Section 6.1: cont'd

example: give the domain of $\dfrac{y}{x^2-4}$

denom is zero when $x^2 - 4 = 0$

$$(x-2)(x+2) = 0$$

$$x = \pm 2$$

domain: $\{x \mid x \neq 2 \text{ and } x \neq -2\}$

$$(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$$

---

find the domain of $\dfrac{3x-2}{x - x^3}$

$$x - x^3 = 0$$
$$x(1 - x^2) = 0$$
$$x(1-x)(1+x) = 0$$
$$x = 0, 1, -1$$

domain: $\{x \mid x \neq -1 \text{ and } x \neq 0 \text{ and } x \neq 1\}$

$$(-\infty, -1) \cup (-1, 0) \cup (0, 1) \cup (1, \infty)$$

-1   0   1

reducing to lowest terms:

$$\frac{3m^2 + 6m}{9m} = \frac{3m(m+2)}{3 \cdot 9m} = \frac{m+2}{3}$$

note: $\frac{m+3}{3} = \frac{m}{3} + 1$

$$\frac{\overset{4}{\cancel{36}} \, y^3 \, z^8}{\underset{6}{\cancel{54}} \, y^2 \, z^9} = \frac{2y}{3z}$$

$$\frac{2m - 2n}{4n - 4m} = \frac{2(m-n)}{4(n-m)} = \frac{-2(n-m)}{4(n-m)} = \frac{-1}{2}$$

_____

$$\frac{9x^2 - 15x - 6}{81x^2 - 9}$$

$$\frac{3(3x+1)(x-2)}{3 \cdot 9(3x-1)(3x+1)}$$

$$\frac{x-2}{3(3x-1)}$$
or $\frac{x-2}{9x-3}$ $\Big\}$ either

factor num:
$9x^2 - 15x - 6$
$3(3x^2 - 5x - 2)$
$3(3x^2 - 6x + x - 2)$
$3[3x(x-2) + (x-2)]$
$3(3x+1)(x-2)$

$ac = -6$
$+1 \quad -6$
$2 \quad 3$

factor denom:
$81x^2 - 9$
$9(9x^2 - 1)$
$9(3x-1)(3x+1)$

method: to reduce rational expressions to lowest terms, factor everything and hope stuff cancels

$$\frac{3m^2 + 3mn + m + n}{}$$

factor num:

$$\overline{12m^2 - 5m - 3}$$

$$\frac{(3m+1)(m+n)}{(3m+1)(4m-3)}$$

$$\frac{m+n}{4m-3}$$

$3m^2 + 3mn + m + n$

$3m(m+n) + (m+n)$

$(3m+1)(m+n)$

factor denom:

$12m^2 - 5m - 3$

$12m^2 - 9m + 4m - 3$

$3m(4m-3) + (4m-3)$

$(3m+1)(4m-3)$

$ac = -36$

1	36
2	18
3	12
4	-9