Mathematics

11-Nov-21

Q1 (i) $25x^2 - 36y^2$

$= (5x)^2 - (6y)^2$

$= (5x - 6y)(5x + 6y)$

Ans $= (5x - 6y)(5x + 6y)$

(ii) $11x^2 + 75x - 14$ $\quad (11)\times(-14) = -154$, $(77)\times(-2)$

$= 11x^2 + 77x - 2x - 14$

$= 11x(x + 7) - 2(x + 7)$

$= (x + 7)(11x - 2)$.

Ans $= (x + 7)(11x - 2)$

(iii) $(3 - 4x)^2 - (3 - 5x)^2$

$= ((3 - 4x) - (3 - 5x)((3 - 4x) + (3 - 5x))$

$= (3 - 4x - 3 + 5x)(3 - 4x + 3 - 5x)$

$= (x)(6 - 9x)$.

Ans $= x(6 - 9x)$

(iv) $8ax + 4ay - 6bx - 3by$

$2a\,4a(2x + y) - 3b(2x + y)$.

$= (2x + y)(4a - 3b)$

Ans $= (2x + y)(4a - 3b)$

(v) $3ax^2 - 3ay^2 - 4x^2b + 4by^2$

$3a(x^2 - y^2) - 4b(x^2 + y^2)$

$3ax^2 - 4bx^2 - 3ay^2 + 4by^2$

$x^2(3a - 4b) + y^2(3a - 4b)$

$= (3a - 4b)(x^2 - y^2)$

$= (3a - 4b)((x)^2 - (y)^2)$

$= (3a - 4b)(x - y)(x + y)$

Ans $= (3a - 4b)(x - y)(x + y)$

Q2 (i) $64 - 125a^3$

$= (4)^3 - (5a)^3$

$= (4 - 5a)((4)^2 + (4)(5a) + (5a)^2)$

$= (4 - 5a)(16 + 20a + 25a^2)$.

Ans $= (4 - 5a)(16 + 20a + 25a^2)$

(ii) $5x^3 + 40y^3$

$= 5(x^3 + 8y^3)$

$= 5((x)^3 + (2y)^3)$

$= 5(x + 2y)((x)^2 \mp (x)(2y) + (2y)^2)$

$= 5(x + 2y)(4y^2 - 2xy + 4y^2)$

Ans $= 5(x + 2y)(4y^2 - 2xy + 4y^2)$.

Over Leaf →

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Q2 (iii). $(2x-4y)^3 - (3x-y)^3$

$= ((2x-4y)-(3x-y)).((2x-4y)^2 + (2x-4y)(3x-y) + (3x-y)^2)$

$= (2x-4y-3x-y).(4x^2-16xy+16y^2+6x^2-2xy-12xy+4y^2+9x^2-6xy+y^2)$

$= (-x-5y).(4x^2+9x^2+6x^2-36xy+21y^2)$

$= (-x-5y)(19x^2-36xy+21y^2)$

Ans $= (-x-5y)(19x^2-36xy+21y^2)$

Q3 (a). $\frac{2x+3y}{x+6y} = \frac{4}{5}$

$\Rightarrow \frac{2(\frac{x}{y})+3}{(\frac{x}{y})+6} = \frac{4}{5}$.

$\boxed{\frac{x}{y} = z}$

$\Rightarrow \frac{(2z+3)}{(z+6)} = \frac{4}{5}$

$\Rightarrow (2z+3)5 = 4(z+6)$

$\Rightarrow 10z+15 = 4z+24$

$\Rightarrow 6z = 9$

$\Rightarrow z = \frac{9}{6}$

$\Rightarrow \frac{x}{y} = \frac{3}{2}$

Ans $\frac{x}{y} = \frac{3}{2}$

Mathematics

$-6c^2 + 12c - 6 = -6b^2$

$\Rightarrow 6c^2 - 12c + 6 = 6b^2$

$\Rightarrow c^2 - 2c + 1 = b^2$

$\Rightarrow (c-1)^2 = b^2$

$\Rightarrow c - 1 = b$

$\Rightarrow c = b + 1$

3(a)

