

Find the roots, singularities, and asymptote lines of the rational function below and draw the graph.

$$Y = \frac{X^3 + 2X^2 - 5X + 6}{X^2 + 4X + 4}$$

Root

$$X^3 + 2X^2 - 5X + 6$$

$$(X + 1)(X - 2)(X + 3) = 0$$

$$x_1, x_2, x_3 = -1, 2, -3$$

$$= \frac{-X + 14}{X^2 + 4X + 4} + X - 2$$

Singularities

$$X^2 + 4X + 4$$

$$(X + 2)(X + 2) = 0$$

$$x_1, x_2 = -2 \text{ (double roots)}$$

Asymptotes

$$X - 2$$

