REVIEW EXERCISE

Q.1

our options are given against each statement. Encircle the correct one.

(i)

he equation of a straight line in the slope-intercept form is written as:

(a) $y = m(x + c)$

(b) $y - y_1 = m(x - x_1)$

(c) $y = c + mx$

(d) $ax + by + c = 0$

(ii)

he gradients of two parallel lines are:

(a) Equal

(b) Zero

(c) Negative reciprocals of each other

(d) Always undefined

(iii)

f the product of the gradient of two lines is –1, then the liens are:

(a) Parallel

(b) Perpendicular

(c) Collinear

(d) Coincident

(iv)

istance between two point $P(1,2)$ **and** $Q(4,6)$ **is:**

(a) 5 (b) 6

(c) $\sqrt{13}$ (d) 4

(v)

he midpoint of a line segment with endpoints $(-2,4)$ **and** $(6,-2)$ **is:**

(a) $(4,2)$ (b) $(2,1)$

(c) $(1,1)$ (d) $(0,0)$

(vi)

line passing through points $(1,2)$ **and** $(4,5)$ **is:**

(a) $y = x + 1$ (b) $y = 2x + 3$

(c) $y = 3x - 2$ (d) $y = x + 2$

(vii) **The equation of a line in point-slope form is:**

(a) $y = m(x + c)$

(b) $y - y_1 = m(x - x_1)$

(c) $y = c + mx$

(d) $ax + by + c = 0$

(viii) $2x + 3y - 6 = 0$ **in the slope-intercept form is**

(a) $y = \frac{-2}{3}x + 2$ (b) $y = \frac{2}{3}x - 2$

(c) $y = \frac{2}{3}x + 1$ (d) $y = \frac{-2}{3}x - 2$

(ix)

he equation of a line in symmetric form is:

(a) $\frac{x}{a} + \frac{y}{b} = 1$

(b) $\frac{x - x_1}{1} + \frac{y - y_1}{m} = \frac{z - z_1}{1}$

(c) $ax + by + c = 0$

(d) $y - y_1 = m(x - x_1)$

(x)

he equation of a line in normal form is:

(a) $y = mx + c$ (b) $\frac{x}{a} + \frac{y}{b} = 1$

(c) $\frac{x - x_1}{\cos\alpha} = \frac{y - y_1}{\sin\alpha}$

(d) $x\cos\alpha + y\sin\alpha = p$

Answer Key

1	c	**2**	a	**3**	b	**4**	a	**5**	b
6	a	**7**	b	**8**	a	**9**	c	**10**	d

Q.2

ind the distance between two points $A(2,3)$ **and** $B(7,8)$ **on a coordinate plane.**

Ans:

$A(2,3), B(7,8)$

$x_1 = 2,\ y_1 = 3,\ y_2 = 7,\ y_2 = 8$

$|AB| = \sqrt{|x_2 - x_1|^2 + |y_2 - y_1|^2}$

$|AB| = \sqrt{|7 - 2|^2 + |8 - 3|^2}$

$|AB| = \sqrt{(5)^2 + (5)^2}$

$|AB| = \sqrt{25 + 25}$

$|AB| = \sqrt{50}$

$|AB| = \sqrt{25 \times 2}$

$|AB| = 5\sqrt{2}$

$= 7.67$ unit

Q.3

ind the midpoint of the line segment joining the points $(4,-2)$ and $(-6,3)$

Ans:

$(4,-2),(-6,3)$

$x_1=4,\ y_1=-2,\ x_2=-6,\ y_2=3$

$\text{Midpoint} = \left[\frac{x_1-x_2}{2}, \frac{y_2+y_1}{2}\right]$

$= \left[\frac{-6+4}{2}, \frac{3-2}{2}\right] = \left[\frac{-2}{2}, \frac{1}{2}\right] = \left(-1, \frac{1}{2}\right)$

Q.4

alculate the gradient (slope) of the line passing through the points $(1,2)$ and $(4,6)$.

Ans:

$(1,2),(4,6)$

$m = \frac{y_2-y_1}{x_2-x_1}$

$x_1=1,\ y_1=2,\ x_2=4,\ y_2=6$

$m = \frac{6-2}{4-1}$

$m = \frac{6-2}{4-1}$

$m = \frac{4}{3}$

Q.5

ind the equation of the line in the form $y=mx+c$ that passes through the points $(3,7)$ and $(5,11)$.

Ans:

$(3,7),(5,11)$

$x_1=3,\ y_1=7,\ x_2=5,\ y_2=11$

$m = \frac{y_2-y_1}{x_2-x_1} = \frac{11-7}{5-3} = \frac{4}{2} = 2$

$y-y_1 = m(x-x_1)$

$y-7 = 2(x-3)$

$y-7 = 2x-6$

$y = 2x-6+7$

$y = 2x+1$

Q.6

f two lines are parallel and one line has a gradient of $\frac{2}{3}$**, what is the gradient of the other line?**

Ans:

Since given that tow lines are parallel.

