Math Worksheet: Polynomial Division (2)

Find the remainder of each division.

A. \( \frac{x^3 - x + 2}{x - 2} = \frac{P(x)}{Q(x)} \)

Remainder Theorem:
remainder = \( P(2) = 2^3 - 2 + 2 = 8 \)

B. \( \frac{x^4 - x^3 + 2x^2 - x + 3}{-x + 3} = \frac{-x^4 + x^3 - 2x^2 + x - 3}{x - 3} = \frac{P(x)}{Q(x)} \)

Remainder Theorem:
remainder = \( P(3) = -72 \)

hence
\[
\frac{P(x)}{Q(x)} = \frac{-72}{x - 3} + W(x) = \frac{72}{-x + 3} + W(x)
\]
remainder = \( \frac{72}{-x + 3} \)

C. \( \frac{2x^2 - x + 3}{2x + 1} \)

= \( \frac{2(x^2 - \frac{x}{2} + \frac{3}{2})}{2(x + \frac{1}{2})} = \frac{x^2 - \frac{x}{2} + \frac{3}{2}}{x + \frac{1}{2}} = \frac{P(x)}{Q(x)} \)

Remainder Theorem:
remainder = \( P(-\frac{1}{2}) = 2 \)

hence
\[
\frac{P(x)}{Q(x)} = \frac{2}{x + \frac{1}{2}} + W(x)
\]
\[
= \frac{2 \cdot 2}{2(x + \frac{1}{2})} + W(x)
\]
\[
= \frac{4}{2x + 1} + W(x) ; \text{ remainder } = \frac{4}{2x + 1}
\]