

SECTION 1 (30 marks)

Answer all the questions in this section in the space provided.

1. Without using mathematical tables or a calculator, evaluate $0.13 \times 0.3 - 0.009$ giving the answer in decimal form. (3 marks)

$$\begin{array}{r} 0.13 \times 0.3 = 0.039 \\ \hline 0.09 \end{array}$$

$$\begin{array}{r} = 0.039 - 0.009 \\ \hline 0.09 \end{array}$$

$$\begin{array}{r} = 0.036 \\ \hline 0.09 \end{array}$$

$$\begin{array}{r} = \frac{36}{1000} \times \frac{100}{9} = \frac{36}{90} \\ = \frac{4}{10} \end{array}$$

$$= \underline{0.4}$$

2. Simplify the expression $\frac{4x^2 - 9}{2x^2 - 5x + 6}$. (3 marks)

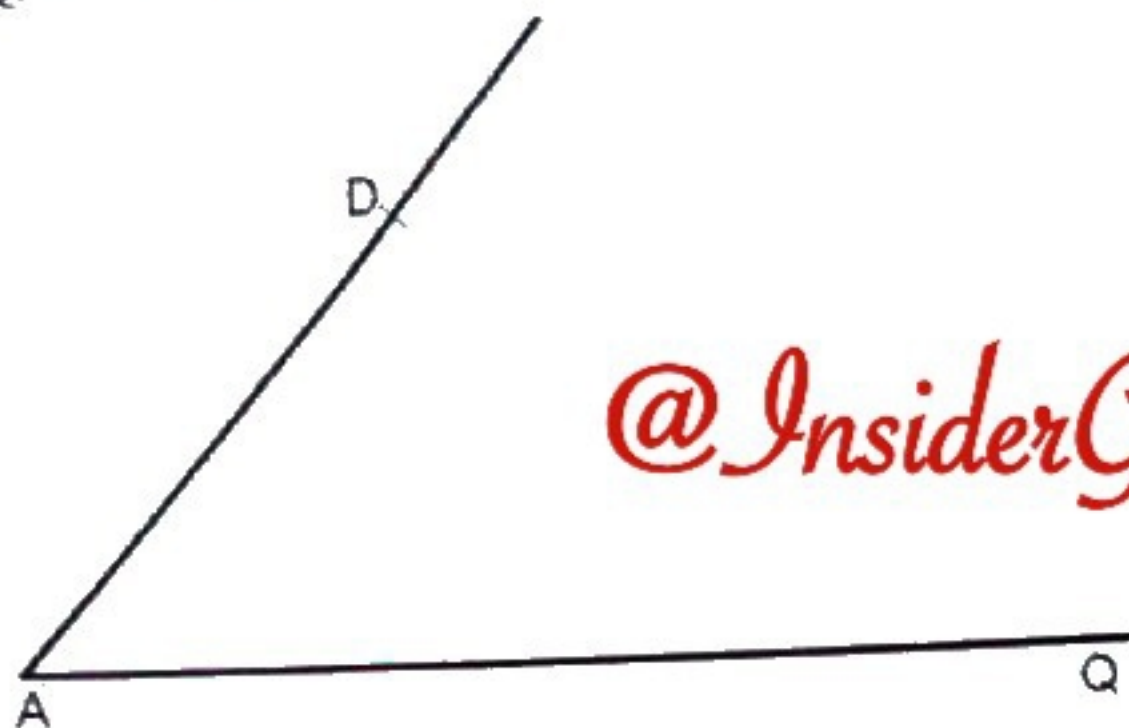
$$\frac{4x^2 - 9}{2x^2 - 5x + 6} = \frac{(2x+3)(2x-3)}{(2x-3)(x+2)}$$

$$\frac{(2x+3) \cancel{(2x-3)}}{\cancel{(2x-3)} (x+2)}$$

$$\begin{array}{r} = \frac{2x+3}{x+2} \\ \hline \hline \end{array}$$

8

In the following figure, points A and D are vertices of a trapezium ABCD. Line DC is parallel to line AQ. Line DC = 4 cm. Point B lies on the line AQ such that angle DCB = 90°.



