Tom Price Senior High School
An Independent Public School

Unit 3
Essential Mathematics Mini Test 1
Measurement

Name	SOLUTIONS

Answer all questions with full setting out where necessary.

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. Write down the formula for each of the following shapes. **(7 Marks)**

a) Area of a triangle $A_\triangle = \frac{1}{2}b \times h$

b) Area of a trapezium $A_\trapezium = \frac{a+b}{2} \times h$

c) Area of a circle $A_\circ = \pi r^2$

d) Area of a parallelogram $A_\parallelogram = b \times h$

e) Surface area of a cube $SA_\square = 6L^2$

f) Surface area of a rectangular prism $SA = 2(l_1 \times w_1) + 2(l_2 \times w_2) \times 2(l_3 \times w_3)$

g) Surface area of a sphere $A_\circ = 4\pi r^2$

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

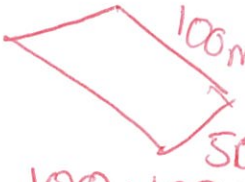
$C_o = 2\pi r$ 12.5

$= 2 \times \pi \times$ ~~12.5~~

$=$ ~~157.08cm~~

78.54cm

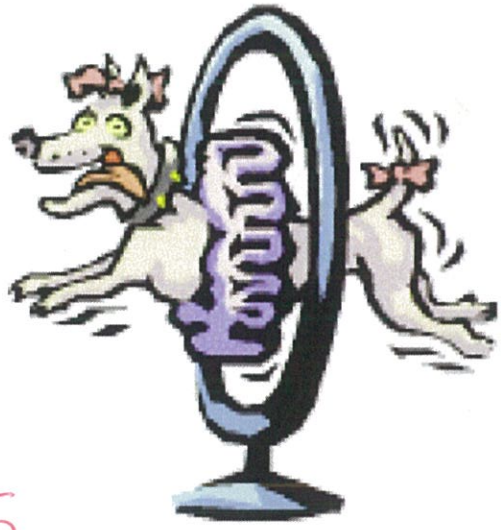
4. A rectangular football field has side lines 100m long. Each of the end lines is 50m long. What is the perimeter of the football field? (2 Marks)



100+100+50+50

P = 300m

5. Skeeter, the wonder dog, jumps through circular rings as part of his dog show exhibition. Skeeter requires a width of 45cm for his costume to clear the ring. Will a ring with an inner circumference of 100cm ~~inches~~ be large enough for Skeeter's act? (3 Marks)



$C = 2\pi r$

$= 2 \times \pi \times 22.5$

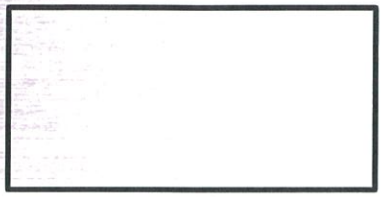
$=$

141.37 cm.

No Less 141cm.

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

a)

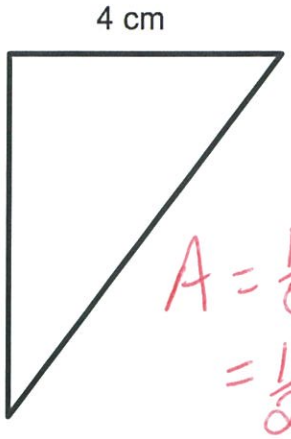


$A = L \times W$

$= 12.5 \times 7.25$

$= 90.62\ m^2$

b)

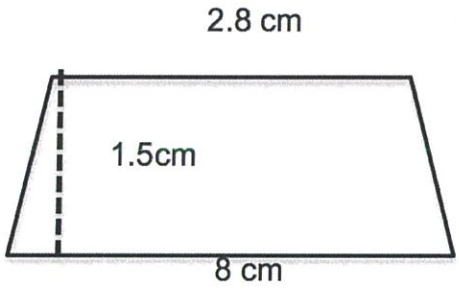


$A = \frac{1}{2} b \times h$

$= \frac{1}{2} 4 \times 4.5$

$= 9\ cm^2$

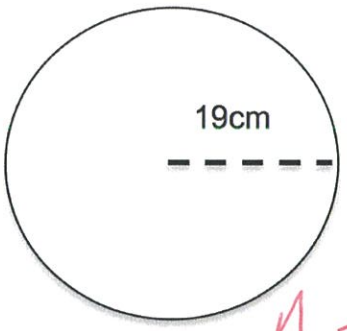
c)



$A = \frac{a+b}{2} \times h$

$= \frac{2.8+8}{2} \times 1.5 = 8.1\ m^2$

d)

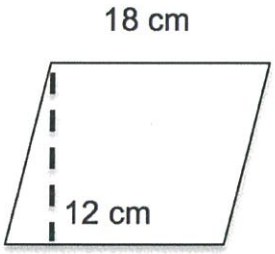


$A_o = \pi r^2$

$= \pi \times 19^2$

$= 1134.11\ cm^2$

e)

