



MACHAKOS UNIVERSITY

DIRECTORATE OF TVET

MATHEMATICS

MATHEMATICS DIPLOMA EXAM SEPT-DEC 2023 2023 FOR FBM AND CAM

DATE: 27/11/2023

TIME: 8:30-11:30AM

INSTRUCTIONS

Attempt all questions

All questions carry equal marks

1. Simplify:

(a)

(i) $\frac{X-1}{2} + \frac{X+2}{4} + \frac{X}{5}$ (3 marks)

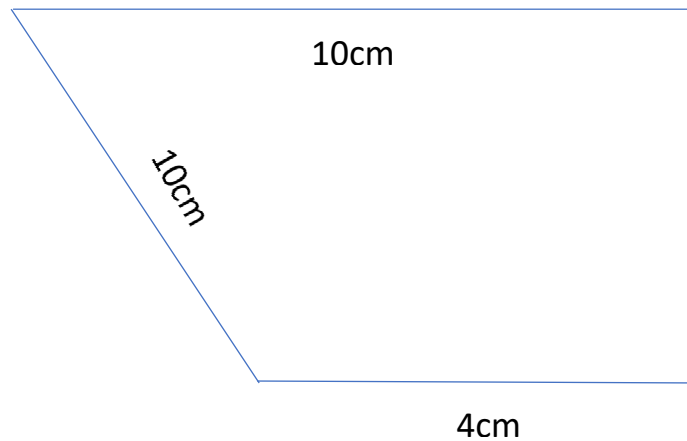
(ii) Evaluate $22 \div 5 \times \frac{-20}{11} + 30 - 8$ (3 marks)

(b) The cost price of an article is two fifths of its selling price. Find the profit percentage. (4 marks)

(c) A cube of side 15cm has the same volume as a cylinder of height 20cm. Find the radius of cylinder. (5 marks)

2. (a) A group of 6 boys has a mean weight of 54kg. When two more boys joined the group, one with x kg and the other with (x + 10)kg, the new mean is 55 kg. Determine the value of x. (5 marks)

(b) Calculate the area of the trapezium.



(4 marks)

(d) Solve the equation

$$x = \frac{2x-1}{3} + \frac{x-3}{4}$$

(3 marks)

3. (a) Simplify

$$\frac{x^2(x^2+1)^{-\frac{1}{2}} - (x^2+1)^{1/2}}{x^2} -$$

(5 marks)

(b) A man owes a bank Shs. 5000, Another has Shs 1200 in the bank. What is the difference in the deposits of the two men?

(3 marks)

(c) Make L the subject of the formular

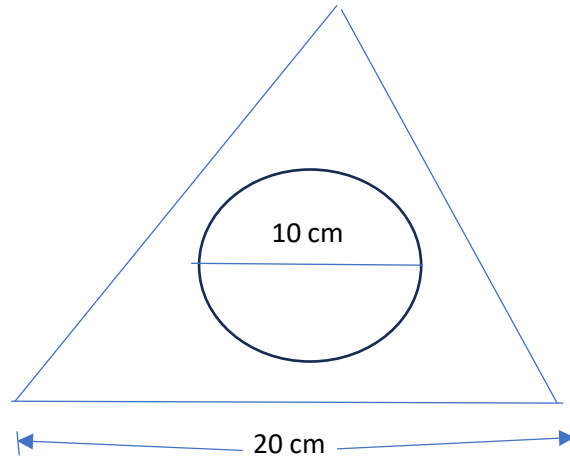
$$M = \frac{2L}{L + rCR}$$

Hence calculate the value of L when $M = \frac{1}{2}$, $r = 3$, $C = 4$ and $R = 5$

(4 marks)

4. (a) If Grace spent Ksh. 1200 a day, her money would last for 36 days. Determine the number of days it would take if the expenditure is increased by Ksh.300 per day. (3 marks)

(b) Find the area of the shaded region.



(5 marks)

- (c) Given that $a = -5$ and $b = -4$, evaluate

$$\frac{1}{2}(4a - 6b)$$

(3 marks)

5. (a) The daily sales of a cake is directly proportional to the population P of a town. When P is 20,000 people, S is Ksh 260,000. Determine S when $P = 200,000$. (5 marks)

(b) The ratio of men, women to children who attended a church service was 2:3:6 respectively. If there were 150 men, determine

- (i) The difference between women and men who attended the service.

(2 marks)

- (ii) The total number of people who attended the service.

(3 marks)