

4. [7 points] In this problem you do not *need* to show any work, but you can receive **partial credit for work shown if your final answer is incorrect**. Write your final answer in the space provided.

Consider the function:

$$P(r) = \frac{r(2r - 1)^3}{5(2r - 1)(r^2 + 10)(r + 3)}$$

- a. [3 points] Find the r -**coordinate(s)** of the hole(s) and the zero(s) of $y = P(r)$. If the function has no holes or zeros, write NONE in the space provided.

r -coordinate(s) of hole(s): _____ 0.5 _____

r -coordinate(s) of zero(s): _____ 0 _____

- b. [4 points] Find the **equations** of the vertical and horizontal asymptote(s) of $y = P(r)$. If the function has no vertical or horizontal asymptotes, write NONE in the space provided.

Vertical asymptote(s): _____ $r = -3$ _____

Horizontal asymptote(s): _____ $y = \frac{8}{10}$ _____