MPM 1D0

Grade 9 Academic Math
Unit 0 – Measurement and Geometry Review – Practice Test

Victim: Mr. Solutions Well done Mr. S.!

KU	APP	TIPS	COM
10 /10	20 /20	10 /10	10 /10

***Modified True or False* (5 KU)**

Indicate whether each statement is ***true*** or ***false***. If false, ***change*** the underlined part to make the statement true.

1. F ✓ Math is like a dating service because it's all about relativity. **Change:** relationships ✓
2. F ✓ If the radius of a circle is doubled, its area is doubled. **Change:** quadrupled ✓
3. F ✓ A triangular pyramid has four ***lateral*** faces. **Change:** three ✓
4. F ✓ The basic elements of math are objects, operatives and relationships. **Change:** operations ✓
5. F ✓ $(A_{base})(\text{height})$ is the surface area of any solid with a uniform cross-section. **Change:** volume ✓

✓ = ½ mark

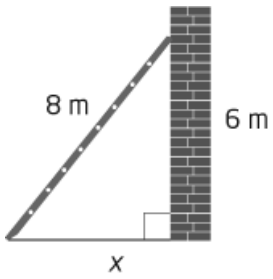
***Multiple Choice* (5 KU)**

For questions 6 to 10, select the best answer. Write the letter of your choice in the provided blank space.

6. b ✓ A cone has a volume of 314.16 cm^3 and a radius of 5 cm. To one decimal place, what is its height?

   (a) 10.1 cm **(b)** 12.0 cm **(c)** 11.3 cm **(d)** 12.8 cm

7. c ✓ A window cleaner has placed an 8-m ladder against a wall. The top of the ladder is 6 m above the ground. What is the distance, to the nearest tenth of a metre, of the ladder from the wall?



   (a) 5.1 m **(b)** 5.2 m **(c)** 5.3 m **(d)** 5.4 m

8. d ✓ A circular swimming pool has a diameter of 8.6 m. It is filled to height of 1.6 m. To the nearest 100 L, how much water is in the pool?

   (a) 93 800 L **(b)** 98 500 L **(c)** 99 900 L **(d)** 92 900 L

9. d ✓ Which statement is ***not*** true?

   (a) The length of any side of a right triangle can be calculated if the lengths of the other two sides are known.

   (b) The hypotenuse is the longest side in a right triangle.

   (c) The hypotenuse is always opposite the 90° angle in a right triangle.

   (d) The Pythagorean Theorem applies to ***all*** triangles.

10. b ✓ The measure of any exterior angle of a triangle is equal to

    (a) The measure of the opposite interior angle.

    (b) The sum of the measures of the two opposite interior angles.

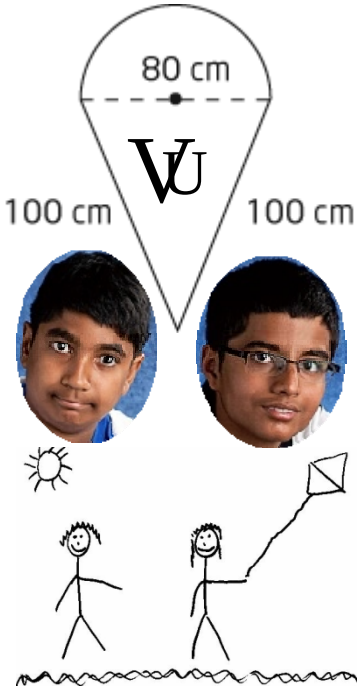
    (c) 180°

    (d) 360°

KU	APP	TIPS	COM
– 0	– 0	– 0	– 0

Full Solutions/Explanations

11. Vyshna and Uday have a kite-making business that they call VUiTon Fashionable Kites. Their company makes large kites in the shape shown at the right. Each of these kites has fancy gold trim around the ***perimeter***. How much gold trim is used for each kite? **(4 APP)**



Let P represent the perimeter of the kite.

