Division of Algebraic Expressions Ex 8.4 Q23

Answer :

(i)

$$
\begin{array}{r l}
 & \quad\quad\quad x-7 \\
x+6 \,\big)\!\! & \overline{x^2 - x - 42} \\
 & x^2 + 6x \\
 & - \;\; - \\
\hline
 & \quad -7x - 42 \\
 & \quad -7x - 42 \\
 & \quad + \quad\; + \\
\hline
 & \quad\quad\quad 0
\end{array}
$$

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

(ii)

$$
\begin{array}{r l}
 & \quad\quad\quad\; x-3 \\
4x-1 \,\big)\!\! & \overline{4x^2 - 13x - 12} \\
 & 4x^2 - x \\
 & - \quad + \\
\hline
 & \quad -12x - 12 \\
 & \quad -12x + 3 \\
 & \quad + \quad\; - \\
\hline
 & \quad\quad\quad -15
\end{array}
$$

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

(iii)

$$
\begin{array}{r|l}
 & 2y^2 - 5y + \frac{5}{2} \\
\hline
2y - 5 & 4y^4 - 10y^3 - 10y^2 + 30y - 15 \\
 & 4y^4 - 10y^3 \\
 & - \quad + \\
\hline
 & -10y^2 + 30y - 15 \\
 & -10y^3 + 25y \\
 & + \quad - \\
\hline
 & 5y - 15 \\
 & 5y - \frac{25}{2} \\
 & - \quad + \\
\hline
 & -\frac{5}{2} \\
\hline
\end{array}
$$

∵ The remainder is non zero,
$2y - 5$ is not a factor of $4y^4 - 10y^3 - 10y^2 + 30y - 15$.

(iv)

$$
\begin{array}{r|l}
 & 2y^3 + 5y^2 + 2y - \frac{21}{3} \\
\hline
3y^2 + 5 & 6y^5 + 15y^4 + 16y^3 + 4y^2 + 10y - 35 \\
 & 6y^5 \quad + 10y^3 \\
 & - \quad - \\
\hline
 & 15y^4 + 6y^3 + 4y^2 + 10y - 35 \\
 & 15y^4 \quad + 25y^2 \\
 & - \quad - \\
\hline
 & 6y^3 - 21y^2 + 10y - 35 \\
 & 6y^3 \quad + 10y \\
 & - \quad - \\
\hline
 & -21y^2 - 35 \\
 & -21y^2 - \frac{105}{3} \\
 & + \quad + \\
\hline
 & 0 \\
\hline
\end{array}
$$

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

(v)

$$
\begin{array}{r|l}
 & z^3 - 3z \\
\hline
z^2 + 3 & z^5 - 9z \\
 & z^5 \quad + 3z^3 \\
 & - \quad - \\
\hline
 & -3z^3 - 9z \\
 & -3z^3 - 9z \\
 & + \quad + \\
\hline
 & 0 \\
\hline
\end{array}
$$

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

(vi)

$$
\begin{array}{r|l}
 & 3x^3 + x^2 - 2x - 5 \\
\hline
2x^2 - x + 3 & 6x^5 - x^4 + 4x^3 - 5x^2 - x - 15 \\
 & 6x^5 - 3x^4 + 9x^3 \\
 & - \quad + \quad - \\
\hline
 & \quad 2x^4 - 5x^3 - 5x^2 - x - 15 \\
 & \quad 2x^4 - x^3 + 3x^2 \\
 & \quad - \quad + \quad - \\
\hline
 & \qquad -4x^3 - 8x^2 - x - 15 \\
 & \qquad -4x^3 + 2x^2 - 6x \\
 & \qquad + \quad - \quad + \\
\hline
 & \qquad\quad -10x^2 + 5x - 15 \\
 & \qquad\quad -10x^2 + 5x - 15 \\
 & \qquad\quad + \quad - \quad + \\
\hline
 & \qquad\qquad 0 \\
\hline
\end{array}
$$

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

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