

868



TUTORS

Preparation for

High School Mathematics

Measurement II

Solutions

Math



Instructions and Tips:

- ✓ **You have 60 minutes to complete this worksheet**
- ✓ **This worksheet consists of 5 questions**
- ✓ **Write answers in the spaces provided**
- ✓ **All working must be clearly shown**



Student Name: _____

Student ID: _____

Date: __ / __ / ____

Total Score:

Highest Score:

Tutor's Comments:

Access more free worksheets at www.868tutors.com

Question 1**Use $\pi = 3.14$**

- (a) Consider a rectangular room with a length of 20 m and a width of 10 m. Calculate the area of carpet that needs to be purchased to carpet the room.**

$$\text{Area} = \text{length} \times \text{width}$$

$$\text{Area} = 20\text{m} \times 10\text{m}$$

$$\boxed{\text{Area} = 200 \text{ m}^2}$$

(2 marks)

- (b) Calculate the radius of a sphere that has a volume of 1000m^3 .**

$$\text{Volume of a sphere} = \frac{4}{3}\pi r^3 \quad V = \frac{4}{3}\pi r^3$$

$$\text{Make } r \text{ the subject of the formula } r = \left(\frac{0.75 V}{\pi} \right)^{\frac{1}{3}}$$

$$r = \left(\frac{0.75 \times 1000}{\pi} \right)^{\frac{1}{3}} \quad r = \left(\frac{750}{\pi} \right)^{\frac{1}{3}} \quad r = \left(\frac{750}{3.14} \right)^{\frac{1}{3}} \quad \boxed{\text{radius} = 6.20 \text{ m (to 2 decimal places)}}$$

(2 marks)

- (c) Calculate the surface area of a sphere that has a volume of 1000m^3 .**

$$A (\text{Surface area of a sphere}) = 4\pi r^2 \quad \text{recall from (b) that } r = \left(\frac{750}{\pi} \right)^{\frac{1}{3}} \quad \text{using } r = 6.203504909$$

$$A = 4\pi r^2 \quad A = 4(3.14) (38.48347316) \quad \boxed{A = 483.35 \text{ m}^2 \text{ (to 2 decimal places)}}$$

(2 marks)

- (d) Calculate the volume of a pyramid that has a base area of 20m^2 and a height of 5m.**

$$\text{Volume of a pyramid} = \text{Area of base} \times \text{height}$$

$$\text{Volume of pyramid} = 20\text{m}^2 \times 5\text{m}$$

$$\boxed{\text{Volume of pyramid} = 100 \text{ m}^3}$$

(2 marks)

(c) Use the scale to Calculate the ACTUAL distance between C and D in kilometres on the map.

Scale 1: 2500

$$1 \text{ cm} = 2,500 \text{ cm}$$

$$4 \text{ cm} = 10,000 \text{ cm}$$

$$\text{Actual distance} = 10,000 \text{ cm}$$

Converting cm to m

$$100 \text{ cm} = 1 \text{ m}$$

$$1 \text{ cm} = \frac{1}{100} \text{ m}$$

$$10,000 \text{ cm} = \frac{1}{100} \text{ m} \times 10,000 = 100 \text{ m}$$

Converting m to km

$$1000 \text{ m} = 1 \text{ km}$$

$$1 \text{ m} = \frac{1}{1000} \text{ km} \quad 100 \text{ m} = \frac{1}{1000} \text{ km} \times 100 = 0.1 \text{ km}$$

Actual distance between C and D = 0.1 km



(2 marks)

(d) Calculate, the ACTUAL area in square metres of the island.

$$\text{Estimate} = 76 \text{ cm}^2$$

Converting estimate using scale

$$\text{Scale } 1:2500$$

$$1 \text{ cm} = 2500 \text{ cm} \quad 1 \text{ cm}^2 = (2500 \text{ cm})^2$$

$$1 \text{ cm}^2 = 6,250,000 \text{ cm}^2$$

$$76 \text{ cm}^2 = 6,250,000 \text{ cm}^2 \times 76$$

$$76 \text{ cm}^2 = 6,250,000 \text{ cm}^2 \times 76 = 475,000,000 \text{ cm}^2$$

Converting to m²

$$100 \text{ cm} = 1 \text{ m} \quad 1 \text{ cm} = \frac{1}{100} \text{ m} \quad 1 \text{ cm}^2 = \left(\frac{1}{100} \text{ m}\right)^2 \quad 475,000,000 \text{ cm}^2 = \left(\frac{1}{100} \text{ m}\right)^2 \times 475,000,000$$

