

END OF SEMESTER ONE EXAMINATION - DECEMBER 2013

MAT 101 – Elementary Mathematics

Time: 2 hours

Total marks: 80

Instructions: Answer *ALL* questions. Marks will only be awarded for neat work.

1. Answer True or False to each statement below:

#M75

- a) All rational numbers are real numbers.
- b) $\sqrt{-4}$ is NOT real number.
- c) The set of natural numbers is a subset of the set of integers.
- d) Addition operations are carried out before Subtraction operations in the PEMDAS rules for the order of operations.
- e) 0 is the smallest whole number. [5]

2. Copy and complete the following statements:

- a) When I add two negative numbers together the sign of the result is _____.
- b) When an arithmetic operation has only multiplication and division operations, one proceeds from the _____ and carries out the operations one after another, when applying the PEMDAS rules for the order of operations.
- c) A prism is a _____ while a rectangle is a _____.
- d) $\frac{1}{5}$ expressed as a _____ is 0.2. [5]

3.

- a) Write down the next two terms of the sequence: $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \dots$ [2]
- b) Find the H. C. F. of 90, 135, 405. [3]

4.

- a) Find the LCM of 14, 54 and 60. [3]
- b) Hence, find the LCM of 1400, 5400 and 6000. [2]

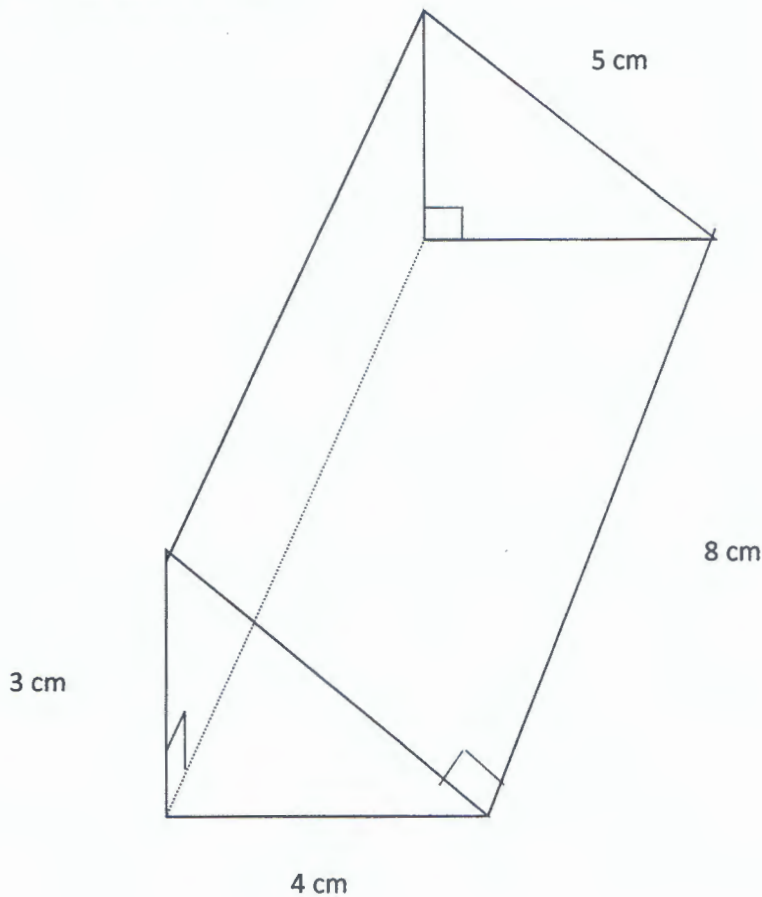
5.

- a) Convert
 - i. 1.72 km to m, [2]
 - ii. 902 mm² to cm². [2]

- b)
- i. Simplify the ratio 12 : 14 : 18. [2]
 - ii. The ratio of the number of goats to the number of pigs to the number of cows on Mr. Joe's farm is 12 : 14 : 18. If there are 154 animals altogether, find the numbers of each animal on Mr. Joe's farm. [5]

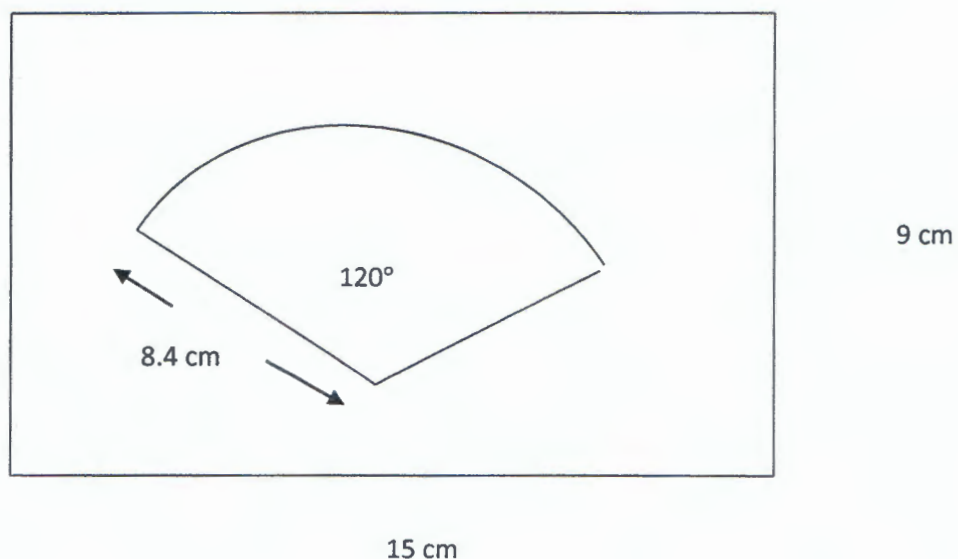
6. The diagram shows a triangular prism. Find

- a) its volume, [4]
- b) its surface area. [6]



7. A machine part, which is a sector of a circle of radius 8.4 cm with an angle of 120° between the radii is pressed out from a rectangular sheet of metal measuring 15 cm by 9 cm. See diagram below. **Calculate:**

- a) the perimeter of the part, [4]
- b) the area of the part, [2]
- c) the area of the sheet of metal that remains. [4]



8. Evaluate the following showing ALL working, giving the EXACT answer, and applying PEMDAS rules. **CALCULATORS must not be used to evaluate any step of the expressions below.**

a) $2 - 5 \times 9 \div 3 + -6$ [5]

b) $\frac{2\frac{1}{4} - 2\frac{3}{5} \times 1\frac{1}{13}}{\frac{1}{6}}$ [8]

9. Evaluate the following showing ALL working, giving the EXACT answer, and applying PEMDAS rules. **CALCULATORS must not be used to evaluate any step of the expressions below.**

a) $(4.5 - 9.3) \div (-0.3 \div 0.2)$, giving the answer as a decimal. [6]

b) $2\frac{2}{3} + \left(-\frac{16}{9} + 60\%\right) \div 1.1$, giving the answer as a mixed number. [10]