Then,

$$P = 100 + 100 + \frac{2\pi r}{2}$$

$$= 200 + \pi r$$

$$\doteq 200 + 3.14(40)$$

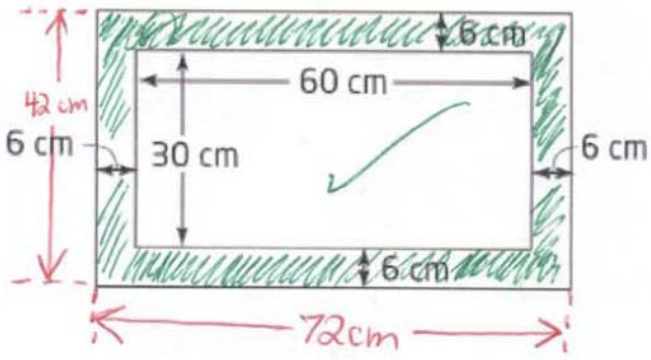
$$= 325.6$$

About 325.6 cm of gold trim is needed for each kite.

12. A picture measures 60 cm by 30 cm. The mat around the picture is 6 cm wide. Find the area of the mat. **(4 APP)**

$A_m \rightarrow$ area of mat, $A_L \rightarrow$ area of large rectangle

A_S = area of small rectangle



$$\therefore A_m = A_L - A_S$$

$$= 72(42) - 60(30)$$

$$= 3024 - 1800$$

$$= 1224$$

The area of the mat is $1224\ cm^2$.

13. A ***cone*** with a volume of 120 cm^3 just fits inside a ***cylindrical*** container having the same radius and height. What is the volume of the cylindrical container? **(2 APP)**

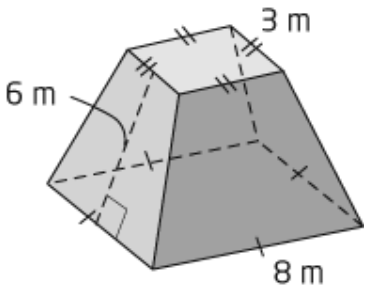
$$V_{cone} = \frac{1}{3} A_{base}(height) = 120\ cm^3$$

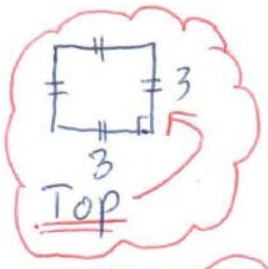
But $V_{cylinder} = A_{base}(height) = 3V_{cone}$

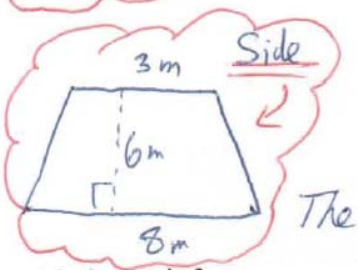
$$\therefore V_{cylinder} = 3(120) = 360\ cm^3$$

KU	APP	TIPS	COM
– 0	– 0	– 0	– 0

14. The base for a large statue is in the form of a frustum of a pyramid with dimensions as shown. The ***top*** and ***sides*** are covered with paint. What area is painted? **(4 APP)**



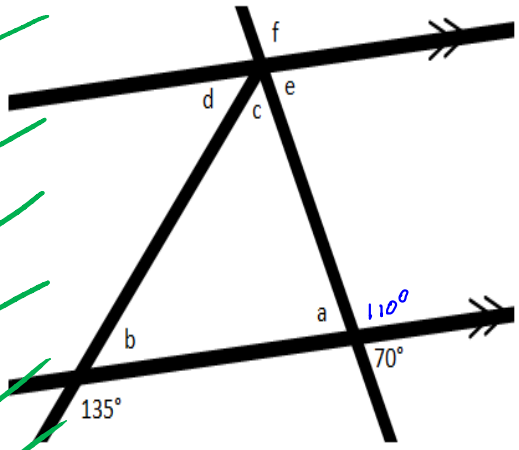




Total painted area
$= A_{Top} + 4A_{side}$
$= 3(3) + 4^2\left(\frac{6(8+3)}{2_1}\right)$
$= 9 + 12(11)$
$= 141$
The total painted area is $141 m^2$

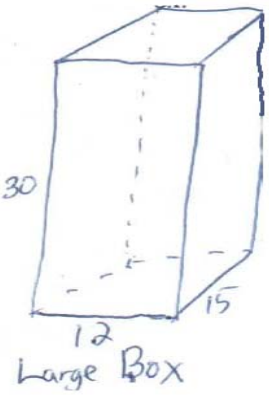
15. Find the measures of each angle labelled with a letter. In each case, state your ***reasoning***. **(6 APP)**

