60

Unit 3
Essential Mathematics Test 1
Measurement

SOLUTIONS

Baldivis Secondary College

Name	

- **Attempt all questions**
- **Show all working and calculations where possible**
- **Calculators are allowed**
- **One A4 page of notes is allowed**

You must include all working out to receive full marks

1. Convert to the units specified. **(8 Marks)**

a) 15 cm to 0.15 m

b) 3.15 m to 3150 mm

c) $25cm^2$ to 2500 mm^2

d) $1km^2$ to 1000000000 cm^2

e) $1m^2$ to 10000 cm^2

f) $385cm^2$ to 38500 mm^2

g) 0.056 m^2 to 56000 mm^2

h) $3125mm^2$ to 0.003125 m^2

2. The diameter of this circular placemat is 25cm. Find the circumference to 2 decimal places (2 Marks)

$C = 2\pi r$ $\quad r = 12.5$

$= 2 \times \pi \times 12.5$

$= 78.5\ m$ ✓✓

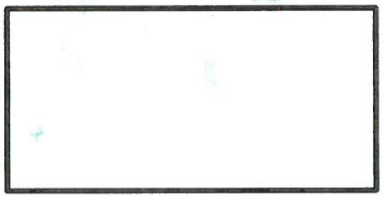
3. **A rectangular football field has side lines 100m long. Each of the end lines is 50m long. What is the perimeter of the football field? (2 Marks)**

$P = 100 + 100 + 50 + 50$

$= 300\ m$ ✓✓

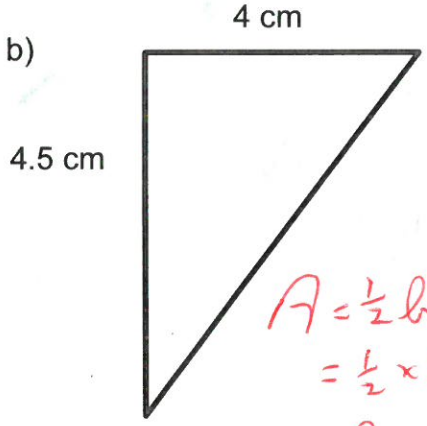
4. Calculate the area of the following shapes to 2 decimal places. (2,2,2,2,3 Marks)

a)



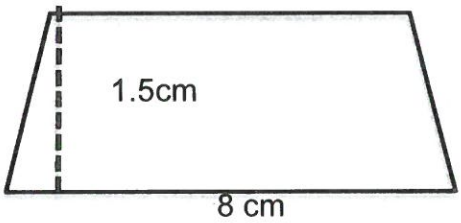
$A = l \times w$
$= 12.5 \times 7.25$
$= 90.62\ m^2$ //

b)



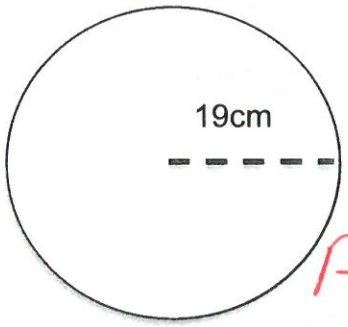
$A = \frac{1}{2} b \times ht$
$= \frac{1}{2} \times 4 \times 4.5$
$= 9\ cm^2$ //

c)



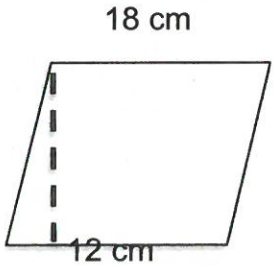
$A = \frac{(a+b)}{2} \times ht$
$= \frac{(2.8+8)}{2} \times 1.5 = 8.1\ cm^2$ //

d)



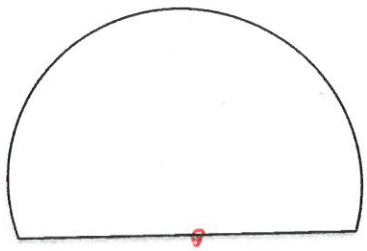
$A = \pi r^2$
$= \pi \times 19^2$ //
$= 1134.11\ cm^2$

e)



$A = b \times ht$
$= 18 \times 12$
$= 216\ cm^2$ //

f)