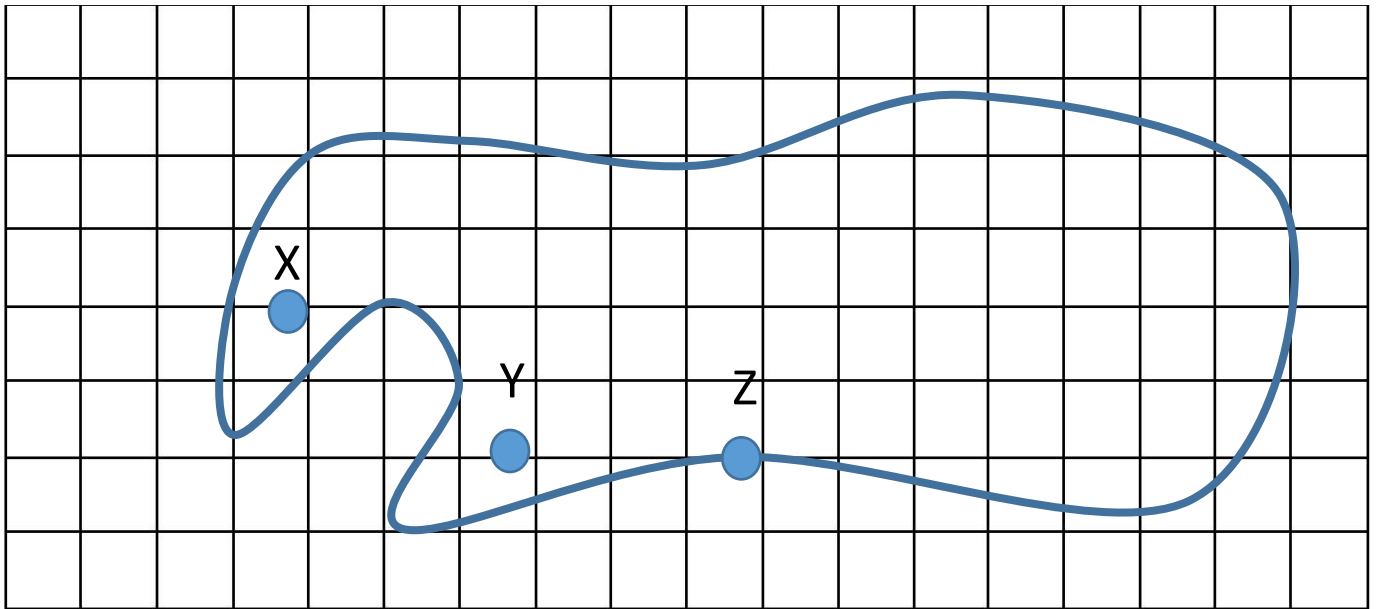
Actual area = 47,500 m²

(3 marks)

Question 3

Consider the island below. The map is drawn on a grid of 1 cm squares. X, Y and Z are three all-inclusive tourist resorts.

The scale of the map is 1:1500



(a) Determine, in centimetres, the distance from Y to Z on the map.

Y to Z = 3 cm

(1 mark)

(b) Estimate, by counting, the area in square centimetres of the island.

Estimate = 54 cm²

(2 marks)

(c) Use the scale to Calculate the ACTUAL distance in kilometres between Y and Z on the map.

$$\text{Scale } 1:1500 \quad 1 \text{ cm} = 1500 \text{ cm} \quad 3 \text{ cm} = 1500 \text{ cm} \times 3 \quad 3 \text{ cm} = 4500 \text{ cm}$$

Converting 4500 cm to m then to km

$$100 \text{ cm} = 1 \text{ m}$$

$$1 \text{ cm} = \frac{1}{100} \text{ m} \quad 4500 \text{ cm} = \frac{1}{100} \text{ m} \times 4500 \quad 4500 \text{ cm} = 45 \text{ m}$$

$$1000 \text{ m} = 1 \text{ km}$$

$$1 \text{ m} = \frac{1}{1000} \text{ km} \quad 45 \text{ m} = \frac{1}{1000} \text{ km} \times 45 = 0.045 \text{ km}$$

Actual distance = 0.045 km

(3 marks)

(d) Calculate, the ACTUAL area in square metres of the island.