Using a ruler and a pair of compasses only, complete the trapezium. Hence measure the length of line AB. (4 marks)

9

The length of a minor arc AB of a circle centre O is 10 cm. The arc AB subtends an angle of 1.25 radians at O. Calculate the area of the minor sector AOB. (3 marks)

$$\text{length of an arc} = \frac{\theta}{360} \times 2\pi r$$

$$\frac{71.6125}{360} \times 2 \times \frac{22}{7} \times r = 10 \text{ cm}$$

$$\frac{1.2504 r}{1.2504} = \frac{10 \text{ cm}}{1.2504}$$

$$r = 7.997$$

$$\approx r = \underline{\underline{8 \text{ cm}}}$$

$$\text{Area of the Minor Sector AOB} = \frac{\theta}{360} \pi r^2$$

$$\frac{71.61}{360} \times \frac{22}{7} \times 8 \times 8$$

$$= \underline{\underline{40 \text{ cm}^2}}$$



the question in the image:

Question (a)

- Calculate the area of the triangular plot $\triangle AMD$ and hence the perpendicular distance between the two parallel sides.

◦ Given:

- ▶ $AD = 39, \text{ m}$
- ▶ $MD = 41, \text{ m}$
- ▶ Angle $\angle AMD = 30^\circ$ (since $\angle ABC = 30^\circ$ and $AB \parallel DC$).

◦ Step 1: Use the formula for the area of a triangle:

$$\text{Area} = \frac{1}{2} \times AD \times MD \times \sin(30^\circ)$$

- Step 3: Use the area to find the perpendicular distance h between AB and DC :

$$\text{Area} = \text{Base} \times h$$

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Question (b)

- Calculate the l



◦ (i) BC :



Message



Q₃

$$L_1 \quad y = 2 - \frac{1}{3}x$$

$$\text{At } y\text{-axis } x = 0$$

$$y = 2 - \frac{1}{3}(0) \\ = 2$$

$$P(0, 2)$$

$$L_2 \quad M_1 \times M_2 = -1$$

$$-\frac{1}{3} \times M_2 = -1$$

$$M_2 = -1 \times \frac{3}{-1}$$

$$\text{Gradient of } L_2 = 3$$

$$\begin{matrix} (0, 2) \\ (x, y) \end{matrix} ; 3$$

$$\frac{y-2}{x-0} = 3$$

$$y-2 = 3x$$

$$y = 3x + 2$$

Q₄

$$\text{Area of hexagon: } \frac{360}{6} = 60^\circ$$

$$\text{Area} = \frac{1}{2} ab \sin \theta \times 6$$

$$= \frac{1}{2} \times 3 \times 3 \times \sin 60 \times 6$$

$$= 23.38 \text{ cm}^2$$

$$\text{Area of circle} = \pi r^2$$

$$= \frac{22}{7} \times 3 \times 3$$

$$= 28.29 \text{ cm}^2$$

$$\text{Area outside} = 28.29 \text{ cm}^2 - 23.38 \text{ cm}^2$$

$$= 4.91 \text{ cm}^2$$

Q1

Veritas

$$\text{Num} = [0.13 \times 0.3] - 0.003$$

$$0.039 - 0.003$$

$$\text{Num} = 0.036$$

$$\text{Ans} = \frac{\text{Num}}{\text{Den}} = \frac{0.036}{0.09}$$

$$= 0.4$$

Q2: Num: $4x^2 - 9 = (2x-3)(2x+3)$

Den: $2x^2 + x - 6$

$$2x^2 + 4x - 3x - 6$$

$$2x(x+2) - 3(x+2)$$

$$(2x-3)(x+2)$$

$$\text{Ans} = \frac{(2x-3)(2x+3)}{(2x-3)(x+2)}$$

$$= \frac{2x+3}{x+2}$$

Q3)

$$y = 2 \cdot \frac{1}{3}x$$

$$y = -\frac{1}{3}x - 2$$

$$x = 0$$

$$y = -2$$

$$Q(0, -2)$$

$$m_1 \times m_2 = -1$$

$$-\frac{1}{3} \times m_2 = -1$$

$$m_2 = 3$$

$$\frac{y+2}{x-0} = 3$$

$$y+2 = 3(x-0)$$

$$y+2 = 3x$$

$$y = 3x - 2$$

Q4)

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Area of circle

$$= \frac{22}{7} \times 3 \text{ cm} \times 3 \text{ cm}$$

$$= 28 \frac{2}{7} \text{ cm}^2$$

Area of hexagon

$$\left[\frac{1}{2} \times 3 \text{ cm} \times 3 \text{ cm} \times 6 \right] \text{ cm}^2$$

$$23.38 \text{ cm}^2$$

Area outside

$$\text{The hexagon} = 28 \frac{2}{7} \text{ cm}^2 - 23.38 \text{ cm}^2$$

$$= 4.91 \text{ cm}^2$$

1.

