

3. Determine each quotient, Q , using long division.

a) $(x^3 + 3x^2 - 3x - 2) \div (x - 1)$

b) $(x^3 + 2x^2 - 7x - 2) \div (x - 2)$

c) $(2w^3 + 3w^2 - 5w + 2) \div (w + 3)$

d) $(9m^3 - 6m^2 + 3m + 2) \div (m - 1)$

e) $(t^4 + 6t^3 - 3t^2 - t + 8) \div (t + 1)$

f) $(2y^4 - 3y^2 + 1) \div (y - 3)$

$$\begin{array}{r} x^2 + 4x + 1 \\ x-1 \overline{) x^3 + 3x^2 - 3x - 2} \\ \underline{-x^3 + x^2} \\ 4x^2 - 3x \\ \underline{-4x^2 + 4x} \\ x - 2 \\ \underline{-x + 1} \\ -1 \end{array}$$

$$x^2(x-1) = x^3 - x^2$$

$$4x(x-1) = 4x^2 - 4x$$

$$1(x-1) = x-1$$

$$(x^2 + 4x + 1) - \frac{1}{(x-1)}$$

Q

$$\begin{array}{r} x^2 + 4x + 1 \\ x-2 \overline{) x^3 + 2x^2 - 7x - 2} \\ \underline{-x^3 + 2x^2} \\ 4x^2 - 7x \\ \underline{-4x^2 + 8x} \\ x - 2 \\ \underline{-x + 2} \\ 0 \end{array}$$

$$x^2(x-2) = x^3 - 2x^2$$

$$4x(x-2) = 4x^2 - 8x$$

$$x^2 + 4x + 1$$

$$\begin{array}{r} 2w^2 - 3w + 4 \\ w+3 \overline{) 2w^3 + 3w^2 - 5w + 2} \\ \underline{-2w^3 - 6w^2} \\ -3w^2 - 5w \\ \underline{+3w^2 + 9w} \\ 4w + 2 \\ \underline{-4w - 12} \\ -10 \end{array}$$

$$2w^2(w+3) = 2w^3 + 6w^2$$

$$-3w(w+3) = -3w^2 - 9w$$

$$4(w+3) = 4w + 12$$

$$(2w^2 - 3w + 4) - \frac{10}{(w+3)}$$

answers

3. a) $Q(x) = x^2 + 4x + 1$ b) $Q(x) = x^2 + 4x + 1$
 c) $Q(w) = 2w^2 - 3w + 4$ d) $Q(m) = 9m^2 + 3m + 6$
 e) $Q(t) = t^3 + 5t^2 - 8t + 7$
 f) $Q(y) = 2y^3 + 6y^2 + 15y + 45$