Estimate from (b) = 54 cm^2

$$1 \text{ cm} = 1500 \text{ cm} \quad 1 \text{ cm}^2 = (1500 \text{ cm})^2 \quad 1 \text{ cm}^2 = 2,250,000 \text{ cm}^2$$

$$54 \text{ cm}^2 = 2,250,000 \text{ cm}^2 \times 54 \quad 54 \text{ cm}^2 = 121,500,000 \text{ cm}^2$$

Converting $121,500,000 \text{ cm}^2$ to m^2

$$100 \text{ cm} = 1 \text{ m} \quad 1 \text{ cm} = \frac{1}{100} \text{ m} \quad 1 \text{ cm}^2 = \left(\frac{1}{100} \text{ m}\right)^2$$

$$121,500,000 \text{ cm}^2 = \left(\frac{1}{100} \text{ m}\right)^2 \times 121,500,000 \text{ cm}^2 = 12,150 \text{ m}^2$$

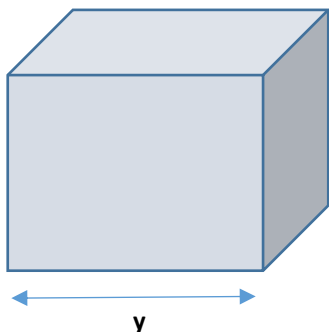
Actual area = $12,150 \text{ m}^2$

(4 marks)

Question 4

Consider the cube below. The cube has a volume of 100 m^3 .

(Diagram not drawn to scale)



(a) Calculate the length of one side of the cube.

Volume of a cube = side \times side \times side

$$V = y^3 \quad 100 \text{ m} = y^3 \quad y = (100)^{\frac{1}{3}} \quad \boxed{\text{length of one side} = 4.64 \text{ m (to 2 decimal places)}}$$

(2 marks)

(b) Calculate the surface area of the cube.

$$\text{Surface area of the cube} = 6 \times \text{side}^2 = 6y^2 = 6 \times (4.641588834)^2$$

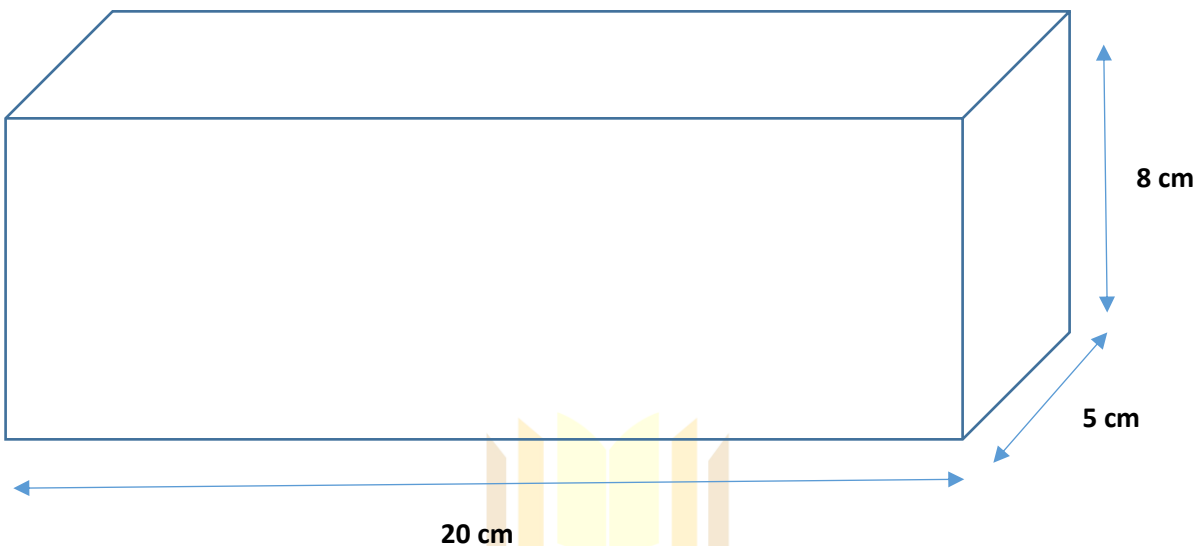
$$\boxed{\text{Surface area of the cube} = 129.27 \text{ m}^2 \text{ (to 2 decimal places)}}$$

(2 marks)

Question 5

Consider the dimensions of the cuboid shown:

(Diagram not drawn to scale)



(a) Calculate the volume of the cuboid shown.

Volume of a cuboid = length \times width \times height

Volume of the cuboid = 20 cm \times 5 cm \times 8 cm

Volume of the cuboid = 800 cm³

(2 marks)

(b) Calculate the surface area of the cuboid shown.

Surface area of cuboid = (4 \times length \times height) + (2 \times width \times height)

Surface area of cuboid = (4 \times 20 cm \times 8 cm) + (2 \times 5 cm \times 8 cm)

Surface area of cuboid = 640 cm² + 80 cm²

Surface area of cuboid = 720 cm²

(2 marks)



END OF WORKSHEET



Access more free worksheets at www.868tutors.com