Questions on polynomial long division from Lesson 6.2?

No quiz today, but we need to take our first Illuminate interim assessment.

$$\frac{s}{\sqrt{n}} \qquad \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

Feb 27-8:47 AM

$$(35n^3 + 7n^2 + 25n) \div (5n + 1)$$

$5\left(n+\frac{1}{5}\right)$

$$\begin{array}{r} 7n^2 \qquad\quad +5 \\ 5n+1 \overline{) \, 35n^3 + 7n^2 + 25n + 0} \\ -(35n^3 + 7n^2) \qquad\qquad \\ \hline 0 + 25n + 0 \\ -(25n + 5) \\ \hline -5 \end{array}$$

$-\frac{1}{5}$

Answer: $7n^2 + 5 - \frac{5}{5n+1}$

$$(x^3 + 5x^2 - 55x - 42) \div (x + 10)$$

$$\begin{array}{r} x^2 - 5x - 5 \\ x+10 \overline{) \, x^3 + 5x^2 - 55x - 42} \\ -(x^3 + 10x^2) \qquad\qquad \\ \hline -5x^2 - 55x - 42 \\ -(-5x^2 - 50x) \qquad \\ \hline -5x - 42 \\ -(-5x - 50) \\ \hline \boxed{8} \end{array}$$

Answer: $x^2 - 5x - 5 + \frac{8}{x+10}$

$$(k^4 - 4k^3 + 3k - 15) \div (k - 4)$$

$$\begin{array}{r} k^3 \qquad\qquad\qquad +3 \\ k-4 \overline{) \, k^4 - 4k^3 + 0k^2 + 3k - 15} \\ -(k^4 - 4k^3) \qquad\qquad\qquad \\ \hline 0k^2 + 3k - 15 \\ -(3k - 12) \\ \hline \boxed{-3} \end{array}$$

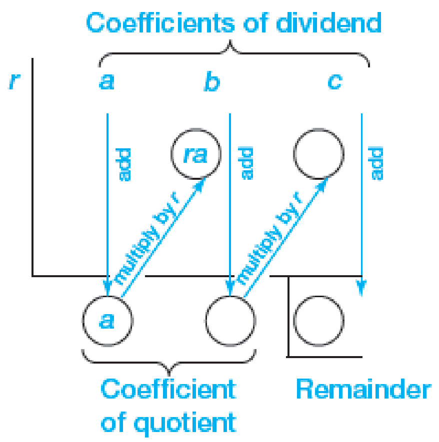
Answer: $k^3 + 3 - \frac{3}{k-4}$

pg.443 in your book.

Although dividing polynomials through long division is analogous to integer long division, it can still be inefficient and time consuming. Synthetic division is a shortcut method for dividing a polynomial by a linear factor of the form $(x - r)$. This method requires fewer calculations and less writing by representing the polynomial and the linear factor as a set of numeric values. After the values are processed, you can then use the numeric outputs to construct the quotient and the remainder.

pg.444 in your book.

To use synthetic division to divide a polynomial $ax^2 + bx + c$ by a linear factor $x - r$, follow this pattern.



You can use synthetic division in place of the standard long division algorithm to determine the quotient for $(2x^2 - 3x - 9) \div (x - 3)$.

Long Division	Synthetic Division
$$\begin{array}{r} 2x + 3 \\ x - 3\overline{)2x^2 - 3x - 9} \\ \underline{2x^2 - 6x} \\ 3x - 9 \\ \underline{3x - 9} \\ 0 \end{array}$$	$r = 3$ $$\begin{array}{r\|rrr} 3 & 2 & -3 & -9 \\ & & 6 & 9 \\ \hline & 2 & 3 & \boxed{0} \end{array}$$ add, multiply by r

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

$2x^2 - 3x - 9 =$
$(x-3)(2x+3)$

Answer:
$2x+3$

$$\begin{array}{r|rrr} 3 & 2 & -3 & -9 \\ & \downarrow & 6 & 9 \\ \hline & 2 & 3 & \boxed{0} \end{array}$$

Remainder

$$\left(k^3 - 12k^2 + 21k + 6\right) \div \left(k - 2\right)$$

$$\begin{array}{r|rrrr} 2 & 1 & -12 & 21 & 6 \\ & \downarrow & 2 & -20 & 2 \\ \hline & 1 & -10 & 1 & \boxed{8} \end{array}$$

Answer: $k^2 - 10k + 1 + \dfrac{8}{k-2}$

$$\begin{array}{r} k^2 - 10k + 1 \\ k-2 \overline{\big)\, \cancel{k^3} - 12k^2 + 21k + 6} \\ -(\cancel{k^3} - 2k^2) \downarrow \quad \downarrow \\ \hline -\cancel{10k^2} + 21k + 6 \\ -(-\cancel{10}k^2 + 20k) \downarrow \\ \hline \cancel{k} + 6 \\ -(\cancel{k} - 2) \\ \hline 8 \end{array}$$

$$\boxed{k^2 - 10k + 1 + \frac{8}{k-2}}$$

$$\left(r^4 - 2r^3 - 10r^2 - 3\right) \div \left(r + 1\right)$$

$$\left(6x^5 - 2x^4 - 4x^3 - 10x + 19\right) \div \left(x - 1\right)$$

$$\left(9r^5 - 33r^4 + 12r^3 + 22r^2 - 19r + 31\right) \div \left(r - 3\right)$$

Nov 23-12:43 PM

Homework
Finish Lesson 6.2