$$\frac{0.13 \times 0.3 - 0.003}{0.09}$$

$$N: 0.13 \times 0.3 = 0.039$$

$$0.039 - 0.03 = 0.009$$

$$\frac{0.009 \times 100}{0.09 \times 100}$$

$$= \frac{0.9}{9} = 0.1$$

$$2. \frac{4x^2 - 9}{2x^2 + x - 6}$$

$$N = (2x - 3)^2 - (3)^2$$

$$(2x - 3)(2x + 3)$$

$$D = 2x^2 + x - 6$$

$$p = -12 \quad (4, -3)$$

$$s = 1$$

$$2x^2 + 4x - 3x - 6$$

$$2x(x + 2) - 3(x + 2)$$

$$(2x - 3)(x + 2)$$

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

3.

$$y = 2 - \frac{1}{3}x$$

$$y = -\frac{1}{3}x - 2$$

$$x = 0$$

$$y = -2$$

$$Q: (0, -2)$$

$$M_1 \times M_2 = -1$$

$$-\frac{1}{3} \times M_2 = -1$$

$$-\frac{3}{1}x - \frac{1}{3} \times M_2 = -1 \times -\frac{3}{1}$$

$$M_2 = 3$$

$$\frac{y + 2}{x - 0} = \frac{3}{1}$$

$$y + 2 = 3(x - 0)$$

$$y + 2 = 3x$$

$$= y = \underline{3x - 2}$$

Answers

Let x goats Abdul sold.

Let y goats Chebet sold.

Abdul's remaining = $32 - x$

Chebet's = $56 - 2x$

$$\frac{32 - x}{56 - 2x} = \frac{3}{5}$$

$$5(32 - x) = 3(56 - 2x)$$

$$160 - 5x = 168 - 6x$$

$$x = 8 \text{ - Abdul}$$

$$\text{Chebet} = 2 \times 8 = 16 \text{ goats}$$

$$8 + 16 = 24 \text{ goats}$$

$$\text{Sales raised} = 97600$$

$$\text{Let Abdul's selling price} = p$$

$$\text{Chebet} = 0.95p$$

$$\text{Abdul's earnings} = 8 \times p$$

$$= 8p$$

$$\text{Chebet's} = 16 \times 0.95p =$$

$$= 15.2p$$

$$\text{Total Earnings}$$

$$8p + 15.2p = 97600$$

$$23.2p = 97600$$

$$p = 4200$$

$$\text{Abdul price} = 4200$$

$$\text{Chebet } 0.95 \times 4200 = 3990$$

$$\text{Earnings}$$

$$\text{Abdul's } 8 \times 4200 = 33600$$

$$\text{Chebet } 16 \times 3990 = 63840$$

$$33600 + 63840$$

$$= 97440$$

$$97440 = 21:40$$

$$c) \text{ Abdul} = 19:21$$

$$\text{selling price Abdul} = 4200$$

$$\text{New sp } 4200 \times 1.19$$

$$= 4998$$

$$\text{Ans} = 3800$$

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$$(1) \frac{0.036}{0.09} = 0.4$$

$$\frac{0.036}{0.09} = 0.4$$

$$\frac{0.036 \times 1000}{0.09 \times 1000}$$

$$= \frac{36}{90} \times \frac{1000}{1000}$$

$$= 0.4$$

$$x^2 - 6x$$

$$2 \frac{(4x^2 - 9)}{2x^2 + x - 6}$$

$$\frac{(2x+3)(2x-3)}{2x^2 + 3x - 2x - 6}$$

$$x(2+3) - 2(2+3)$$

$$\frac{(2x+3)(2x-3)}{(x-2)(2x+3)} = \frac{2x-3}{x-2}$$



$$\text{Area} = \text{Base} \times h$$

Question (b)

- Calculate the length of:

- (i) BC :

- Use the cosine rule in $\triangle ABC$:

$$BC^2 = AB^2 + AC^2 - 2 \cdot AB \cdot AC \cdot \cos(30^\circ)$$

- Since M is the midpoint of AB , $AM = MB = 50 \text{ m}$.
- Use the cosine rule in $\triangle AMC$ with known values.

