$\frac{m}{k} = \frac{+8}{+2}, \frac{+8}{-2}, \frac{-8}{+2}, \frac{-8}{-2}$ $\frac{m}{k} = \frac{+8}{+1}, \frac{+8}{-1}, \frac{-8}{+1}, \frac{-8}{-1}$

$\frac{m}{k} = \frac{+4}{+2}, \frac{+4}{-2}, \frac{-4}{+2}, \frac{-4}{-2}$ $\frac{m}{k} = \frac{+4}{+1}, \frac{+4}{-1}, \frac{-4}{+1}, \frac{-4}{-1}$

$\frac{m}{k} = \frac{+1}{+2}, \frac{+1}{-2}, \frac{-1}{+2}, \frac{-1}{-2}$ $\frac{m}{k} = \frac{+1}{+1}, \frac{+1}{-1}, \frac{-1}{+1}, \frac{-1}{-1}$

After removing all the repetitions, we get the following candidates as possible solutions for $P(x) = 0$: $\pm 8, \pm 4, \pm 2, \pm 1, \pm \frac{1}{2}$.

Now we only need to examine which of these 10 numbers are solutions to $P(x) = 0$.

We start with the easy ones: ± 1 and ± 2.

$2 \cdot 1^4 + 5 \cdot 1^3 + 3 \cdot 1^2 - 2 \cdot 1 - 8 = 0$ $x = 1$ is a solution

$2 \cdot (-1)^4 + 5 \cdot (-1)^3 + 3 \cdot (-1)^2 - 2 \cdot (-1) - 8 = -6$ $x = -1$ is not a solution

$2 \cdot 2^4 + 5 \cdot 2^3 + 3 \cdot 2^2 - 2 \cdot 2 - 8 = 72$ $x = 2$ is not a solution

$2 \cdot (-2)^4 + 5 \cdot (-2)^3 + 3 \cdot (-2)^2 - 2 \cdot (-2) - 8 = 0$ $x = -2$ is a solution

You can check on your own that none of the other candidates is a solution to $P(x) = 0$. After dividing $2x^4 + 5x^3 + 3x^2 - 2x - 8$ by $x - 1$, we get $2x^3 + 7x^2 + 10x + 8$.

Therefore, we have $2x^4 + 5x^3 + 3x^2 - 2x - 8 = \left(2x^3 + 7x^2 + 10x + 8\right)\left(x - 1\right)$.

Now we solve two equations:

1. $K(x) = x - 1 = 0$
2. $Q(x) = 2x^3 + 7x^2 + 10x + 8 = 0$

The first will give us $x = 1$. To solve the second equation, we need to factor $Q(x)$. We have: $P(x) = Q(x)K(x)$.

Recall $x = -2$ solves the equation $P(x) = 0$. Hence, $P(-2) = Q(-2)K(-2) = 0$..

Since $K(-2) \neq 0$, $Q(-2) = 0$.

Now, we use the Factor Theorem again and divide $Q(x)$ by $x + 2$ to get:

$2x^3 + 7x^2 + 10x + 8 = (2x^2 + 3x + 4)(x + 2)$

The solution of equation $2x^3 + 7x^2 + 10x + 8 = 0$ is reduced to the solution of two equations:

1. $x + 2 = 0$