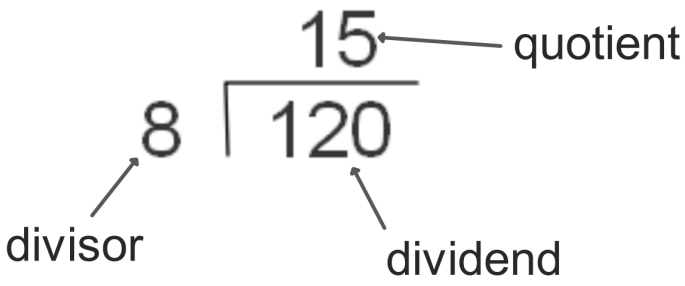
Vocabulary used when doing division:




Ways to leave a remainder.

$$\frac{2x^3 - 7x^2 + x - 9}{x + 3} = 2x^2 - 13x + 40 \qquad R = -129$$

$$\frac{2x^3 - 7x^2 + x - 9}{x + 3} = 2x^2 - 13x + 40 - \frac{129}{x+3}$$

What must be true for a number to be a factor of another number?

There must be NO remainder when they are divided.

Is $x + 4$ a factor of $2x^3 - 12x^2 + 8x - 20$

No, the remainder isn't zero!

$$\begin{array}{r|l} x+4 & 2x^2 - 20x + 88 \\ & 2x^3 - 12x^2 + 8x - 20 \\ & -2x^3 + 8x^2 \\ \hline & \quad -20x^2 + 8x \\ & \quad -20x^2 - 80x \\ \hline & \qquad 88x - 20 \\ & \qquad 88x + 352 \\ \hline & \qquad\quad -372 \end{array}$$

Is x+1 a factor of $3x^3 - x^2 + 5x - 9$ ?

No, the remainder isn't zero!

$$\begin{array}{r|l} x+1 & 3x^2 - 4x + 9 \\ & 3x^3 - x^2 + 5x - 9 \\ & -3x^3 + 3x^2 \\ \hline & \quad -4x^2 + 5x \\ & \quad -4x^2 - 4x \\ \hline & \qquad 9x - 9 \\ & \qquad -9x + 9 \\ \hline & \qquad\quad -18 \end{array}$$

Find this quotient.

$$\frac{x^5 - 9x^4 - 3x^3 + 28x^2 - 13x + 7}{x - 9}$$

$x^4 - 3x^2 + x - 4$ R $= -29$

$x - 9 \overline{)\, x^5 - 9x^4 - 3x^3 + 28x^2 - 13x + 7}$

$-(x^5 - 9x^4)$

$-3x^3 + 28x^2$

$-(-3x^3 + 27x^2)$

$x^2 - 13x$

$-(x^2 - 9x)$

$-4x + 7$

$-(-4x + 36)$

$-29$

Find this quotient.

$$\frac{6x^4 + 20x^3 - 17x^2 + 66x - 24}{3x^2 - 2x + 7}$$

$2x^2 + 8x - 5$ R $= 11$

$3x^2 - 2x + 7 \overline{)\, 6x^4 + 20x^3 - 17x^2 + 66x - 24}$

$-(6x^4 - 4x^3 + 14x^2)$

$24x^3 - 31x^2 + 66x$

$-(24x^3 - 16x^2 + 56x)$

$-15x^2 + 10x - 24$

$-(-15x^2 + 10x - 35)$

$11$

Find this quotient.

$$\frac{6x^5 + x^4 + 8x^3 + 5x^2 - 30x + 6}{x^2 + 3}$$

$x^2 + 0x + 3$ $\quad 6x^3 + x^2 - 10x + 2$

$x^2 + 3 \overline{)\, 6x^5 + x^4 + 8x^3 + 5x^2 - 30x + 6}$

$-(6x^5 + 0x^4 + 18x^3)$

$x^4 - 10x^3 + 5x^2$

$-(x^4 + 0x^3 + 3x^2)$

$-10x^3 + 2x^2 - 30x$

$-(-10x^3 + 0x^2 - 30x)$

$2x^2 + 0x + 6$

$-(2x^2 + 0x + 6)$

$0$

You can now finish Hwk #29 Sec 6-3

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Problems 3, 4, 8-10, 38, 41