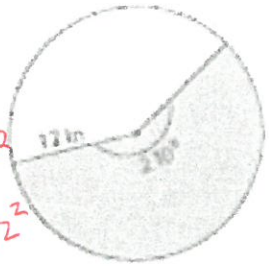


$r = 22.5$

$A = \frac{1}{2} \times \pi r^2$
$= \frac{1}{2} \times \pi \times (22.5)^2$ /
$= 795.22\ cm^2$ //

5. **Calculate the area of the sectors below** **(12 Marks)**

1)

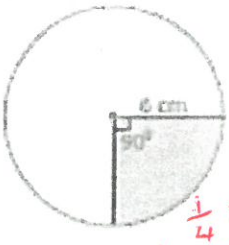


$\frac{210}{360} \times \pi r^2$

$\frac{210}{360} \times \pi \times 12^2$

Area = 263.89 in^2 //

2)



$\frac{1}{4} \pi r^2$

$\frac{1}{4} \times \pi \times 6^2$

Area = 28.27 cm^2

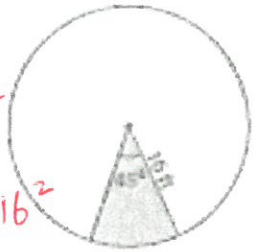
3)

$\frac{240}{360} \times \pi r^2$

$\frac{240}{360} \times \pi (19)^2$

Area = 756.08 m^2

4)



$\frac{45}{360} \times \pi r^2$

$\frac{45}{360} \times \pi \times 16^2$

Area = 100.53 in^2 //

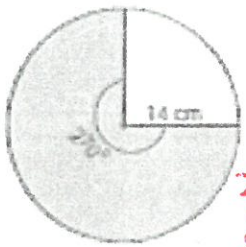
5)

$\frac{285}{360} \times \pi r^2$

$\frac{285}{360} \times \pi \times 8^2$

Area = 159.17 m^2

6)



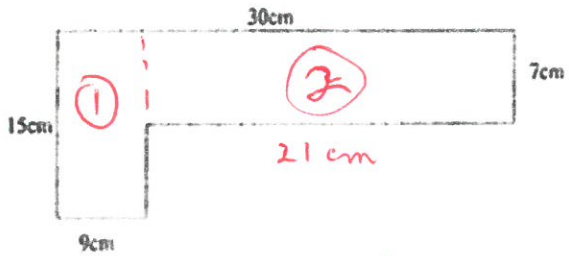
$\frac{270}{360} \times \pi r^2$

$\frac{270}{360} \times \pi \times 14^2$

Area = 461.81 cm^2

6. **Determine the area of the following shapes or <u>shaded</u> shapes. (3,4 marks)**

a)



$A_1 = l \times w$

$= 15 \times 9$

$= 135 \text{ cm}^2$

$A_2 = l \times w$

$= 21 \times 7$

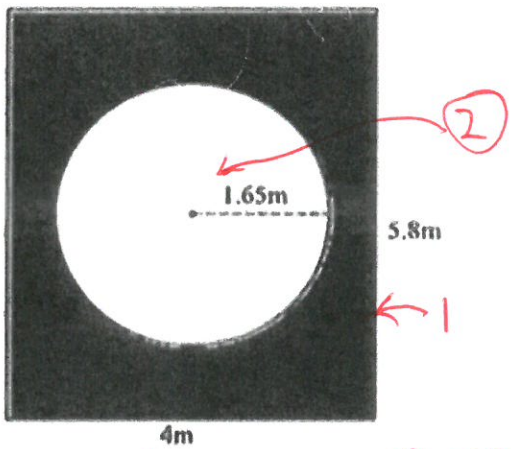
$= 147 \text{ cm}^2$

$A = A_1 + A_2$

$= 135 + 147$

$= 282 \text{ cm}^2$

b)



