

Warm-up

Work Book: Page 12

$$\textcircled{1} (36x^2y^4 + 27x^3y^2 - 9x^2y^2) \div 9x^2y$$

$$\frac{36x^2y^4 + 27x^3y^2 - 9x^2y^2}{9x^2y}$$

Question 1

$$4y^3 + 3xy - y$$

$$\textcircled{2} (3x+6)^2 \div 3x$$

$$(3x+6)(3x+6) \div 3x = (9x^2 + 36x + 36) \div 3x$$

$$\frac{9x^2 + 36x + 36}{3x} = 3x - 12 + 12x^{-1} \quad x^{-1}$$

$$= 3x - 12 + \frac{12}{x}$$

Division of Polynomials

To divide polynomials, we have to use **long division**.

Recall:

$$\begin{array}{r} 56 \\ \underline{42} \overline{) 2388} \\ \underline{-210} \\ \hline 288 \\ \underline{-252} \\ \hline 36 \end{array}$$

56 r 36

Answer: $\boxed{56 \frac{36}{42}}$ or $56 \frac{6}{7}$

Examples:

$$\begin{array}{r}
 \overline{) 5962} \\
 \underline{-36} \\
 236 \\
 \underline{-216} \\
 202 \\
 \underline{-180} \\
 22
 \end{array}$$

Answer: $165 \frac{22}{36}$ & $165 \frac{11}{18}$

$$\begin{array}{r}
 \overline{) 75915} \\
 \underline{-723} \\
 361 \\
 \underline{-241} \\
 1205 \\
 \underline{-1205} \\
 0
 \end{array}$$

Answer: 315

We use this method to divide...

$$\begin{array}{r}
 2x + 3 \\
 \hline
 \underline{3x - 2} \overline{) 6x^2 + 5x - 4} \\
 \underline{-(6x^2 - 4x)} \\
 \hline
 9x - 4 \\
 \underline{-(9x - 6)} \\
 \hline
 2
 \end{array}$$

$\frac{9x}{3x} = 3$

Answer: $2x + 3 + \frac{2}{3x - 2}$

$$\begin{aligned} \text{Divide: } & -6x \div 2x = -3 \quad \left\{ \begin{array}{l} -4x^2 \div 2x \\ = -2x \end{array} \right. \end{aligned}$$

$$2x^3 \div 2x = 1x^2$$

$$\begin{array}{r} x^2 - 2x - 3 \\ 2x+1 \overline{) 2x^3 - 3x^2 - 8x - 3} \\ \underline{-(2x^3 + x^2)} \\ -4x^2 - 8x \\ \underline{-(-4x^2 - 2x)} \\ -6x - 3 \\ \underline{-(-6x - 3)} \\ 0 \end{array}$$

Answer: $x^2 - 2x - 3$

$$\begin{array}{r} x^2 + 5x + 6 \\ x-2 \overline{) x^3 + 3x^2 - 4x - 12} \\ \underline{-(x^3 - 2x^2)} \\ 5x^2 - 4x \\ \underline{-(5x^2 - 10x)} \\ 6x - 12 \\ \underline{-(6x - 12)} \\ 0 \end{array}$$

Answer: $x^2 + 5x + 6$