

Warm-up

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

$$(3x+6)(3x+6) \div 3x$$

Work Book: Page 12

Question 1

$$(9x^2 + 36x + 36) \div 3x \quad 36x^0$$

OR

$$\frac{9x^2 + 36x + 36}{3x}$$

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

$$3x + 12 + 12x^{-1}$$

$$x^{-1} = \frac{1}{x}$$

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

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

OR

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

Division of Polynomials

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

Recall:

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

$$\underline{56 \text{ R } 36}$$

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

Examples:

$$\begin{array}{r}
 165 \\
 36 \overline{) 5962} \\
 \underline{-36} \\
 236 \\
 \underline{-216} \\
 202 \\
 \underline{-180} \\
 22
 \end{array}$$

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

$$\begin{array}{r}
 315 \\
 241 \overline{) 75915} \\
 \underline{-723} \\
 361 \\
 \underline{-241} \\
 1205 \\
 \underline{-1205} \\
 0
 \end{array}$$

Answer: 315

We use this method to divide...

$$\frac{6x^2}{3x} = 2x$$

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

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

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

Divide:

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

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

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

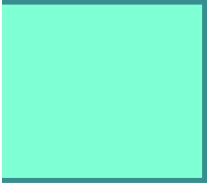
Answer: $x^2 + 5x + 6$

Example: Is $x+2$ a factor of $3x^3 + 10x^2 + x - 14$?

To find out, divide...

$$\begin{array}{r}
 3x^2 + 4x - 7 \\
 \hline
 x+2 \overline{) 3x^3 + 10x^2 + x - 14} \\
 \underline{-(3x^3 + 6x^2)} \\
 4x^2 + x \\
 \underline{-(4x^2 + 8x)} \\
 -7x - 14 \\
 \underline{-(7x + 14)} \\
 0
 \end{array}$$

If the remainder is 0,
it is a factor.



yes, $x+2$ is a factor.