$A_1 = l \times w$

$= 4 \times 5.8$

$= 23.2 \text{ m}^2$

$A_2 = \pi r^2$

$= \pi \times (1.65)^2$

$= 8.55 \text{ m}^2$

$A = A_1 - A_2$

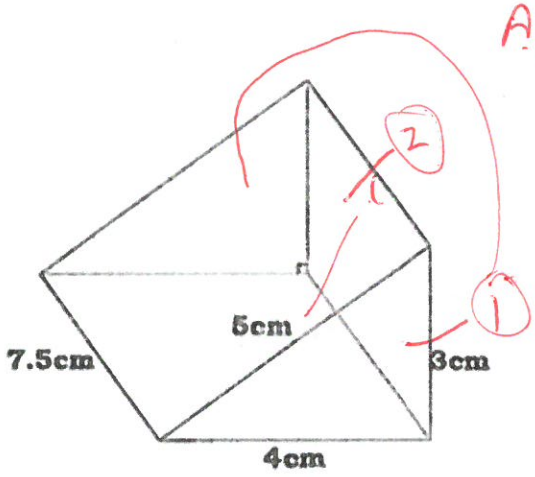
$= 23.2 - 8.55$

$= 14.65 \text{ m}^2$ //

7. **Calculate the surface area of the shapes below.** **(3 ,3 ,2 Marks)**

PLEASE SHOW ALL WORKING

a)



$A_1 = \frac{1}{2} b \times ht \times 2$

$= \frac{1}{2} \times 3 \times 4 \times 2$

$= 12 cm^2$

$l = 3+4+5$

$= 12 cm$

$A_2 = l \times w$

$= 12 \times 7.5$

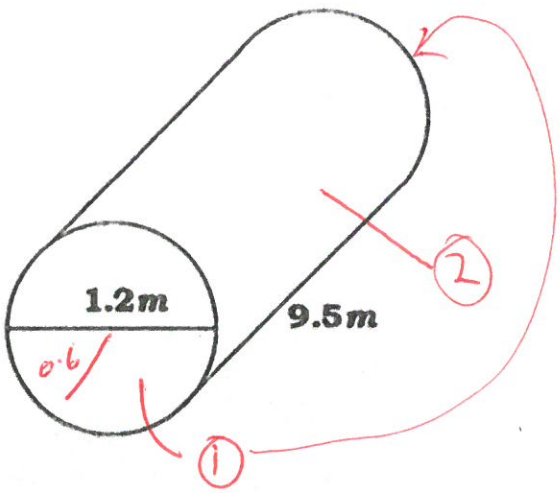
$= 90 cm^2$ ✓

$SA = A_① + A_②$ ✓

$= 12 + 90$

$= 102 cm^2$ ✓

b)



$A_1 = \pi r^2 \times 2$

$= \pi \times (0.6)^2 \times 2$

$= 2.26 m^2$

$A_2 = 2\pi r \times ht$

$= 2 \times \pi \times 0.6 \times 9.5$

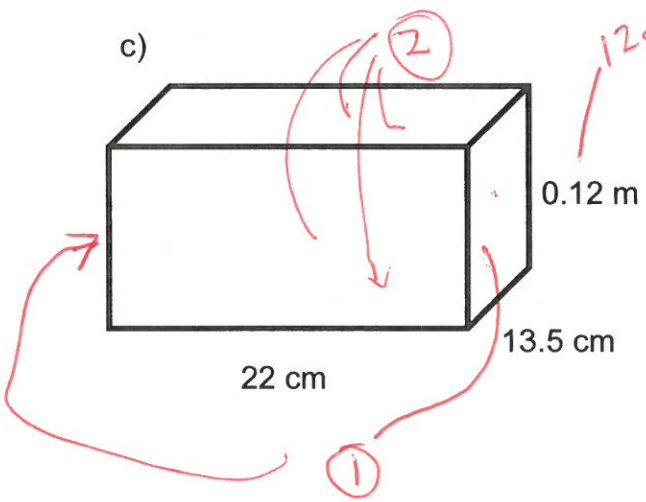
$= 35.81 m^2$ ✓

$SA = A_1 + A_2$ ✓

$= 2.26 + 35.81$

$= 38.07 m^2$ ✓

c)



