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

c. $(8x^4-16x^3+16x^2-27x+18)\div(2x-3)$

$$\begin{array}{r|rrrrr} \frac{3}{2} & 8 & -16 & 16 & -27 & 18 \\ & \downarrow & 12 & -6 & 15 & -18 \\ \hline & 8 & -4 & 10 & -12 & 0 \end{array}$$

? $(2x-3)(8x^3-4x^2+10x-12)$?

$(x-\frac{3}{2})(8x^3-4x^2+10x-12)$

$(2x-3)(4x^3-2x^2+5x-6)$

$\boxed{4x^3-2x^2+5x-6}$; $x\neq 3/2$

d. $(15x^4-x^3-11x^2+17x+9)\div(5x+3)$

$$\begin{array}{r|rrrrr} \frac{-3}{5} & 15 & -1 & -11 & 17 & 9 \\ & \downarrow & -9 & 6 & 3 & -12 \\ \hline & 15 & -10 & -5 & 20 & -3 \end{array}$$

$\boxed{3x^3-2x^2-x+4+\frac{-3}{5x+3}}$

$(5x+3)(3x^3-2x^2-x+4)-3$ Factored form

Example 3:

a. Use synthetic ~~substitution~~ division to evaluate the function.

$f(-2)$ for $f(x)=x^4-3x^3+7x^2-20$

Remainder th.

$f(-2)=(-2)^4-3(-2)^3+7(-2)^2-20$
$=48$

Synthetic ÷

$$\begin{array}{r|rrrrr} -2 & 1 & -3 & 7 & 0 & -20 \\ & \downarrow & -2 & 10 & -34 & 68 \\ \hline & 1 & -5 & 17 & -34 & 48 \end{array}$$

b. Determine k so that $g(x)=2x^3+5x^2+kx-16$ has $x-2$ as a factor.

$$\begin{array}{r|rrrr} 2 & 2 & 5 & K & -16 \\ & \downarrow & 4 & 18 & 2K+36 \\ \hline & 2 & 9 & K+18 & \boxed{2K+20} \end{array}$$

$2K+20=0$
$K=-10$

OR

$2(2)^3+5(2)^2+K(2)-16=0$

$\cancel{16}+20+2K=\cancel{16}$

$K=-10$

We will now do ~~p.159-161~~ #7, 13, 19, 25, 45(a,b), 69, 84 (see below) as classwork. It is due IN CLASS.

7. Use long division to divide $(4x^3-7x^2-11x+5)\div(4x+5)$.

13. Use long division to divide $(6x^3+10x^2+x+8)\div(2x^2+1)$.

19. Use synthetic division to divide $(3x^3-17x^2+15x-25)\div(x-5)$.

25. Use synthetic division to divide $(5x^3-6x^2+8)\div(x-4)$.

45. Use synthetic division to find each function value. $f(x)=4x^3-13x+10$.

a. $f(1)$

b. $f(-2)$

69. Simplify the rational expression $\dfrac{4x^3-8x^2+x+3}{2x-3}$ by using long division or synthetic division.

84. Find the constant c such that the denominator will divide evenly into the numerator for the rational expression $\dfrac{x^3+4x^2-3x+c}{x-5}$.

2.3 Answers

(7) $\boxed{x^2 - 3x + 1;\ x \neq -5/4}$

(13)

$$
\begin{array}{r|l}
 & \quad 3x + 5 \\
\hline
2x^2 + 0x + 1 & 6x^3 + 10x^2 + x + 8 \\
 & -6x^3 + -0x^2 + -3x \\
\hline
 & \quad 10x^2 - 2x + 8 \\
 & \quad 10x^2 \ 70x \ 75 \\
\hline
 & \quad -2x + 3
\end{array}
$$

$2x^2 + 1 \neq 0$
No restrictions

$$\boxed{3x + 5 + \frac{-2x+3}{2x^2+1}}$$

(19) $\boxed{5}$

3	-17	15	-25
↓	15	-10	25
3	-2	5	$\boxed{0}$

$\boxed{3x^2 - 2x + 5;\ x \neq 5}$

(25) $\boxed{4}$

5	-6	0	8
↓	20	56	224
5	14	56	232

$$\boxed{5x^2 + 14x + 56 + \frac{232}{x-4};\ x \neq 4}$$

(45) a) $f(1) = 1$ b) $f(-2) = 4$

(69) $2x^2 - x - 1$; $x \neq 3/2$

(84) $(5)^3 + 4(5)^2 - 3(5) + C = 0$

$125 + 100 - 15 + C = 0$

$C = -210$

(or)

$$\begin{array}{r|rrrr} 5 & 1 & 4 & -3 & C \\ & \downarrow & 5 & 45 & 210 \\ \hline & 1 & 9 & 42 & 0 \end{array}$$

$C = -210$