**Activity 2: Worksheet answers**

# Practice question 1

**Step 1:** **Plot data as shown.**



**Step 2:** **Divide the base width into equal intervals**

Interval width = 10 ÷ 5 = 2 m

**Steps 3 and 4:** **Interval midpoint heights**

Interval 1 = 1.5 m  Interval 2 = 2.5 m

Interval 3 = 3 m  Interval 4 = 2.5 m

Interval 5 = 1.5 m

**Step 5: Interval areas**

Interval 1 area = 1.5 m × 2 m = 3 m2 Interval 2 area = 2.5 m x 2 m = 5 m2

Interval 3 area = 3 m × 2 m = 6 m2  Interval 4 area = 2.5 m × 2 m = 5 m2

Interval 5 area = 1.5 m × 2 m = 3 m2

**Step 6:**

Area of fill = 3 + 5 + 6 + 5 + 3 = 22 m2

**Step 7:**

Total volume of fill material required = 22 × 15 = 330 m3

# Practice question 2

**Step 1:** **Sketch the embankment onto graph paper using the values in the table.**

|  |  |
| --- | --- |
| **Position (m)** | **Proposed height (m)** |
| 0 | 2.5 |
| 2 | 3 |
| 4 | 5 |
| 6 | 5 |
| 8 | 5 |
| 10 | 3 |
| 12 | 2.5  |

**Step 2:** **Divide the base width into equal intervals.**

The base width is 12 m. The number of intervals is 6.

Therefore, the interval width = 12 ÷ 6 = 2 m

**Steps 3 and 4:** **Find the midpoint heights of each interval.**

Interval 1 = 2.75 m  Interval 2 = 4 m

Interval 3 = 5 m  Interval 4 = 5 m

Interval 5 = 4 m Interval 6 = 2.75 m

**Step 5:** **Calculate the area of each interval.**

Interval 1 area = 2.75 m × 2 m = 5.5 m2  Interval 2 area = 4 m × 2 m = 8 m2

Interval 3 area = 5 m × 2 m = 10 m2  Interval 4 area = 5 m × 2 m = 10 m2

Interval 5 area = 4 m × 2 m = 8 m2  Interval 6 area = 2.75 m × 2 m = 5.5 m2

**Step 6:** **Add up the areas of the intervals to get the total area of the cross-section.**

5.5 + 8 + 10 + 10 + 8+ 5.5 = 47 m2

# Practice question 3

**Step 1:** **Sketch the road onto graph paper using the values in the table.**

**Step 2:** **Divide the base width into equal intervals.**

The base width is 10 m. The number of intervals is 5.

Therefore, the interval width is 10 ÷ 5 = 2 m.

**Steps 3 and 4:** **Find the midpoint heights of each interval.**

Interval 1 = 0.25 m  Interval 2 = 0.25 m

Interval 3 = 0.5 m  Interval 4 = 0 m

Interval 5 = –0.75 m

**Step 5:** **Calculate the area of each interval.**

Interval 1 area = 0.25 m × 2 m = 0.5 m2  Interval 2 area = 0.25 m × 2 m = 0.5 m2

Interval 3 area = 0.5 m × 2 m = 1 m2  Interval 4 area = 0 m × 2 m = 0 m2

Interval 5 area = –0.75 m × 2 m = –1.5 m2

**Step 6:** **Add up the areas of the intervals to get the total area of the cross-section.**

0.5 + 0.5 + 1 + 0 – 1.5 = 0.5 m2

**Step 7:** **Calculate the volume of earth needing to be removed.**

0.5 × 9 = 4.5 m3