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Class: 8 'G'
Subject: Opt maths
Roll no: 6

[Mid-Term Exam]-2077

Group 'A' [4x2=8]

1. → Soln

Here,

Let the points be $A(25,10)$, $B(15,5)$ and $C(x_2, y_2)$.

We have,

Mid-point = $B(15,5)$
Point at one end = $A(25,10)$
Point at another end = $C(x_2, y_2)$

Now,

$$B(15,5) = \left(\frac{25+x_2}{2}, \frac{10+y_2}{2}\right)$$

From the above condition,

Taking x component,	Taking y component,
$15 = \frac{25+x_2}{2}$	$5 = \frac{10+y_2}{2}$
or, $15\times2 = 25+x_2$	or, $5\times2 = 10+y_2$
or, $30-25 = x_2$	or, $y_2 = 10-10$
$\therefore x_2 = 5$	$\therefore y_2 = 0$

$\therefore C = (5,0)$

2) → Soln

Here,

$f(x) = 3x - 4$

$g(x) = 2x^2 - 5x + 8$

We have,

$f(x) \times g(x) = (3x-4)(2x^2-5x+8)$

$= 3x(2x^2-5x+8) - 4(2x^2-5x+8)$

$= 6x^3 - 15x^2 + 24x - 8x^2 + 20x - 32$

$= 6x^3 - 15x^2 - 8x^2 + 24x + 20x - 32$

$\therefore f(x) \cdot g(x) = 6x^3 - 23x^2 + 44x - 32$

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3) → Soln

Here,

(i) $\frac{3\pi}{5}^c \longrightarrow$ degree,

$1^c = \left(\frac{180}{\pi}\right)^\circ$

or, $\frac{3\pi}{5}^c = \left(\frac{\cancel{180}^{36}}{\cancel{\pi}} \times \frac{3\cancel{\pi}}{\cancel{5}}\right)^\circ$

$\therefore \frac{3\pi}{5}^c = 108^\circ$

(ii) $\frac{3\pi}{5}^c \longrightarrow$ grade,

$1^c = \left(\frac{200}{\pi}\right)^g$

$$\text{or, } \left(\frac{3\pi}{5}\right)^c = \left(\frac{\cancel{200}^{40}}{\cancel{\pi}} \times \frac{3\pi}{\cancel{5}}\right)^g$$

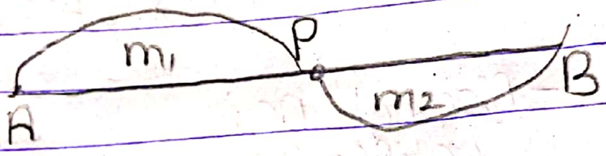
$$\therefore \left(\frac{3\pi}{5}\right)^3 = 120^g$$

4. → Soln,

Here,

Let the points be $A(-3,2)$, $B(2,8)$.

We have,



$A(-3,2) = (x_1, y_1)$

$B(2,8) = (x_2, y_2)$

$m_1 : m_2 = 3:2$

Let the required Point be $P(x,y)$.

Now,

$$P(x,y) = \left(\frac{m_1x_2 + m_2x_1}{m_1+m_2}, \frac{m_1y_2+m_2y_1}{m_1+m_2}\right)$$

$$= \left(\frac{3\times2+2\times-3}{3+2}, \frac{3\times8+2\times2}{3+2}\right)$$

$$= \left(\frac{6-6}{5}, \frac{24+4}{5}\right)$$

$$= \left(\frac{0}{5}, \frac{28}{5}\right)$$

$$= \left(0, \frac{28}{5}\right)$$

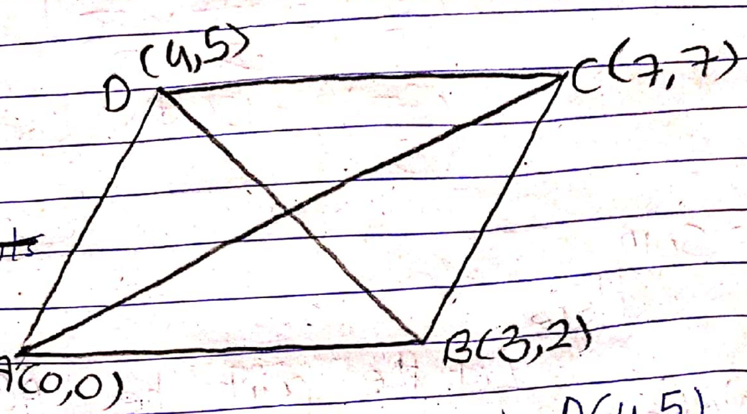
$\therefore$ Reqd. point is $P\left(0, \frac{28}{5}\right)$

Group 'B' [3×4=12]

5) → Soln

Here,

~~Let the points~~



We have,

~~Let~~ Points are A(0,0), B(3,2), C(7,7) and D(4,5).

Now,

– Diagonal AC;

Let P(x,y) be the ~~p~~ mid-point of AC.

$$P(x,y) = \left(\frac{0+7}{2}, \frac{0+7}{2}\right) = \left(\frac{7}{2}, \frac{7}{2}\right)$$

– Diagonal BD;

Let $Q(\bar{x},\bar{y})$ be the mid-point of BD,

$$Q(\bar{x},\bar{y}) = \left(\frac{3+4}{2}, \frac{2+5}{2}\right) = \left(\frac{7}{2}, \frac{7}{2}\right)$$

Since,

Mid-point of AC = Mid-point of BD

or, $(x,y) = (\bar{x},\bar{y}) = \left(\frac{7}{2}, \frac{7}{2}\right)$

∴ ABCD are the vertices of a parallelogram.

Proved.

6) → Solⁿ

Here,

$f(x) = 2x^3 - 5x^2 - 8x + 11$

$g(x) = (x-4)$

Now,

$f(x) \div g(x) = x-2 \overline{) 2x^3 - 5x^2 - 8x + 11 } (2x^2 - 1x - 10$

$\quad (-) 2x^3 (+) 4x^2$

$\quad\quad\quad (-) \quad (+)$

$\quad\quad\quad \cancel{-1x^2} - 8x$

$\quad\quad\quad (+) 1x^2 (-) 2x$

$\quad\quad\quad (+) \quad (-)$

$\quad\quad\quad \times \quad -10x + 11$

$\quad\quad\quad\quad (+) 10x (+) 20$

$\quad\quad\quad\quad (+) \quad (-)$

$\quad\quad\quad\quad \times \quad -9$

$\therefore$ Quotient $= 2x^2 - 1x - 10$

$\therefore$ Remainder $= -9$

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7) → Solⁿ

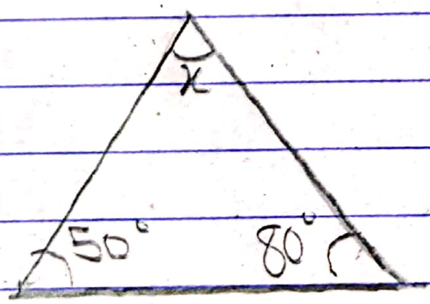
Here (Let the remaining angle be $x°$)

$80° + 50° + x° = 180°$ [$\because$ Sum of angles of a triangle]

or, $130° + x° = 180°$

or, $x° = 180° - 130°$

$\therefore x° = 50°$



Now,

$50° \longrightarrow$ grades,

2.)-

$$1^{\circ} = \left(\frac{10}{9}\right)^{g}$$

or, $50^{\circ} = \left(\frac{10}{9} \times 50\right)^{g}$

$\therefore 50^{\circ} = 55.56^{g}$

$\therefore$ The third angle is ~~50~~ 55.56 in grades.