Operations On Algebraic Expressions
Ex 6C

Q1

Answer :

(i) 24x²y³ by 3xy

$$\frac{24x^2y^3}{3xy}$$

$$\Rightarrow \left(\frac{24}{3}\right)\left(x^{2-1}\right)\left(y^{3-1}\right)$$

$$\Rightarrow 8xy^2.$$

Therefore, the quotient is *8xy²*.

(ii) 36xyz² by −9xz

$$\frac{36xyz^2}{-9xz}$$

$$\Rightarrow \left(\frac{36}{-9}\right)\left(x^{1-1}\right)\left(y^{1-0}\right)\left(z^{2-1}\right)$$

$$\Rightarrow -4yz$$

Therefore, the quotient is *−4yz*.

(iii)

$$-72x^2y^2z \ by \ -12xyz$$

$$\frac{-72x^2y^2z}{-12xyz}$$

$$\Rightarrow \left(\frac{-72}{-12}\right)\left(x^{2-1}\right)\left(y^{2-1}\right)\left(z^{1-1}\right)$$

$$\Rightarrow 6xy$$

Therefore, the quotient is *6xy*.

(iv) −56mnp² by 7mnp

$$\frac{-56mnp^2}{7mnp}$$

$$\Rightarrow \left(\frac{-56}{7}\right)\left(m^{1-1}\right)\left(n^{1-1}\right)\left(p^{2-1}\right)$$

$$\Rightarrow -8p$$

Therefore, the quotient is *−8p*.

Q2

Answer :

(i) 5m³ − 30m² + 45m by 5m

$$\left(5m^3 - 30m^2 + 45m\right) \div 5m$$

$$\Rightarrow \frac{5m^3}{5m} - \frac{30m^2}{5m} + \frac{45m}{5m}$$

$$\Rightarrow m^2 - 6m + 9$$

Therefore, the quotient is *m² − 6m + 9*.

(ii) 8x²y² − 6xy² + 10x²y³ by 2xy

$$\left(8x^2y^2 - 6xy^2 + 10x^2y^3\right) \div 2xy$$

$$\Rightarrow \frac{8x^2y^2}{2xy} - \frac{6xy^2}{2xy} + \frac{10x^2y^3}{2xy}$$

$$\Rightarrow 4xy - 3y + 5xy^2$$

Therefore, the quotient is *4xy − 3y + 5xy²*.

(iii) $9x^2y - 6xy + 12xy^2$ by $-3xy$

$$\left(9x^2y - 6xy + 12xy^2\right) \div -3xy$$

$$\Rightarrow \frac{9x^2y}{-3xy} - \frac{6xy}{-3xy} + \frac{12xy^2}{-3xy}$$

$$\Rightarrow -3x + 2 - 4y$$

Therefore, the quotient is $-3x + 2 - 4y$.

(iv) $12x^4 + 8x^3 - 6x^2$ by $-2x^2$

Q3

Answer:

$(x^2 - 4x + 4) \div (x - 2)$

$$\left(12x^4 + 8x^3 - 6x^2\right) \div -2x^2 \quad {}^{-4x+3^2}$$

$$\Rightarrow \frac{12x^4}{-2x^2} + \frac{8x^3}{-2x^2} - \frac{6x^2}{-2x^2}$$

$$\Rightarrow -6x$$

$$
\begin{array}{r}
x - 2 \overline{\smash{\big)}\, x^2 - 4x + 4 \,\big(\, x - 2} \\
\underline{x^2 - 2x} \quad\quad\quad \\
-\ \ + \quad\quad\quad\quad\quad\quad \\
\underline{-2x + 4} \quad\quad \\
-2x + 4 \quad\quad \\
\underline{+ \quad -} \quad\quad \\
\times \quad\quad\quad
\end{array}
$$

Therefore the quotient is $-6x^2 - 4x + 3$.

Therefore, the quotient is $(x - 2)$ and the remainder is 0.

Q4

Answer:

$$
\begin{array}{r}
x + 2 \overline{\smash{\big)}\, x^2 - 4 \,\big(\, x - 2} \\
\underline{x^2 + 2x} \quad\quad\quad \\
-\ \ - \quad\quad\quad\quad\quad\quad \\
\underline{-2x - 4} \quad\quad \\
-2x - 4 \quad\quad \\
\underline{+ \quad +} \quad\quad \\
\times \quad\quad\quad
\end{array}
$$

Therefore, the quotient is $x-2$ and the remainder is 0.

Q5

Answer:

$(x^2 + 12x + 35)$ by $(x + 7)$

$$
\begin{array}{r}
x + 7 \overline{\smash{\big)}\, x^2 + 12x + 35 \,\big(\, x + 5} \\
\underline{x^2 + 7x} \quad\quad\quad\quad \\
-\ \ - \quad\quad\quad\quad\quad\quad\quad \\
\underline{5x + 35} \quad\quad \\
5x + 35 \quad\quad \\
\underline{- \quad -} \quad\quad \\
\times \quad\quad\quad
\end{array}
$$

Therefore, the quotient is $(x + 5)$ and the remainder is 0.

Answer:

$$
\begin{array}{r}
3x + 2 \overline{\smash{\big)}\, 15x^2 + x - 6 \,\big(\, 5x - 3} \\
\underline{15x^2 + 10x} \quad\quad\quad\quad \\
-\ \ - \quad\quad\quad\quad\quad\quad\quad \\
\underline{-9x - 6} \quad\quad \\
-9x - 6 \quad\quad \\
\underline{+ \quad +} \quad\quad \\
\times \quad\quad\quad
\end{array}
$$

Therefore, the quotient is $(5x - 3)$ and the remainder is 0.

