

Name: ANSWER KEY

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For the polynomial $f(x) = 2x^3 + 3x^2 + 7$

- a. (4) Find best upper & lower bounds for the roots.

$$\begin{array}{r|rrrrrr}
 & 2 & 0 & 3 & 0 & 0 & 7 \\
 1 & 2 & 2 & 5 & 5 & 5 & 12 \\
 -1 & 2 & -2 & 5 & -5 & 5 & 2 \\
 -2 & 2 & -4 & 11 & -22 & 44 & -81
 \end{array}$$

\therefore Upper Bound is 1
 \therefore Lower Bound is -2

- b. (4) Find all possible rational roots.

$$r = \frac{c}{d}, \quad c \text{ divides } 7; d \text{ divides } 2$$

$$\text{Factors of } 7: \pm 1, \pm 7; \text{ Factors of } 2: \pm 1, \pm 2 \quad \therefore r = \frac{c}{d} = \boxed{\pm 1, \pm \frac{1}{2}, \pm 7, \pm \frac{7}{2}}$$

- c. (2) Pare down the list of possible rational roots in part b in accordance with the bounds of part a.

± 7 and $\pm \frac{7}{2}$ are out of bounds. From #a, ± 1 are not roots.

$\therefore \boxed{\pm \frac{1}{2}}$ are the only feasible rational roots.