Question (c)

- Calculate the size of the obtuse angle $\angle BMC$:

- Use the cosine rule or sine rule in $\triangle BMC$ to find $\angle BMC$, which will be obtuse.

Let me know if you'd like further assistance with any specific part of the calculation!



Message





(b) Let x be Chebet's selling price per goat. Abdul's selling price per goat is $1.05x$. Abdul earned $8(1.05x) = 8.4x$ and Chebet earned $16x$. Their total earnings are 97600:

$$8.4x + 16x = 97600$$

$$24.4x = 97600$$

$$x = 4000$$

Abdul's earnings: $8.4 * 4000 = 33600$

Chebet's earnings: $16 * 4000 = 64000$

The ratio of Abdul's earnings to Chebet's earnings is $33600 : 64000$. Simplifying this ratio by dividing both sides by 800 gives $42:80$. Further simplification by dividing by 2 gives $21:40$.

Answer: 21:40



Question 1

Explanation:

We are tasked with creating a frequency distribution table using a class width of 5, starting with the class 6-10. We will then identify the modal class and estimate the mean number of trees planted.

Step 1: Create Frequency Distribution Table

To create the frequency distribution table, we need to group the data into classes of width 5, starting from 6-10.

Step 2: Identify the Modal Class

The modal class is the class interval with the highest frequency.

Step 3: Estimate the Mean Number of Trees Planted

To estimate the mean, we calculate the midpoint of each class, multiply by the frequency, sum these products, and divide by the total number of observations.

Answer 1



- Frequency Distribution Table:





Certainly! Let's delve into the specific questions and provide detailed answers.

Question 1: Frequency Distribution Table

(a) (i) Frequency Distribution Table

To create a frequency distribution table with a class width of 5, starting from 6-10, we need to organize the data into intervals. Assuming you have the raw data, here's how you would structure it:

Class Interval	Frequency
6 - 10	X
11 - 15	Y
16 - 20	Z
21 - 25	A
...	...

(ii) Modal Class

The modal class is the class interval with the highest frequency. Without specific data, I can't determine this, but you would look for the interval with the largest frequency value.

(iii) Estimate the Mean Number of Trees Planted.

—



- 1 Calculate the length of AM.

$$AM = \frac{AB}{2} = \frac{100}{2} = 50 \text{ m.}$$

- 2 Calculate the area of triangle AMD using Heron's formula.

Let s be the semi-perimeter of triangle AMD.

$$s = \frac{AM + AD + MD}{2} = \frac{50 + 39 + 41}{2} = 65$$

m.

Area of triangle AMD =

$$\sqrt{s(s - AM)(s - AD)(s - MD)} = \sqrt{65(65 - 50)(65 - 39)(65 - 41)}$$
$$= \sqrt{65 \times 15 \times 26 \times 24}$$
$$= 780 \text{ m}^2.$$

- 3 Calculate the perpendicular distance between the two parallel sides.

Let h be the perpendicular distance between the two parallel sides.

$$\text{Area of triangle AMD} = \frac{1}{2} \times AM \times h.$$

$$780 = \frac{1}{2} \times 50 \times h.$$

$$h = \frac{780 \times 2}{50} = 31.2 \text{ m.}$$

- 1 Let 'x' be the number of goats Abdul sold.
Chebet sold $2x$ goats.
- 2 Abdul had $32 - x$ goats remaining.
Chebet had $56 - 2x$ goats remaining.
- 3 The ratio of remaining goats is $(32 - x) / (56 - 2x) = 3/5$.
- 4 Cross-multiply: $5(32 - x) = 3(56 - 2x)$
- 5 Simplify: $160 - 5x = 168 - 6x$.
- 6 Solve for x: $6x - 5x = 168 - 160$; $x = 8$.
- 7 Abdul sold 8 goats, Chebet sold $2 * 8 = 16$ goats.
- 8 Total goats sold = $8 + 16 = 24$ goats

NEW EXON 1 (30 marks)

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$$\begin{array}{r} = \frac{2x+3}{x+2} \\ \hline \hline \end{array}$$

(21)

$$Area = \frac{1}{2} \times 6 \sin 60^\circ$$

$$\frac{1}{2} \times 39 \times 41.5 \sin 30^\circ$$

$$= 399.75$$

2

$$399.75 = \frac{1}{2} \times 100 \times h$$

$$\frac{399.75}{50} = \frac{50h}{50}$$

$$h = 6.795 \text{ M}$$

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