Homework

1. $a_n = -4n + 15$

$a_1 = -4 + 15 = 11$

$a_2 = -8 + 15 = 7$

$a_3 = -12 + 15 = 3$

$d = a_3 - a_2 = a_2 - a_1 = -4$

$\therefore$ It forms an A.P

2. $a_n = 6n + 11$

$\therefore a_1 = 6 + 11 = 17$

$a_2 = 12 + 11 = 23$

$\therefore d = a_2 - a_1 = 23 - 17 = 8$

3. $A.P_1 = 9, 7, 5, ---$

$A.P_2 = 15, 12, 9, ---$

A.Q

$a_1 + (n-1)d_1 = a_2 + (n-1)d_2$

$\Rightarrow 9 + (n-1)(-2) = 15 + (n-1)(-3)$

$\Rightarrow 9 - 2n + 2 = 15 - 3n + 3$

$\Rightarrow n = 18 - 11 = 7$

4. $a_8 = 31 \quad \Rightarrow a + 7d = 31$ --- (1)

$a_{15} = 16 + a_{11} \Rightarrow \cancel{a} + 14d = 16 + \cancel{a} + 10d$

$\Rightarrow 4d = 16$

$\Rightarrow d = 4$

Putting $d = 4$ in eq (1),

$a + 7(4) = 31$

$\Rightarrow a = 31 - 28 = 3$

$\therefore A.P \rightarrow 3, 7, 11, 15, ---$

5. AP → 1, 3.5, 6, 8.5 - -

$a = 1$

$d = 3.5 - 1 = 2.5$

$\therefore a_{10} = a + 9d = 1 + 9(2.5) \quad 1 + 22.5 = 23.5$

6. $S_{10} = \frac{n(n+1)}{2}$ [where $n = 10$]

$\Rightarrow S_{10} = \frac{\cancel{10}^{5} \times 11}{\cancel{2}} = 55$

Homework (coordinate Geometry)

1. The distance of the point P(2, 3) from the x-axis is

ans - (b) 3

2. The distance between the point P(1, 4) and Q(4, 0) is

ans - $\sqrt{(4-1)^2 + (0-4)^2} = \sqrt{9+16} = \sqrt{25} = 5$ (b)

3. The points (−5, 1), (1, P) and (4, −2) are collinear if the value of P is

$\frac{1}{2} | -5(P+2) + 1(-2-1) + 4(1-P) | = 0$

$\Rightarrow -5P - 10 - 2 - \cancel{1} + 4 - 4P = 0$

$\Rightarrow -9P + 9 = 0$

$\Rightarrow -9P = 9$

$\Rightarrow P = -1$ (d)

4. $\sqrt{[(a-b) - (a+b)]^2 + (-a-b-a+b)^2}$

$= \sqrt{(-2b)^2 + (-2a)^2} = \sqrt{4b^2 + 4a^2}$

$= \sqrt{4(a^2+b^2)}$

$= 2\sqrt{a^2+b^2}$ units

5)
$$\sqrt{(3-x)^2+(2+1)^2}=5$$
$$\Rightarrow 9+x^2-6x+9=25$$
$$\Rightarrow x^2-6x-7=0$$
$$\Rightarrow x^2-7x+x-7=0$$
$$\Rightarrow x(x-7)+1(x-7)=0$$
$$\Rightarrow x=-1 \text{ or } x=7 \quad (d)$$

6) Let $A(1,1)$, $B(-2,7)$, $C(3,-3)$
$$AB=\sqrt{(-3)^2+6^2}$$
$$=\sqrt{9+36}=\sqrt{45}=3\sqrt{5}$$
$$BC=\sqrt{5^2+10^2}=\sqrt{25+100}=\sqrt{125}=5\sqrt{5}$$
$$AC=\sqrt{2^2+4^2}=\sqrt{4+16}=\sqrt{20}=2\sqrt{5}$$
Area of Δ =
$$\frac{1}{2}\left|1(7+3)-2(-3-1)+3(1-7)\right|$$
$$=\frac{1}{2}\left|7+3+8-18\right|$$
$$=\frac{1}{2}\left|18-18\right|=0$$
$\therefore$ A, B, C are collinear (b)

7)
$$\frac{1}{2}\left|1(0-b)+0(b-2)+a(2-0)\right|=$$
$$\Rightarrow -b+2a=0$$
$$\Rightarrow 2a=b \quad (a)$$

8)
$$\frac{1}{2}\left|2(k+3)+4(-3-3)+6(3-k)\right|=$$
$$\Rightarrow 2k+6-24+18-6k=0$$
$$\Rightarrow -4k=0$$
$$\Rightarrow k=0 \quad (c)$$

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9) The distance of point $(-3, 4)$ from the origin

$$\sqrt{(-3)^2 + (4)^2} = \sqrt{9+16} = 5$$

(d)

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

$BC = \sqrt{(-1)^2 + (7)^2} = \sqrt{1+49} = \sqrt{50}$ units

$AC = \sqrt{(\cancel{+4})^2 + (-\cancel{8})^2} = \sqrt{16+36} = \sqrt{52}$ units