
For the next problems, show all work to receive full credit. No Work = No Credit.

1. Use the function $f(x) = \frac{2x + 4}{x + 2}$.

(a) Find the domain of $f(x)$.

We need for the denominator to not be 0. So we need $x \neq -2$.

(b) Find the vertical asymptote(s) of the function.

These occur when the denominator is zero, and the domain issues don't cancel with the numerator. We need to simplify the fraction first, so that

$$f(x) = \frac{2(x + 2)}{x + 2} = 2$$

so there are no problems with the denominator that do not cancel with the numerator. Therefore there are no vertical asymptotes of the function.

(c) Find the horizontal asymptote(s) of the function.

We need to look at the reduced form of the equation, so $f(x) = \frac{2x + 4}{x + 2} = \frac{2(x + 2)}{x + 2} = 2$. This has no horizontal asymptotes.

(d) Find the y -intercept(s) of the function.

These happen when $x = 0$, so

$$y = \frac{2 \cdot 0 + 4}{0 + 2} = \frac{4}{2} = 2$$

(e) Find the x -intercepts of the function.

This happens when $y = 0$, so when the numerator of the function is 0,

$$2x + 4 = 0$$

$$2x = -4$$

$$x = -2$$

However, this happens when there is a hole in the function, so there is no x -intercept.