ALGEBRA II
HOMEWORK #1-11
SOLVING RATIONAL EQUATIONS

1) Solve each of the following equations for x.

(a) $\frac{x+10}{2} - \frac{13}{x+1} = \frac{11}{3}$

LCD = $6(x+1)$

$3(x+1)(x+10) - 78 = 22$

$(3x+3)(x+10) - 78 = 22(x+1)$

$3x^2 + 30x + 3x + 30 - 78 = 22x + 22$

$3x^2 + 33x - 48 = 22x + 22$

$3x^2 + 11x - 70 = 0$ (M: -210, A: 11)

$3x^2 + 21x - 10x - 70 = 0$

$3x(x+7) - 10(x+7) = 0$

$(x+7)(3x-10) = 0$

$x = -7$ | $3x = 10$, $x = \frac{10}{3}$

(b) $\frac{x+1}{x-5} + \frac{2}{x-6} = \frac{2}{x^2 - 11x + 30}$

$(x-5)(x-6)$

$(x-6)(x+1) + 2(x-5) = 2$

$x^2 + x - 6x - 6 + 2x - 10 = 2$

$x^2 - 3x - 16 = 2$

$x^2 - 3x - 18 = 0$

$(x+3)(x-6) = 0$

$x = -3$ | $x = 6$ Reject ↳ Makes denominator zero (undefined)

2) Which binomial is *not* a factor of the expression $x^3 + 3x^2 - 28x - 60$?

(1) $x + 6$ ($x = -6$)

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

(3) $x + 3$ ($x = -3$)

(4) $x - 5$ ($x = 5$)

$(-6)^3 + 3(-6)^2 - 28(-6) - 60 = 0$

$(-2)^3 + 3(-2)^2 - 28(-2) - 60 = 0$

$(-3)^3 + 3(-3)^2 - 28(-3) - 60 = 24$

$(5)^3 + 3(5)^2 - 28(5) - 60 = 0$

3) If $f(x)=2-x^2$ and $g(x)=x-4$, then which statement is *not* true?

(1) $f(x)\bullet g(x)=-x^3+4x^2+2x-8$

(2) $f(x)+g(x)=-x^2+x-2$

(3) $f(x)-g(x)=-x^2-x+6$

(4) $\dfrac{f(x)}{g(x)}=-x^2-4x+\dfrac{14}{x-4}$

(1) $(2-x^2)(x-4)$
$2x-8-x^3+4x^2$
$-x^3+4x^2+2x-8$ ✓

(2) $2-x^2+x-4$ ✓
$-x^2+x-2$

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

(4)
$$\begin{array}{r|l} x-4 & -x^3+0x+2 \\ & +x^3-4x^2 \\ \hline & -4x^2+2 \\ & +4x^2-16 \\ \hline & -14 \end{array}$$
$-x-4$

4) Which factorization is *incorrect*?

(1) $25k^2-64=(5k-8)(5k+8)$

(2) $m^3-3m+2=(m-1)^2(m+2)$

(3) $8a^3-b^3=(2a-b)(4a^2-2ab+b^2)$ ← wrong signs

(4) $6t^2+t-2=(3t+2)(2t-1)$

5) Divide $3x^3+4x+11$ by x^2-3x+2 and express your answer in $q(x)+\dfrac{r(x)}{b(x)}$ form.

← missing a term!

$$\begin{array}{r|l} x^2-3x+2 & 3x+9 \\ & 3x^3+0x^2+4x+11 \\ & -3x^3+9x^2-6x \\ \hline & 9x^2-2x+11 \\ & -9x^2+27x-18 \\ \hline & 25x-7 \end{array}$$

$$3x+9+\frac{25x-7}{x^2-3x+2}$$

Self-Reflection...

☐ I got	☐ I almost got it...	☐ I need more practice...	☐ I don't get it... Help!