Answer on Question #56451 – Math – Algebra

Question

1. Which of the following expressions is this one equivalent to?

4x^3 + 2x^2 + x + 3
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x + 2

A: 4x^3 – 6x + 13 + 23/x + 2

B: 4x^2 – 6x + 13 – 23/x + 2

C: 4x – 6 + 13/x + 2

D: 4x^2 + 13 – 2/x + 2

Solution

$$
\begin{array}{l|l}
4x^3 + 2x^2 + x + 3 & x + 2 \\
\underline{4x^3 + 8x^2} & \underline{4x^2} \\
\quad - 6x^2 + x + 3 & \square
\end{array}
$$

$$
\begin{array}{l|l}
4x^3 + 2x^2 + x + 3 & x + 2 \\
\underline{4x^3 + 8x^2} & \underline{4x^2 - 6x} \\
\quad - 6x^2 + x + 3 & \\
\quad \underline{- 6x^2 - 12x} & \\
\qquad 13x + 3 & \square
\end{array}
$$

$$
\begin{array}{l|l}
4x^3 + 2x^2 + x + 3 & x + 2 \\
\underline{4x^3 + 8x^2} & \underline{4x^2 - 6x + 13} \\
\quad - 6x^2 + x + 3 & \\
\quad \underline{- 6x^2 - 12x} & \\
\qquad 13x + 3 & \\
\qquad \underline{13x + 26} & \\
\qquad\quad - 23 & \square
\end{array}
$$

Answer: 1. B: $4x^2 - 6x + 13 - 23/(x + 2)$.

Question

2. Which of the following expressions is this one equivalent to?
(x^4 -2x^3 + x – 2) divided by (x^3 + 1)

A: x^2 – x + 1

B: x^2 + 1

C: x^2 + 3x + 2

D: x – 2

Solution

$$
\begin{array}{l|l}
x^4 - 2x^3 + x - 2 & x^3 + 1 \\
\cline{2-2}
x^4 + x & x \\
\hline
\quad - 2x^3 - 2 & \boxed{}
\end{array}
$$

$$
\begin{array}{l|l}
x^4 - 2x^3 + x - 2 & x^3 + 1 \\
\cline{2-2}
x^4 + x & x - 2 \\
\cline{1-1}
\quad - 2x^3 - 2 & \\
\quad - 2x^3 - 2 & \\
\hline
\quad 0 & \boxed{}
\end{array}
$$

Answer: 2. D: x-2

3. What is the remainder when x^2 + 3 is divided by x -1 ?
Answer _____

Solution

Method 1

When x^2 + 3 is divided by x -1, the remainder is $f(1) = 1^2 + 3 = 4$.

Method 2

$$\begin{array}{r|l} x^2 + 3 & x - 1 \\ \cline{2-2} x^2 - x & x \\ \cline{1-1} \quad x + 3 & \square \end{array}$$

$$\begin{array}{r|l} x^2 + 3 & x - 1 \\ \cline{2-2} x^2 - x & x + 1 \\ \cline{1-1} \quad x + 3 & \\ \quad x - 1 & \\ \cline{1-1} \quad 4 & \square \end{array}$$

Answer: 4.

Question

4. Evaluate f(1) using substitution: f(x) = 2x^3 – 3x^2 – 18x + 8
Answer: _____

Solution

$$f(1) = 2 \cdot 1^3 - 3 \cdot 1^2 - 18 \cdot 1 + 8 = -11$$

Answer: -11.