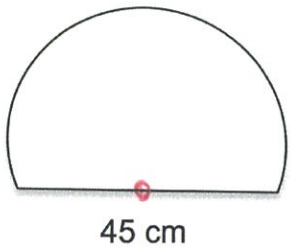


$A_{\square} = b \times h$

$= 18 \times 12$

$= 216\ cm^2$

f)



$r = 22.5$

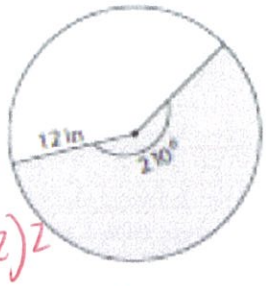
$A_{\triangle} = \frac{1}{2} \pi r^2$

$= \frac{1}{2} \pi (22.5)^2$

$= 795.22\ cm^2$

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

1)

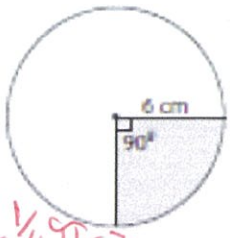


$\frac{210}{360} \times \pi r^2$

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

Area = 263.89 in^2

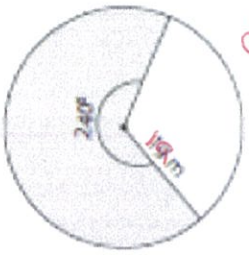
2)



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

Area = 28.27

3)

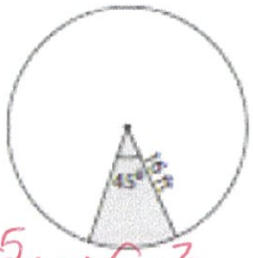


$\frac{240}{360} \times \pi r^2$

$\times \pi (19)^2$

Area = 756.08 m^2

4)



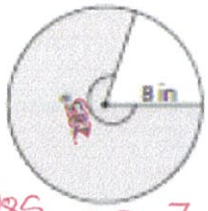
$\frac{45}{360} \times \pi r^2$

$\times \pi (16)^2$

Area = $= 100.53 ft^2$

5)

285°

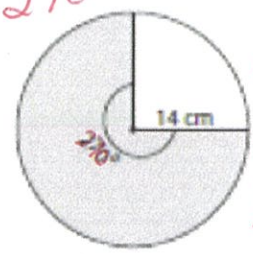


$\frac{285}{360} \times \pi r^2$

Area = 159.17 in^2

6)

270°



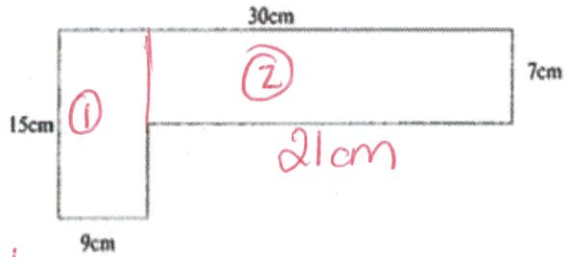
$\frac{270}{360} \times \pi r^2$

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

Area = 461.81 cm^2

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

a)



$A = L \times W$

$A_1 = 15 \times 9$

$= 135$

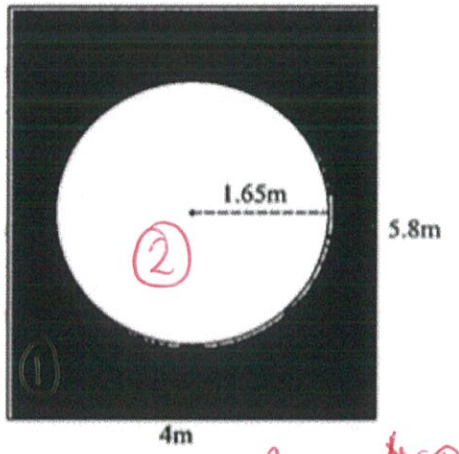
$A_2 = L \times W$

$= 21 \times 7$

$= 147$

$SA = 282\ m^2$

b)



① →

$A_1 = L \times W$

$= 4 \times 5.8$

$= 23.2$

$A_2 = \pi r^2$

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

$= 8.55$

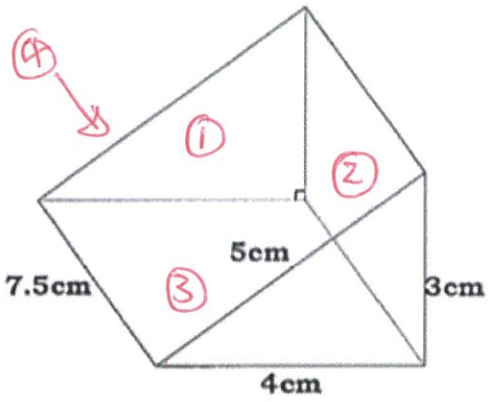
$A = 23.2 - 8.55$

$= 14.65 m^2$

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

PLEASE SHOW ALL WORKING

a)