Measure of Angle	***Reasoning (State Why)***
$a =$ 70°	opposite angles are equal
$b =$ 45°	180° − 135° (supplementary angles)
$c =$ 65°	$d + c + e = 180° \rightarrow 45° + c + 70° = 180°$
$d =$ 45°	alternate angles are equal
$e =$ 70°	alternate angles are equal
$f =$ 110°	corresponding angles are equal



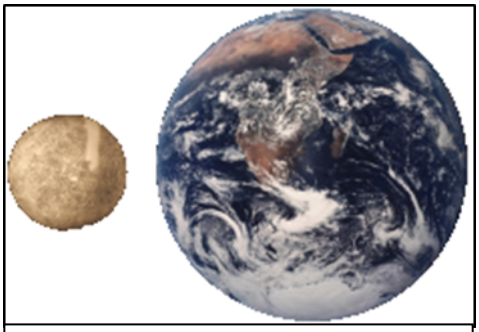
16. Big Bran breakfast cereal is sold in a single serving size. This rectangular prism shaped box has dimensions 4 cm by 5 cm by 10 cm. The manufacturer also sells the cereal in a box that has dimensions three times those of the small box. Compare the volume of the two boxes and explain your answer. **(4 TIPS)**

$V_{small\ box} = (4cm)(5cm)(10cm) = 200\ cm^3$
$V_{large\ box} = (12cm)(15cm)(30cm) = 5400\ cm^3$
$\frac{V_{large\ box}}{V_{small\ box}} = \frac{5400\ cm^3}{200\ cm^3} = 27$
The volume of the large box is 27 times greater than that of the small box.



KU	APP	TIPS	COM
− 0	− 0	− 0	− 0

17. The volume of the planet Mercury is about 61,000,000,000 km^3 (61 billion cubic kilometres). The Earth's radius is about 2.6 times that of Mercury. What is the Earth's volume? **(6 TIPS)**



Mercury (left) Compared to Earth

$V_M = 61{,}000{,}000{,}000 = \frac{4\pi r_M^3}{3}$ ✓

$V_E = \frac{4\pi r_E^3}{3}$

$= \frac{4\pi(2.6 r_M)^3}{3}$ ✓ (Since $r_E = 2.6 r_M$)

$= \frac{(2.6)^3(4\pi r_M^3)}{3}$

$= 17.576\left(\frac{4\pi r_M^3}{3}\right)$ ✓

$= 17.576 V_M$ ✓

$\therefore V_E = 17.576 V_M = 17.576(61{,}000{,}000{,}000)$ ✓

$= 1{,}072{,}136{,}000{,}000$ ✓

The Earth's volume is about 1 trillion km^3 !!

Shorter solution
BUT
a little difficult to understand.

$V_M \rightarrow$ Mercury's volume (km^3)
$V_E \rightarrow$ Earth's volume (km^3)
$r_M \rightarrow$ Mercury's radius (km)
$r_E \rightarrow$ Earth's radius (km)

Alternative Solution

This solution is easier to understand BUT it's longer.

Since $V_M = 61{,}000{,}000{,}000$

$\therefore \frac{4}{3}\pi r_m^3 = 61{,}000{,}000{,}000$

$\therefore 4.189 r_m^3 \doteq 61{,}000{,}000{,}000$

$\therefore r_m^3 \doteq \frac{61{,}000{,}000{,}000}{4.189}$

$\therefore r_m \doteq \sqrt[3]{\frac{61{,}000{,}000{,}000}{4.189}}$

$\therefore r_m \doteq 2442$

$\therefore r_E \doteq 2.6(2442)$

$\therefore r_E \doteq 6349$

$\therefore V_E = \frac{4}{3}\pi r_E^3$

$\doteq \frac{4}{3}(3.14)(6349)^3 \doteq 1{,}072{,}000{,}000\ km^3$

$\sqrt[3]{x}$ is called the "cube root" of x
It means, "What number y, when raised to the exponent 3, is equal to x?"
e.g. $\sqrt[3]{64} = 4$ because $4^3 = 64$.

KU	APP	TIPS	COM
–	–	–	–