$A_1 = l \times w \times 2$

$= 12 \times 13.5 \times 2$

$= 324 cm^2$ ✓

$l = 12 + 13.5 + 12 + 13.5$

$= 51 cm$

$A_2 = l \times w$

$= 51 \times 22$ ✓

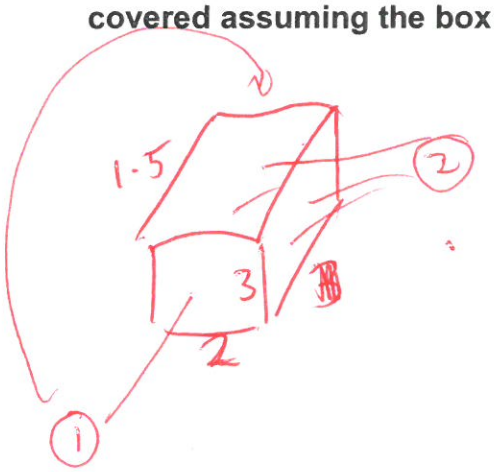
$= 1122 cm^2$

$SA = A_1 + A_2$ ✓

$= 324 + 1122$

$= 1446 cm^2$ ✓

8. A box needs to be covered in brown paper for mailing. If the box measures 3meters by 2 meters by 1.5 meters, what is the surface area of the box that will need to be covered assuming the box is closed? (3 Marks)

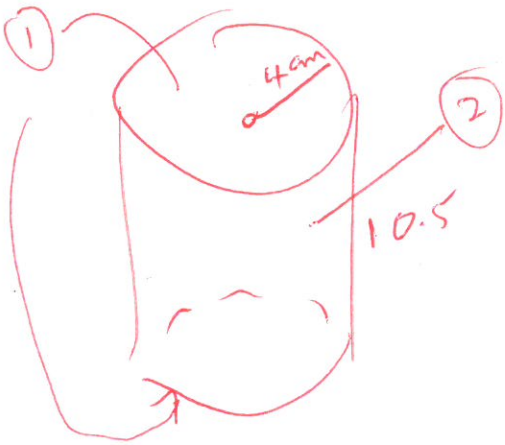


$A_1 = l \times w \times 2$
$= 2 \times 3$
$= 12 m^2$ ✓

$l = 2+3+2+3$
$= 10m$
$A_2 = l \times w$
$= 10 \times 1.5$
$= 15 m^2$ ✓

$SA = A_1 + A_2$
$= 12 + 15$
$= 27 m^2$ ✓

9. A soup can has a diameter of 8 cm and a height of 10.5 cm. How much metal is needed to make the can? (3 Marks)

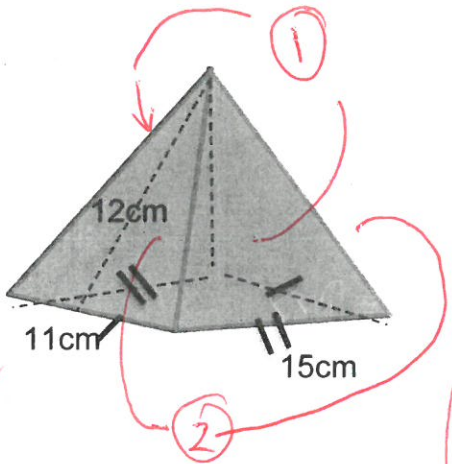


$A_{①} = \pi r^2 \times 2$
$= \pi \times 4^2 \times 2$
$= 100.53 cm^2$ ✓

$A_{②} = 2\pi r \times ht$
$= 2 \times \pi \times 4 \times 10.5$
$= 263.89$ ✓

$SA = A_1 + A_2$
$= 100.53 + 263.89$
$= 364.42 cm^2$ ✓

10. For a project, Kenneth has to cover all sides of a rectangular based pyramid with cloth (excluding the base). The pyramid has the dimensions shown below. How much cloth will Kenneth need to cover the sides of the pyramid? (4 Marks)



$A_{①} = \frac{1}{2} b \times ht \times 2$
$= \frac{1}{2} \times 15 \times 12 \times 2$
$= 180 cm^2$ ✓

$A_2 = \frac{1}{2} b \times ht \times 2$
$= \frac{1}{2} \times 11 \times 12 \times 2$
$= 132 cm^2$ ✓

$SA_{SIDES} = A_1 + A_2$
$= 180 + 132$ ✓✓
$= 312 cm^2$

IF THEY ADD AREA OF BASE
$165 cm^2$
$\Rightarrow SA = 477 cm^2$
-1 mk