Warm-up

Work Book: Page 12

Question 1

① $\left(36x^2y^4 + 27x^3y^2 - 9x^2y^2\right) \div 9x^2y$

$4y^3 + 3xy - y$

OR

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

② $(3x+6)^2 \div 3x$

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

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

OR

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

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

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

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

$36x^0$

Division of Polynomials

To divide polynomials, we have to use long division.

Recall:

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

Remainder

56 R 36

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

Examples:

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

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

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

Answer: 315

We use this method to divide...

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

$$3x-2\overline{)6x^2+5x-4}$$

$2x + 3$

$-(6x^2 - 4x)$

$9x - 4$

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

$-(9x - 6)$

2

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

Divide:

a) $(2x^3 - 3x^2 - 8x - 3) \div (2x + 1)$

$x^2 - 2x - 3$

$2x+1 \overline{)\,2x^3 - 3x^2 - 8x - 3}$

$-(2x^3 + x^2)$

$-4x^2 - 8x$

$-(-4x^2 - 2x)$

$-6x - 3$

$-(-6x - 3)$

0

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

b) $(x^3 + 3x^2 - 4x - 12) \div (x - 2)$

$x^2 + 5x + 6$

$x-2 \overline{)\,x^3 + 3x^2 - 4x - 12}$

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

$5x^2 - 4x$

$\frac{5x^2}{x} = 5x$ $-(5x^2 - 10x)$

$6x - 12$

$\frac{6x}{x} = 6$ $-(6x - 12)$

0

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

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

To find out, divide... $x+2\overline{)3x^3+10x^2+x-14}$

$3x^2+4x-7$

$-(3x^3+6x^2)$

$4x^2+x$

$-(4x^2+8x)$

$-7x-14$

$-(-7x-14)$

0

If the remainder is 0, it is a factor.

Yes, $x+2$ is a factor.