

Algebra II

8-3

Dividing Polynomials

Divide.

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

Even though we can factor the numerator, none of the factors reduce. We need to find another way to divide these.

The Division Algorithm -

$$17 \overline{)2347} \quad 138 \frac{1}{17}$$

$$\begin{array}{r} 138 \\ 17 \overline{)2347} \\ \underline{-17} \\ 64 \\ \underline{-51} \\ 137 \\ \underline{-136} \\ 1 \end{array}$$

Divide.

$$1) \frac{x^2 + 3x - 4}{x + 2} = \boxed{x + 1 - \frac{6}{x+2}}$$

$$\begin{array}{r} x+1 \\ x+2 \overline{)x^2+3x-4} \\ \underline{-x^2+2x} \\ 1x-4 \\ \underline{-x+2} \\ -6 \end{array}$$

$$17 \overline{)2347} \frac{138}{17}$$

$$\begin{array}{r} 138 \frac{1}{17} \\ 17 \overline{)2347} \\ \underline{-17} \\ 64 \\ \underline{-51} \\ 137 \\ \underline{-136} \\ 1 \end{array}$$

$$9) \frac{2s^3 - 29s + 13}{s + 4}$$

$$\begin{array}{r} 2x^2 - 8x + 3 \\ x+4 \overline{)2x^3+0x^2-29x+13} \\ \underline{-2x^3+8x^2} \\ -8x^2-29x \\ \underline{+8x^2+32x} \\ 3x+13 \\ \underline{-3x+12} \\ 1 \end{array}$$

$$17 \overline{)2347} \frac{138}{17}$$

$$\begin{array}{r} 138 \frac{1}{17} \\ 17 \overline{)2347} \\ \underline{-17} \\ 64 \\ \underline{-51} \\ 137 \\ \underline{-136} \\ 1 \end{array}$$

$$\boxed{2x^2 - 8x + 3 + \frac{1}{x+4}}$$

$$25) \frac{x^4 + a^4}{x^2 + a^2}$$

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

$$17 \overline{)2347} \frac{138}{17}$$

$$\begin{array}{r} 138 \frac{1}{17} \\ 17 \overline{)2347} \\ \underline{-17} \\ 64 \\ \underline{-51} \\ 137 \\ \underline{-136} \\ 1 \end{array}$$

$$\boxed{x^2 - a^2 + \frac{2a^4}{x^2 + a^2}}$$

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