$$x+p \;\overline{)\; ax^2 + bx + b \;(\; ax - ap}$$

$-ax^2 \mp apx$

$-apx + b$

$\pm apx \mp pb$

0

Remainder $= 0$

$b - pb = 0 \ldots (i)$

$$x+p \;\overline{)\; ax^2 + bx - ac \;(\; ax + (b-ap)}$$

$-ax^2 \mp apx$

$(b-ap)x - ac$

$(b-ap)x \mp p(b-ap)$

$-ac - p(b-ap) = 0$

$-ac - p(b-ap) = 0 \ldots (ii)$

Cancelled

from (i) $b = pb$

$\Rightarrow p = 1.$ xxx

Q3 (B).

$$x+p \;\overline{)\; ax^2+0x+b \;\big|\; ax-ap}$$

$$ax^2 \mp apx$$

$$-apx+b$$

$$\pm apx \pm ap^2$$

$$b+ap^2$$

Remainder $= 0$

$\Rightarrow b+ap^2 = 0 \quad \ldots (i)$

$\Rightarrow \boxed{p^2 = -\frac{b}{a}}$ Qed

$$x+p \;\overline{)\; ax^2+bx-ac \;\big|\; ax+(b-ap)}$$

$$-ax^2 \mp apx$$

$$(b-ap)x - ac$$

$$-(b-ap)x \mp p(b-ap)$$

$$-p(b-ap)-ac$$

Remainder $= 0$

$\Rightarrow -p(b-ap)-ac = 0$

$\Rightarrow p(b-ap) = -ac$

$\Rightarrow pb-ap^2 = -ac$

from (i) $p^2 = -\frac{b}{a}$

$\Rightarrow pb - a\left(-\frac{b}{a}\right) = -ac$

$\Rightarrow pb+b = -ac$

$\Rightarrow pb = -ac-b$

$\Rightarrow \boxed{p = \frac{-ac-b}{b}}$ Qed.

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Q3 (B) DIVISION METHOD

$$(x-c+1)\,\overline{)\,x^2+x(-5+5c)-6b^2}\;\;x+(6c-6)$$

$$-x^2+x(-c+1)$$

$$x(6c-6)-6b^2$$

$$-x(6c-6)+(-c+1)(6c-6)$$

$$-6b^2-(-c+1)(6c-6)$$

REMAINDER $=0$

$$\Rightarrow -6b^2-(-c+1)(6c-6)=0$$

$$\Rightarrow -6b^2-(-6c^2+6c+6c-6)$$

$$\Rightarrow -6b^2-(-6c^2+12c-6)=0$$

$$\Rightarrow -6b^2=-6c^2+12c-6$$

$$\Rightarrow -b^2=-c^2+2c-1$$

$$\Rightarrow b^2=c^2-2c+1$$

$$\Rightarrow b^2=(c-1)^2$$

$$\Rightarrow b=c-1$$

$$\Rightarrow \underline{c=b+1}$$

MULTIPLICATION METHOD (II)

$$(x-c+1)(x+a)=x^2+x(-5+5c)-6b^2$$

$$x^2-xc+x+ax+a-ac=x^2+x(-5+5c)-6b^2$$

$$\Rightarrow x^2+x(-c+1+a)+(a-ac)=x^2+x(-5+5c)-6b^2$$

SAME NO. OF x's

$$-c+1+a=-5+5c$$

$$\Rightarrow -6c=-a-6$$

$$\Rightarrow \boxed{a=6c-6}$$

SAME NON-x-TERM

$$a-ac=-6b^2$$

$$\Rightarrow (6c-6)-(6c-6)c=-6b^2$$

$$\Rightarrow 6c-6-6c^2+6c=-6b^2$$