Q7

Answer:

$$
\begin{array}{r}
7x - 9 \overline{\smash{\big)}\, 14x^2 - 53x + 45 \,\big(\, 2x - 5} \\
\underline{14x^2 - 18x} \quad\quad\quad\quad \\
-\ \ + \quad\quad\quad\quad\quad\quad\quad \\
\underline{-35x + 45} \quad\quad \\
-35x + 45 \quad\quad \\
\underline{+ \quad -} \quad\quad \\
\times \quad\quad\quad
\end{array}
$$

Therefore, the quotient is $(2x - 5)$ and the remainder is 0.

Q8

Answer :

$$
2x - 5 \overline{\smash{\big)}\ 6x^2 - 31x + 47} \ \big(\ 3x - 8 \\
 \underline{6x^2 - 15x} \\
 \;-\quad+ \\
 \qquad -16x + 47 \\
 \qquad \underline{-16x + 40} \\
 \qquad\; +\quad- \\
 \qquad\qquad 7
$$

Therefore, the quotient is $(3x - 8)$ and the remainder is 7.

Q9

Answer :

$$
2x + 3 \overline{\smash{\big)}\ 2x^3 + x^2 - 5x - 2} \ \big(\ x^2 - x - 1 \\
 \underline{2x^3 + 3x^2} \\
 \;-\quad- \\
 \qquad -2x^2 - 5x \\
 \qquad \underline{-2x^2 - 5x} \\
 \qquad\; +\quad+ \\
 \qquad\qquad -2x - 2 \\
 \qquad\qquad \underline{-2x - 3} \\
 \qquad\qquad\; +\quad+ \\
 \qquad\qquad\qquad 1
$$

Therefore, the quotient is $\left(x^2 - x - 1\right)$ and the remainder is 1.

Q10

Answer :

$$
x + 1 \overline{\smash{\big)}\ x^3 + 1} \ \big(\ x^2 - x + 1 \\
 \underline{x^3\quad + x^2} \\
 \;-\quad\; - \\
 \qquad -x^2 + 1 \\
 \qquad \underline{-x^2\quad -x} \\
 \qquad +\qquad + \\
 \qquad\qquad x + 1 \\
 \qquad\qquad \underline{x + 1} \\
 \qquad\qquad -\;\; - \\
 \qquad\qquad\quad 0
$$

Therefore, the quotient is x^2-x+1 and the remainder is 0.

Q11

Answer :

$$
x^2 + x + 1 \overline{\smash{\big)}\ x^4 - 2x^3 + 2x^2 + x + 4} \ \big(\ x^2 - 3x + 4 \\
 \underline{x^4 + x^3 + x^2} \\
 \;-\quad-\quad- \\
 \qquad -3x^3 + x^2 + x \\
 \qquad \underline{-3x^3 - 3x^2 - 3x} \\
 \qquad +\quad+\quad+ \\
 \qquad\qquad 4x^2 + 4x + 4 \\
 \qquad\qquad \underline{4x^2 + 4x + 4} \\
 \qquad\qquad -\quad-\quad- \\
 \qquad\qquad\qquad \times
$$

Therefore, the quotient is (x^2 - 3x + 4) and remainder is 0.

Q12

Answer :

$$
x^2 - 5x + 6 \overline{\smash{\big)}\ x^3 - 6x^2 + 11x - 6} \ \big(\ x - 1 \\
 \underline{x^3 - 5x^2 + 6x} \\
 \;-\quad+\quad- \\
 \qquad -1x^2 + 5x - 6 \\
 \qquad \underline{-1x^2 + 5x - 6} \\
 \qquad +\quad-\quad+ \\
 \qquad\qquad \times
$$

Therefore, the quotient is (x-1) and the remainder is 0.

Q13

Answer :

$$x^2 - 3x + 4 \overline{\smash{\big)}\, 5x^3 - 12x^2 + 12x + 13} \left(5x + 3 \right.$$
$$\underline{\quad 5x^3 - 15x^2 + 20x \quad}$$
$$\underline{- \quad + \quad -}$$
$$3x^2 - 8x + 13$$
$$3x^2 - 9x + 12$$
$$\underline{- \quad + \quad -}$$
$$x + 1$$

Therefore, the quotient is (5x+ 3) and the remainder is (x + 1).

Q14
Answer :

$$2x^2 - 3x + 5 \overline{\smash{\big)}\, 2x^3 - 5x^2 + 8x - 5} \left(x - 1 \right.$$
$$2x^3 - 3x^2 + 5x$$
$$\underline{- \quad + \quad -}$$
$$-2x^2 + 3x - 5$$
$$-2x^2 + 3x - 5$$
$$\underline{+ \quad - \quad +}$$
$$\times$$

Therefore, the quotient is (x-1) and the remainder is 0.

Q15
Answer :

$$2x^2 + x - 1 \overline{\smash{\big)}\, 8x^4 + 10x^3 - 5x^2 - 4x + 1} \left(4x^2 + 3x - 2 \right.$$
$$8x^4 + 4x^3 - 4x^2$$
$$\underline{- \quad - \quad +}$$
$$6x^3 - x^2 - 4x + 1$$
$$6x^3 + 3x^2 - 3x$$
$$\underline{- \quad - \quad +}$$
$$-4x^2 - x + 1$$
$$-4x^2 - 2x + 2$$
$$\underline{+ \quad + \quad -}$$
$$x - 1$$

Therefore, the quotient is ($4x^2$+ 3x -2) and the remainder is (x-1).