3.7 Answers

3.7.1 Solutions (3.3 Example)

$$
\begin{aligned}
f(x) &= \frac{x^3 + 4x^2 + 3}{x} \\
&= \frac{x^3}{x} + \frac{4x^2}{x} + \frac{3}{x} \\
&= x^2 + 4x + 3x^{-1} \\
\therefore f'(x) &= 2x + 4 - 3x^{-2} \\
&= 2x + 4 - \frac{3}{x^2}
\end{aligned}
$$

3.7.2 Solutions (3.6 Exercise)

Answer 1

$$\frac{x^2 - 7}{[(x-2)(x-3)]} = A + \frac{B}{(x-2)} + \frac{C}{(x-3)}$$

$$x^2 - 7 = A(x-2)(x-3) + B(x-3) + C(x-2)$$

Let $x = 2$: $\quad -3 = -B \qquad \therefore B = 3$

Let $x = 3$: $\quad 2 = C \qquad \therefore C = 2$

Let $x = 0$: $\quad -7 = 6A - 3B - 2C$

$$-7 = 6A - 9 - 4 \qquad \therefore A = 1$$

Thus

$$\frac{x^2 - 7}{(x-2)(x-3)} = 1 + \frac{3}{(x-2)} + \frac{2}{(x-3)}$$

Answer 2

$$\frac{2x^3+5}{[(x+1)(x+2)]} = Ax + B + \frac{C}{(x+1)} + \frac{D}{(x+2)}$$

$$2x^3 + 5 = (Ax + B)(x+1)(x+2) + C(x+2) + D(x+1)$$

Let $x = -2$ $\quad -11 = -D \quad \therefore D = 11$

Let $x = -1$ $\quad 3 = C \quad \therefore C = 3$

Let $x = 0$ $\quad 5 = 2B + 2C + D$

$5 = 2B + 6 + 11 \quad \therefore B = -6$

Let $x = 1$ $\quad 7 = (A + B)6 + 3C + 2D$

$7 = 6A - 36 + 9 + 22$

$12 = 6A \quad \therefore A = 2$

Thus

$$\frac{2x^3+5}{(x+1)(x+2)} = 2x - 6 + \frac{3}{(x+1)} + \frac{11}{(x+2)}$$

Answer 3

$$\frac{x^3+12x^2+3}{(x-1)(x+3)} = x + 10 + \frac{4}{(x-1)} - \frac{21}{(x+3)}$$

Answer 4

$$\frac{x^2+8x+4}{(x+5)(2x-1)} = \frac{1}{2} + \frac{1}{(x+5)} + \frac{3}{2(2x-1)}$$