 = ∠4 ~~alternate~~

(∵ corresponding angles are equal)

⇒ ΔAMB ~ ΔABC

$$\frac{ar(\Delta AMN)}{ar(\Delta ABC)} = \frac{AM^2}{AB^2}$$

(∵ The ratio of the areas of two similar triangles is equal to square of the ratio of their corresponding sides)

$$= \left(\frac{AM}{AB}\right)^2$$

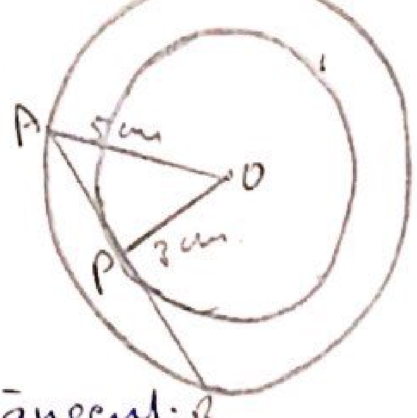
$$= \left(\frac{AM}{AM+MB}\right)^2$$

$$= \left(\frac{k}{k+2k}\right)^2 = \left(\frac{\cancel{k}}{3\cancel{k}}\right)^2 = \frac{1}{9}$$

$$= \frac{1}{9} = 1 : 9$$

13 In given fig
the length PB = — cm.

दी गई आकृति में
लम्बाई PB = — cm



$\angle P = 90^\circ$ [$\because$ The tangent to a circle is perpendicular to the radius at point of contact.)

$$AP^2 = OA^2 - OP^2$$
$$= (5)^2 - (3)^2$$
$$= 25 - 9$$
$$= 16$$
$$AP^2 = 16$$
$$AP = 4$$

$AP = PB$ [Perpendicular from the centre to the chord bisect the chord]

$\Rightarrow PB = 4$ cm.

14. In ΔABC $AB = 6\sqrt{3}$ cm. $AC = 12$ cm and $BC = 6$cm then $\angle B =$ ____

एक त्रिभुज ABC में $AB = 6\sqrt{3}$ सेमी $AC = 12$ cm, और $BC = 6$ सेमी $\angle B$ का मान है

Solution $AB = 6\sqrt{3}$ cm $AB^2 = 108$

$AC = 12$ cm $AC^2 = 144$

$BC = 6$ cm $BC^2 = 36$

$\Rightarrow AC^2 = AB^2 + BC^2$ $\left[\begin{array}{l} \because 144 = 108 + 36 \\ 144 = 144 \end{array}\right]$

$\Rightarrow \angle B = 90°$

or.

13) Two triangles are similar if their corresponding sides are ——

दो त्रिभुज समरूप होते हैं यदि उनकी संगत भुजाएं —— हैं ।

Solution proportional

15 The value of $\sin 23^\circ . \cos 67^\circ + \cos 23^\circ \sin 67^\circ$ is

$\sin 23^\circ \cos 67^\circ + \cos 23^\circ \sin 67^\circ$ का मान है —

$$\sin 23 \cos 67^\circ + \cos 23^\circ \sin 67^\circ$$

$$\sin 23 \cos (90-23) + \cos 23 \sin (90-23)$$

$$\sin 23 \sin 23 + \cos 23 \cos 23$$

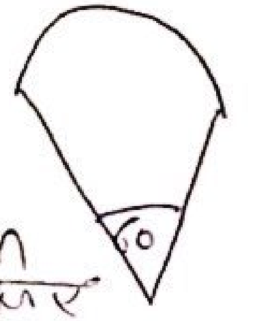
$$\sin^2 23 + \cos^2 23$$

$$1$$

Scanned with CamScanner

16 In fig is a sector of circle of radius 10.5 cm Find the perimeter of the sector (Take $\pi = \frac{22}{7}$

त्रिज्या 10.5 सेमी वाले वृत्त का एक त्रिज्यखण्ड दिया है इस त्रिज्यखण्ड का परिमाप ज्ञात कीजिए



$\pi = \frac{22}{7}$

Let l = length of arc $\quad r = 10.5$ cm

$$l = \frac{\theta}{360} 2\pi r$$

$$= \frac{60}{360} \times 2 \times \frac{22}{7} \times 10.5$$

$$= \frac{\cancel{60}}{\cancel{360}} \times \cancel{2} \times \frac{\cancel{22}}{\cancel{7}} \times \frac{\cancel{105}}{\cancel{10}}$$

$$= 11 \text{ cm}$$

Perimeter (परिमाप) = 10.5 + 10.5 + 11

= 32 cm

17 प्र· a number x is chosen at random from the numbers $-3, -2, -1, 0, 1, 2, 3$. Then find the probability of $x^2 < 4$

यदि संख्याओं $-3, -2, -1, 0, 1, 2, 3$ में से एक संख्या x यादृच्छया चुनी गई हो तो $x^2 < 4$ की प्रायिकता ज्ञात कीजिए

$$x^2 < 4$$

$$x^2 - 4 < 0$$

$$(x+2)(x-2) < 0$$

$$-2 < x < 2$$

$$P(-2 < x < 2) = P(-1, 0, 1) = \frac{3}{7}$$

or

17 What is the probability that a random taken leap year has 52 Sundays

किसी यादृच्छया चुने गए लीप वर्ष में 52 रविवार होने की प्रायिकता क्या है

Solution – A leap year has 366 days

$52 \times 7 + 2$

So there are 52 Sundays but there are two extra days

These two extra days are

(Sunday, Monday), (Monday, Tuesday)
(Tuesday, Wednesday), (Wednesday, Thursday)
(Thursday, Friday), (Friday, Saturday)
(Saturday Sunday)

Now we are to find probability of having 52 Sundays

So from the combination listed above leave two combinations

I (Sunday, Monday) II (Saturday, Sunday)

So ~~sum~~ number of remaining combination $= 5$

So Probability of getting 52 Sundays

$= \frac{5}{7}$