

Find all zeros of the polynomial $V(x) = 2x^3 + x^2 - 18x - 9$.

1. *Possible rational zeros:* ± 1 , ± 9 , ± 3 , $\pm \frac{1}{2}$, $\pm \frac{9}{2}$, $\pm \frac{3}{2}$

2. *Since* $V(3) = 54 + 9 - 54 - 9 = 0$, *$x - 3$ must be a factor.*

3. *Use long division to divide* $2x^3 + x^2 - 18x - 9$ *by* $x + 3$.

$$2x^3 + x^2 - 18x - 9 = (x + 3)(2x^2 - 5x - 3)$$

4. *Now* $2x^3 + x^2 - 18x - 9 = (x + 3)(2x^2 - 5x - 3) = (x + 3)(x - 3)(2x + 1) = 0$

when $x = -3$, $x = 3$, *and* $x = -\frac{1}{2}$.