$= 2a + 3$

Using long division method :

$$
\begin{array}{r|l}
 & 2a+3 \\
\hline
a-6 & 2a^2-9a-18 \\
 & 2a^2-12a \\
 & \quad - \quad + \\
\hline
 & \quad\quad 3a-18 \\
 & \quad\quad 3a-18 \\
 & \quad\quad - \quad + \\
\hline
 & \quad\quad\quad \times
\end{array}
$$

Hence, $(2a^2 - 9a - 18) \div (a - 6) = 2a + 3$

Solution :

$$
\begin{array}{r|l}
 & 8x^2+16x+12 \\
\hline
2x^2-4x-12 & 16x^4+8x^2-6x+16 \\
 & 16x^4-32x^3+96x^2 \\
 & \quad - \quad + \quad - \\
\hline
 & \quad\quad 32x^3-88x^2-6x+16 \\
 & \quad\quad 32x^3-64x^2+192x \\
 & \quad\quad - \quad + \quad - \\
\hline
 & \quad\quad\quad -24x^2-198x+16 \\
 & \quad\quad\quad -24x^2+48x-144 \\
 & \quad\quad\quad + \quad - \quad + \\
\hline
 & \quad\quad\quad\quad -246x+160
\end{array}
$$

Hence, the quotient $= (8x^2 + 16x - 12)$ and the remainder $= (-246x + 160)$.

EXERCISE 14.3

1. Divide :

(a) a^{25} by a^{12} (b) x^3 by $-y^3$ (c) $27a^4$ by $-9a^3$

(d) $28mn^3r^2$ by $7mn^2r$ (e) $15x^2y^2$ by $5y$ (f) $-12t^5$ by $9st$

2. Divide :

(a) $32xy^2 - 16x^2y$ by $16xy$ (b) $x^5 - 7x^4 + 3x^3$ by x^2

(c) $-30a^6 - 6a^3$ by $-6a^3$ (d) $4a^3 - 16a^2 + 200a$ by $-4a$

(e) $18x^3 - 30x^2 + 48x$ by $6x$ (f) $14a^9b - 8a^3d$ by $2a^3$

3. Divide by the long division method :

(a) $(2a^3 - 7a^2 - 7a + 30)$ by $(2a - 5)$ (b) $(x^3 + 8x^2 - 3x - 24)$ by $(x + 8)$

(c) $(2x^3 + 7x^2 + 2x - 3)$ by $(2x - 1)$ (d) $(14x^2 - 5x - 24)$ by $(2x - 3)$

4. Using the long division method, prove that $(x+1)$ is a factor of $(x^3 + 1)$.

5. Check if $3m^3 - 6m^2 + 9m - 2^7$ is exactly divisible by $(m + 3)$ or not.

Key Ideas

- The process of writing the algebraic expression as a product of its factors is called factorisation.
- Algebraic expression can be factorised by :
  - Taking out common factors.