$A_\Delta = \frac{1}{2}b \times h$

$A_\Delta = \frac{1}{2}(3 \times 4)$

$= 6 \times 2$

$= 12$

$A_{①} = L \times W$

$= 3 \times 7.5$

$= 22.5$

$A_{②} = L \times W$

$= 4 \times 7.5 = 30$

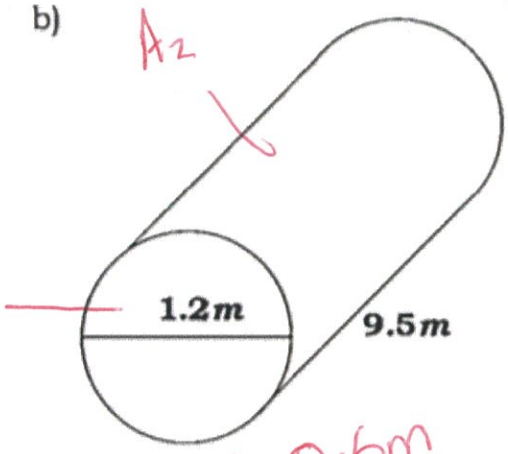
$A_{④} = L \times W$

$= 7.5 \times 5$

$= 37.5$

$SA = 102m^2$

b)



AO

$r = 0.6m$

$A_O = \pi r^2$

$= \pi(0.6)^2$

$= 1.13m^2$

$\times 2$

$2.26m^2$

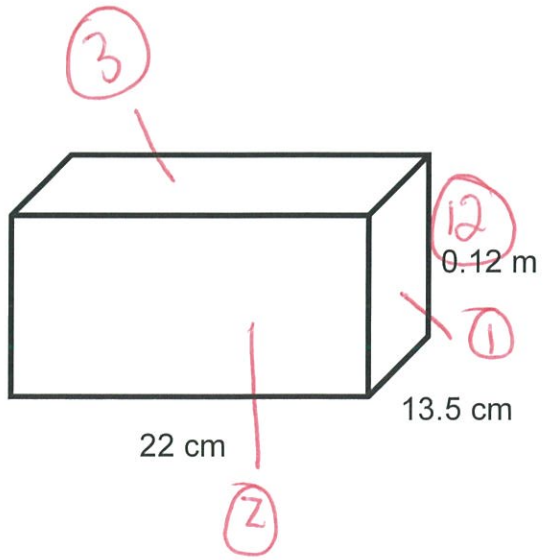
$C = 2\pi r$

$= 3.77$

$\times 9.5$

35.81

$38.07m^2$



$A_2 = L \times W$

$= 22 \times 12$

$= 264 \times 2 = 528$

$A_1 = L \times W$

$= 12 \times 13.5$

$= 162 \times 2$

$= 324$

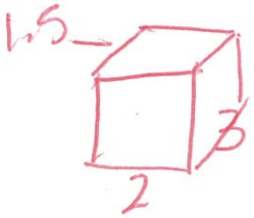
$A_3 = L \times W$

$= 13.5 \times 22$

$= 297 \times 2 = 594$

$SA = 1446cm^2$

10. A box needs to be covered in brown paper for mailing. If the box measures 3meters by 2 meters feet 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)



$A_2 = L \times W$
$= 1.5 \times 2$
$= 3 \times 2 = 6$

$SA = 27 m^2$

$A_1 = L \times W$
$= 2 \times 3$
$= 6 \times 2$
$= 12$

$A_3 = L \times W$
$= 1.5 \times 3$
$= 4.5 \times 2$
$= 9$

11. 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)

$r = 4$

$A_O = \pi r^2$
$= \pi (4)^2$
$= 50.26$
$\times 2$

$100.53 cm^2$

$C = 2\pi r$
$= 2 \times \pi \times 4$
$= 25.13 cm$

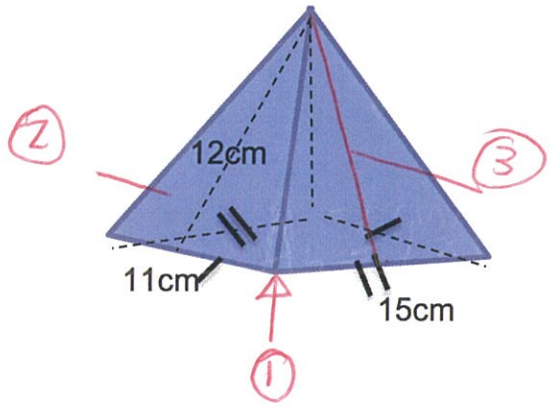
$A_\square = L \times W$
$= 25.13 \times 10.5$
$= 263.89$

$SA = 364.42 cm^2$

12. For a project, Kenneth has to cover all sides of a square 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)

$A_1 = L \times W$
$= 11 \times 15$
$= 165 cm^2$

$A_2 = \frac{1}{2} b \times h$
$= \frac{1}{2}(11) \times 12$
$= 66 cm^2$
$\times 2$
$= 132 cm^2$



$A_3 = \frac{1}{2} b \times h$
$= \frac{1}{2} 15 \times 12$
$= 90 \times 2$
$= 180$

$SA = 477 cm^2$