Division of Algebraic Expressions Ex 8.4 Q23

Answer :

(i)

$$\begin{array}{r} x-7 \\ x+6\overline{\smash{)}x^2-x-42} \\ x^2+6x \\ {-}\ \ {-} \\ \hline -7x-42 \\ -7x-42 \\ {+}\ \ \ {+} \\ \hline 0 \end{array}$$

Remainder is zero. Hence $(x+6)$ is a factor of x^2-x-42

(ii)

$$\begin{array}{r} x-3 \\ 4x-1\overline{\smash{)}4x^2-13x-12} \\ 4x^2-\ x \\ {-}\ \ {+} \\ \hline -12x-12 \\ -12x+3 \\ {+}\ \ \ {-} \\ \hline -15 \end{array}$$

As the remainder is non zero . Hence $(4x-1)$ is not a factor of $4x^2-13x-12$

(iii)

$$
\begin{array}{r}
2y^2 - 5y + \dfrac{5}{2} \\[4pt]
2y - 5\ \overline{)\ 4y^4 - 10y^3 - 10y^2 + 30y - 15} \\
4y^4 - 10y^3 \\
\underline{-\quad +\qquad\qquad\qquad} \\
-10y^2 + 30y - 15 \\
-10y^3 + 25y \\
\underline{+\qquad\quad -\qquad\qquad} \\
5y - 15 \\
5y - \dfrac{25}{2} \\
\underline{-\quad +\qquad\qquad} \\
-\dfrac{5}{2} \\
\underline{\qquad\qquad}
\end{array}
$$

∵ The remainder is non zero,

$2y - 5$ is not a factor of $4y^4 - 10y^3 - 10y^2 + 30y - 15$.

(iv)

$$
\begin{array}{r}
2y^3 + 5y^2 + 2y - \dfrac{21}{3} \\[4pt]
3y^2 + 5\ \overline{)\ 6y^5 + 15y^4 + 16y^3 + 4y^2 + 10y - 35} \\
6y^5 \qquad\quad + 10y^3 \\
\underline{-\qquad\qquad -\qquad\qquad} \\
15y^4 + 6y^3 + 4y^2 + 10y - 35 \\
15y^4 \qquad\quad + 25y^2 \\
\underline{-\qquad\qquad -\qquad\qquad} \\
6y^3 - 21y^2 + 10y - 35 \\
6y^3 \qquad\quad + 10y \\
\underline{-\qquad\qquad -\qquad\qquad} \\
-21y^2 - 35 \\
-21y^2 - \dfrac{105}{3} \\
\underline{+\qquad +\qquad} \\
0 \\
\underline{\qquad\qquad}
\end{array}
$$

Remainder is zero. Therefore, $3y^2 + 5$ is a factor of $6y^5 + 15y^4 + 16y^3 + 4y^2 + 10y - 35$.

(v)

$$
\begin{array}{r}
z^3 - 3z \\[4pt]
z^2 + 3\ \overline{)\ z^5 - 9z} \\
z^5 \qquad + 3z^3 \\
\underline{-\qquad\quad -\qquad} \\
-3z^3 - 9z \\
-3z^3 - 9z \\
\underline{+\qquad +\qquad} \\
0 \\
\underline{\qquad\qquad}
\end{array}
$$

Remainder is zero; therefore, $z^2 + 3$ is a factor of $z^5 - 9z$.

(vi)

$$
\begin{array}{r}
3x^3 + x^2 - 2x - 5 \\
2x^2 - x + 3 \overline{\smash{\big)}\; 6x^5 - x^4 + 4x^3 - 5x^2 - x - 15} \\
6x^5 - 3x^4 + 9x^3 \\
\underline{-+-} \\
2x^4 - 5x^3 - 5x^2 - x - 15 \\
2x^4 - x^3 + 3x^2 \\
\underline{-+-} \\
-4x^3 - 8x^2 - x - 15 \\
-4x^3 + 2x^2 - 6x \\
\underline{+-+} \\
-10x^2 + 5x - 15 \\
-10x^2 + 5x - 15 \\
\underline{+-+} \\
0
\end{array}
$$

Remainder is zero ; therefore, $2x^2 - x + 3$ is a factor of $6x^5 - x^4 + 4x^3 - 5x^2 - x - 15$.

********** END *********