1. Solve $4x^3 - x^2 - 4x + 1 = 0$ for all value(s) of x.

$x^2(4x-1) - 1(4x-1) = 0$

$(4x-1)(x^2-1) = 0$

$(4x-1)(x+1)(x-1) = 0$

$x = \frac{1}{4} \quad | \quad x = -1 \quad | \quad x = 1$

2. Find the roots of the polynomial equation $x^5 - 10x^3 + 9x = 0$.

$x(x^4 - 10x^2 + 9) = 0$

$x(x^2 - 9)(x^2 - 1) = 0$

$x(x+3)(x-3)(x+1)(x-1) = 0$

$x = 0 \quad | \quad x = -3 \quad | \quad x = 3 \quad | \quad x = -1 \quad | \quad x = 1$

3. You are given the polynomial function $P(x) = 6x^3 + kx^2 - 52x + 15$. You know that one of the roots is $x = 1.5$. What is the value of k? What are the zeros of $P(x)$?

$0 = 6(1.5)^3 + k(1.5)^2 - 52(1.5) + 15$

$0 = 20.25 + 2.25k - 78 + 15$

$0 = 2.25k - 42.75$

$\begin{array}{r} +42.75 \qquad\qquad +42.75 \\ \hline \end{array}$

$42.75 = 2.25k$

$19 = k$

$P(x) = 6x^3 + 19x^2 - 52x + 15$

$(x-1.5)(\underline{\qquad\qquad})$

Since we can't factor this, we can divide to find the other factor!

$\begin{array}{r|rrrr} 1.5 & 6 & 19 & -52 & 15 \\ & \downarrow & 9 & 42 & -15 \\ \hline & 6 & 28 & -10 & 0 \\ & x^2 & x & c & R \end{array}$

$(x-1.5)(6x^2 + 28x - 10)$

$(x-1.5)(3x^2 + 14x - 5)$

$(x-1.5)(3x^2 + 15x - 1x - 5)$

$(x-1.5)(3x(x+5) - 1(x+5))$

$(x-1.5)(x+5)(3x-1)$

4. Which of the following expressions can be reduced further?

(1) $\dfrac{x+7}{7}$

(3) $\dfrac{2x+5}{5}$

(2) $\dfrac{5(x+3)}{3x}$

(4) $\dfrac{x(x+1)}{2x}$

5. Solve $\dfrac{x^2}{x-4} = \dfrac{16}{x-4}$

LCD: $X-4$

$(x-4)\ \dfrac{x^2}{X-4} = \dfrac{16}{X-4}\ (x-4)$

$$X^2 = 16$$

$$X = 4 \qquad \boxed{X = -4}$$

6. Divide $\dfrac{x^4+3x^2+2x-4}{x+2}$ and write your answer in quotient remainder form.

$$
\begin{array}{r}
x^3-2x^2+7x-12 \\
x+2\overline{\smash{)}\,x^4+0x^3+3x^2+2x-4} \\
-(x^4+2x^3) \\
\hline
-2x^3+3x^2 \\
-(+2x^3+4x^2) \\
\hline
7x^2+2x \\
-(7x^2+14x) \\
\hline
-12x-4 \\
-(+12x+24) \\
\hline
20
\end{array}
$$

$$
\begin{array}{r|rrrrr}
-2 & 1 & 0 & 3 & 2 & -4 \\
& & -2 & 4 & -14 & 24 \\
\hline
& 1 & -2 & 7 & -12 & 20 \\
& x^3 & x^2 & x & C & R
\end{array}
$$

$$\boxed{X^3-2X^2+7X-12+\dfrac{20}{X+2}}$$

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