INTRODUCTION TO COORDINATES

Form 1

Vol 6

Part 4B – Area (B)

1. Area of $ABCD$

$= (\text{Area of } \Delta ABD) - (\text{Area of } \Delta BCD)$

$= \dfrac{(7-1)(8-1)}{2} - \dfrac{(7-1)(3-1)}{2} = 15$ sq. units

2. (a) $AF = 2 - (-6) = 8$

$BE = 3 - (-6) = 9$

$OD = 0 - (-9) = 9$

(b) Area of $ABCDEF$

$= (\text{Area of } \Delta CDE) + (\text{Area of } \Delta BCE) + (\text{Area of } ABEF)$

$= \dfrac{(6)(3)}{2} + \dfrac{(6)(9)}{2} + \dfrac{(8+9)(2)}{2} = 53$ sq. units

3. Area of $OABC$ = (Area of $BCDE$) – (Area of ΔOCD) – (Area of $OEFA$) – (Area of ΔABF)

$= \dfrac{(10+1)7}{2} - \dfrac{4(1)}{2} - \dfrac{(3+5)2}{2} - \dfrac{8(5)}{2} = 8.5$ sq. units

4. Since BC is vertical and $\angle ABC = 90°$, we have AB being horizontal.

Thus, $k = 2$.

$AD = 2 - (k - 5) = 5$

Area of $ABCD = \dfrac{(5+8)(h+6)}{2} = 6.5h + 39 = 6.5h + 39$

Area of $\Delta AOD = \dfrac{5h}{2} = 2.5h$

Area of $OABCD = 6.5h + 39 - 2.5h = 47$

$4h + 39 = 47$

$h = 2$

5. Since BC is horizontal and $\angle BCD = 90°$, we have CD being vertical.

Thus, $a = 6$.

$BC = 6 - (a - 8) = 8$

$CD = (k + 2) - (k - 3) = 5$

$AD = a - (-4) = 10$

Height of ΔADE corresponding to base $AD = k - (k - 3) = 3$

Area of $ABCDE$ = (Area of $ABCD$) – (Area of ΔADE)

$= \dfrac{(8+10)(5)}{2} - \dfrac{(10)(3)}{2}$

= 30 sq. units

6. $AH = (a + 4) - (2a - 9) = 13 - a$

$AB + CD = (k + 6) - (k - 4) = 10$

Perimeter of $ABCDEFGH = 2(10 + 13 - a) = 44$

$23 - a = 22$

$a = 1$

$AH = 13 - a = 12$

$BC = -4 - (2a - 9) = -4 - (-7) = 3$

$CD = k + 6 - k = 6$

$EF = k + 6 - (k - 2) = 8$

$FG = a + 4 - a = 4$

Area of the polygon

$= (12)(10) - (3)(6) - (4)(8)$

= 70 sq. units

7. $BC = 6 - (-4) = 10$

The height of ΔABC corresponding to base $BC = 6 - (-2) = 8$

The area of $\Delta ABC = \dfrac{10 \times 8}{2} = 40$ sq. units

8. $AC = (a + 3) - (a - 5) = 8$

The height of ΔABC corresponding to base $AC = (a + 3) - a = 3$

The area of $\Delta ABC = \dfrac{8 \times 3}{2} = 12$ sq. units

9. Case 1: $a > 3$.

$AB = a - 3$

The height of ΔABC corresponding to base $AB = 5 - 3 = 2$

The area of $\Delta ABC = \dfrac{(a-3)\times 2}{2} = 18$ sq. units

$a - 3 = 18$

$a = 21$

Case 2: $a < 3$.

The area of $\Delta ABC = \dfrac{(3-a)\times 2}{2} = 18$ sq. units

$3 - a = 18$

$a = -15$

10. $AB = 2 - (-4) = 6$

Case 1: $k > -3$

The height of ΔABC corresponding to base $AB = k - (-3) = k + 3$

The area of $\Delta ABC = \dfrac{(k+3)\times 6}{2} = 30$ sq. units

$k + 3 = 10$

$k = 7$

Case 2: $k < -3$

The area of $\Delta ABC = \dfrac{(-3-k)\times 6}{2} = 30$ sq. units

$-3 - k = 10$

$k = -13$

11. $ABCD$ is a trapezium, where AD and BC are the bases, AB is the height.

$AB = k + 6 - (k - 8) = 14$

$AD = k - (-8) = k + 8$

$BC = k - 6$

Area of $ABCD = \dfrac{(k+8+k-6)(14)}{2} = 112$

$2k + 2 = 16$

$k = 7$