1. $\dfrac{3x^3 + 5x^2 - 23x + 20}{x + 4} = 3x^2 - 7x + 5$

$$
\begin{array}{r}
3x^2 - 7x + 5 \\
x+4 \overline{)\,3x^3 + 5x^2 - 23x + 20} \\
3x^3 + 12x^2 \\
\hline
-7x^2 - 23x \\
-7x^2 - 28x \\
\hline
5x + 20 \\
5x + 20 \\
\hline
0
\end{array}
$$

2. $\dfrac{8x^3 + 14x^2 - 13x + 2}{2x - 1} = 4x^2 + 9x - 2$

$$
\begin{array}{r}
4x^2 + 9x - 2 \\
2x - 1 \overline{)\,8x^3 + 14x^2 - 13x + 2} \\
8x^3 - 4x^2 \\
\hline
18x^2 - 13x \\
18x^2 - 9x \\
\hline
-4x + 2 \\
-4x + 2 \\
\hline
0
\end{array}
$$

3. Is $x + 6$ a factor of $5x^3 + 19x^2 - 57x + 54$

$0 = 5(-6)^3 + 19(-6)^2 - 57(-6) + 54$

yes, b/c $R = 0$

$$
\begin{array}{r|rrrr}
-6 & 5 & +19 & -57 & +54 \\
 & & -30 & 66 & -54 \\
\hline
 & 5x^2 & +11x & +9 &
\end{array}
$$