If one line has gradient slope $\frac{2}{3}$ then other lines will have the same gradient (slope) gradient of other line $\frac{2}{3}$ **C**

If line were perpendicular the product of their gradient would be –1

Q.7

n airplane needs to fly from city A **to coord9inates** $(12,5)$ **to city** B **at coordinates** $(8,-4)$**. Calculate the straight-line distance between these two cities.**

Ans:

$A(12,5), B(8,-4)$

$x_1=12,\ y_1=5,\ x_2=8,\ y_2=-4$

$AB = \sqrt{|x_2-x_1|^2+|y_2-y_1|^2}$

$|AB| = \sqrt{|8-12|^2+|-4-5|^2}$

$|AB| = \sqrt{|-4|^2+|-9|^2}$ **F**

$|AB| = \sqrt{16+81}$

$|AB| = \sqrt{97}$

$= 9.85$ units

Q.8

n a landscaping project, the path starts at $(2,3)$ **and ends at** $(10,7)$**. Find the midpoints.**

Ans:

$(2,3),(10,7)$

$x_1=2,\ y_1=3,\ x_2=10,\ y_2=7$

$m = \left[\frac{x_1+x_2}{2}, \frac{y_2+y_1}{2}\right]$

$m = \left[\frac{2+10}{2}, \frac{3+7}{2}\right]$ **I**

$m=\left[\frac{12}{2},\frac{10}{2}\right]$

$m=(6,5)$

Q.9

drone is flying from point $(2,3)$ to point $(10,15)$ on the grid. Calculate the gradient of the line along which the drone is flying and the total distance travelled.

Ans:

$(2,3),(10,5)$

$x_1=2,\ y_1=3,\ x_2=10,\ y_2=15$

Total distance $=\sqrt{|x_2-x_1|^2+|y_2-y_1|^2}$

$=\sqrt{|10-2|^2+|15-3|^2}=\sqrt{(8)^2+(12)^2}$

$=\sqrt{64+144}=\sqrt{208}=4\sqrt{13}$

$m=\frac{y_2-y_1}{x_2-x_1}$

$m=\frac{15-3}{10-2}$

$m=\frac{12}{8}$

$m=\frac{3}{2}$

$=14.12$ units

Q.10

or a line with a gradient of –3 and a y-intercept of 2, write the equation of the line in:

(a) Slope-intercept form

Ans:

Given gradient (slope) $=2=-3$ y-intercept $=c=2$

Required equation of line using formula

$y=mx+c$ slope intercept form

$y=-3x+2$

(b) Point-slope form using the point $(1,2)$

Ans:

$m=-3$ point $(x_1,y_1)=(1,2)$

$y-2=-3(x-1)$

$y-2=-3x+3$

$3x+y-2-3=0$

$3x+y-5=0$

(c) Two-point form using the points $(1,2)$ and $(4,-7)$ **A**

Ans:

Intercept form is

$\frac{x}{a}+\frac{y}{b}=1$

We consider first part as

$y=-3x+2$

$\frac{3}{2}x+\frac{y}{2}=\frac{2}{2}$

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

$a=\frac{2}{3}\quad b=2$

(d) Intercepts form

Ans:

$\frac{x}{a}+\frac{y}{b}=1$

$y=-3+2$

$\frac{3}{2}x+\frac{y}{2}=\frac{2}{2}$

$\frac{x}{\frac{2}{3}}+\frac{y}{2}=1$ **F**

(e) Symmetric form

Ans:

$y=-3x+2$

$3x+y=2$

Divide both side by $\sqrt{x^2+1^2}=\sqrt{10}$

$\frac{3}{\sqrt{10}}x+\frac{1}{\sqrt{10}}y=\frac{2}{\sqrt{10}}$

(f) Normal form

Ans:

Normal form is $x\cos\alpha+y\sin\alpha=p$

$y=-3x+2$

$3x+y=2$

Divide both side by $\sqrt{3^2+1^2}=\sqrt{10}$

$\frac{3}{\sqrt{10}}x+\frac{1}{\sqrt{10}}y=\frac{2}{\sqrt{10}}$

$\cos\alpha = \frac{3}{\sqrt{10}}$ $\sin\alpha = \frac{1}{\sqrt{10}}$ $p = \frac{2}{\sqrt{10}}$

$\alpha = \cos^{-1}\left[\frac{3}{\sqrt{10}}\right]$

$\alpha = 18.43°$

$x\cos(18.43°) + y\sin(18.43°) = \frac{2}{\sqrt{10}}$