Question 1.

Divide:

(i) $-39pq^2r^5$ by $-24p^3q^3r$

(ii) $-\frac{3}{4}a^2b^3$ by $\frac{6}{7}a^3b^2$

Solution:

$$(i)\ -39pq^2r^5 \div (-24p^3q^3r) = \frac{-39pq^2r^5}{-24p^3q^3r}$$

$$= \left(\frac{-39}{-24}\right) \times \left(\frac{pq^2r^5}{p^3q^3r}\right)$$

$$= \frac{13}{8} \times \frac{r^4}{p^2q} = \frac{13r^4}{8p^2q}$$

$$(ii)\ \frac{-3}{4}a^2b^3 \div \frac{6}{7}a^3b^2$$

$$= \frac{\frac{-3}{4}a^2b^3}{\frac{6}{7}a^3b^2}$$

$$= \left(\frac{\frac{-3}{4}}{\frac{6}{7}}\right) \times \left(\frac{a^2b^3}{a^3b^2}\right)$$

$$= \left(\frac{-3}{4} \times \frac{7}{6}\right) \times \left(\frac{b}{a}\right)$$

$$= \frac{-7}{8} \times \frac{b}{a} = \frac{-7b}{8a}$$

Question 2.

Divide:

(i) $9x^4 - 8x^3 - 12x + 3$ by $3x$

(ii) $14p^2q^3 - 32p^3q^2 + 15pq^2 - 22p + 18q$ by $-2p^2q$.

Solution:

(i) $$\frac{9x^4 - 8x^3 - 12x + 3}{3x}$$

$$= \frac{9x^4}{3x} - \frac{8x^3}{3x} - \frac{12x}{3x} + \frac{3}{3x}$$

$$= 3x^3 - \frac{8}{3}x^2 - 4 + \frac{1}{x}$$

(ii) $$\frac{14p^2q^3 - 32p^3q^2 + 15pq^2 - 22p + 18q}{-2p^2q}$$

$$= \frac{14p^2q^3}{-2p^2q} - \frac{32p^3q^2}{-2p^2q}$$

$$+ \frac{15pq^2}{-2p^2q} - \frac{22p}{-2p^2q} + \frac{18q}{-2p^2q}$$

$$= -7q^2 + 16pq - \frac{15q}{2p} + \frac{11}{pq} - \frac{9}{p^2}$$

Question 3.

Divide:

(i) $6x^2 + 13x + 5$ by $2x + 1$

(ii) $1 + y^3$ by $1 + y$

(iii) $5 + x - 2x^2$ by $x + 1$

(iv) $x^3 - 6x^2 + 12x - 8$ by $x - 2$

Solution:

(i) $2x + 1 \overline{)\, 6x^2 + 13x + 5 \,}(\, 3x + 5$

$$6x^2 + 3x$$
$$- \quad -$$
$$10x + 5$$
$$10x + 5$$
$$- \quad -$$
$$0$$

∴ Quotient = $3x + 5$

and remainder = 0

(ii) $y + 1 \overline{)\, y^3 + 1 \,}(\, y^2 - y + 1$

$$y^3 + y^2$$
$$- \quad -$$
$$-y^2 + 1$$
$$-y^2 - y$$
$$+ \quad +$$
$$y + 1$$
$$y + 1$$
$$- \quad -$$
$$0$$

∴ Quotient = $y^2 - y + 1$

and remainder = 0

(iii) Arranging the terms of dividend in descending order

of powers of x and then dividing, we get

$$x + 1\overline{)\,-2x^2 + x + 5\,}(-2x + 3$$
$$-2x^2 - 2x$$
$$+ \quad +$$
$$3x + 5$$
$$3x + 3$$
$$- \quad -$$
$$2$$

∴ Quotient = $-2x + 3$ and remainder = 2

(iv) $x^3 - 6x^2 + 12x - 8$ by $x - 2$

$$x - 2\overline{)\,x^3 - 6x^2 + 12x - 8\,}(x^2 - 4x + 4$$
$$x^3 - 2x^2$$
$$- \quad +$$
$$-4x^2 + 12x$$
$$-4x^2 + 8x$$
$$+ \quad -$$
$$4x - 8$$
$$4x - 8$$
$$- \quad +$$
$$\times$$

Quotient = $x^2 - 4x + 4$ and remainder = 0

Question 4.

Divide:

(i) $6x^3 + x^2 - 26x - 25$ by $3x - 7$

(ii) $m^3 - 6m^2 + 7$ by $m - 1$

Solution:

(i)

$$3x - 7\,)\,6x^3 + x^2 - 26x - 25\,(\,2x^2 + 5x + 3$$
$$6x^3 - 14x^2$$
$$- \quad +$$
$$15x^2 - 26x - 25$$
$$15x^2 - 35x$$
$$- \quad +$$
$$9x - 25$$
$$9x - 21$$
$$- \quad +$$
$$-4$$

∴ Quotient = $2x^2 + 5x + 3$ and remainder = -4

$$(ii)\; m - 1\,)\,m^3 - 6m^2 + 7\,(\,m^2 - 5m - 5$$
$$m^3 - m^2$$
$$- \quad +$$
$$-5m^2 \qquad + 7$$
$$-5m^2 + 5m$$
$$+ \quad -$$
$$-5m \quad + 7$$
$$-5m \quad + 5$$
$$+ \quad -$$
$$2$$

Question 5.

Divide:

(i) $a^3 + 2a^2 + 2a + 1$ by $+ a^2 + a + 1$

(ii) $12x^3 - 17x^2 + 26x - 18$ by $3x^2 - 2x + 5$

Solution:

$$(i)\ a^2 + a + 1\ \overline{)\ a^3 + 2a^2 + 2a + 1\ }(\ a + 1$$

$$a^3 + a^2 + a$$

$$- \quad - \quad -$$

$$a^2 + a + 1$$

$$a^2 + a + 1$$

$$0$$

∴ Quotient = $a + 1$ and remainder = 0.

(ii) $12x^3 - 17x^2 + 26x - 18$ by $3x^2 - 2x + 5$

$$3x^2 - 2x + 5\overline{)12x^3 - 17x^2 + 26x - 18}(4x - 3$$

$$12x^3 - 8x^2 + 20x$$

$$- \quad + \quad -$$

$$-9x^2 + 6x - 18$$

$$-9x^2 + 6x - 15$$

$$+ \quad - \quad +$$

$$-3$$

∴ Quotient = $4x - 3$ and remainder = -3

Question 6.

If the area of a rectangle is $8x^2 - 45y^2 + 18xy$ and one of its sides is $4x + 15y$, find the length of adjacent side.

Solution:

Area of rectangle = $8x^2 - 45y^2 + 18xy$

One side = $4x + 15y$

$\therefore$ Second (adjacent) side

$$\Rightarrow \frac{\text{Area}}{\text{One side}} = \frac{8x^2 - 45y^2 + 18xy}{4x + 15y} = 2x - 3y$$

$$\begin{array}{r l}
 & \underline{\;2x - 3y\;} \\
4x + 15y\,) & 8x^2 + 18xy - 45y^2 \;(\\
 & 8x^2 + 30xy \\
 & \underline{-\quad\;\; -\qquad\qquad\quad} \\
 & \quad -12xy - 45y^2 \\
 & \quad -12xy - 45y^2 \\
 & \quad \underline{+\qquad\quad +\quad} \\
 & \qquad\quad \underline{\;\times\;}
\end{array}$$