1. Work out the following problems about the polynomial function $f(x) = -3(2x - 1)^3(x + 4)^2$.

   (1.) Find the leading term of $f(x)$. Using **the leading coefficient test** to determine the **end behavior** of $f(x)$

   (2.) Find the **zeros** of $f(x)$ and their **multiplicities**.

   (3.) Find the **y-intercept** of $f(x)$.

2. Work out the following problems for rational function

$$f(x) = \frac{2x+4}{x^2-x-2}.$$

Find its domain, Vertical asymptotes, Horizontal asymptote, x-intercept, and y-intercept.

3. Work out the following problems for rational function

$$f(x) = \frac{2x^2+5x-3}{x^2-x-2}.$$

Find its domain, Vertical asymptotes, Horizontal asymptote, x-intercept, and y-intercept.

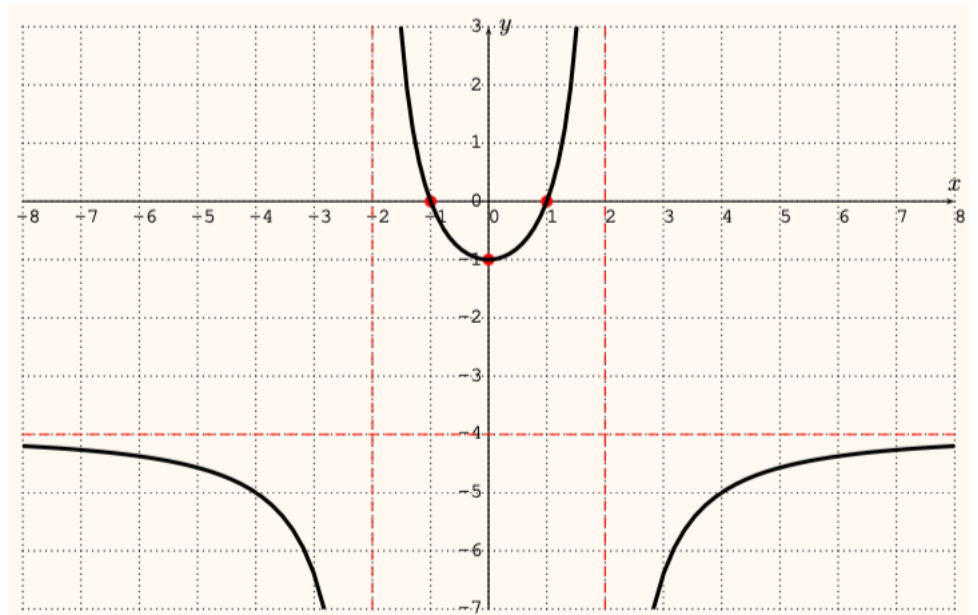4. Use the 3-step strategy to solve for x:

$$x^3 + 8 \leq -2x^2 + 11x$$

5. Use the 3-step strategy to solve for x:

$$\frac{x-2}{x^2-4x-5} > 0.$$

6. The graph of $f(x) = \frac{p(x)}{q(x)}$ is displayed below, where $\deg(p(x)) = \deg(q(x)) = 2$. All intercepts and

   asymptotes are at integer values. Find all intercepts, asymptotes, and a formula for $f(x)$.

7. Let $u = \ln(x)$ and $v = \ln(y)$, where $x, y > 0$. Write the following expression in terms of u and v.

(a) $\ln(x^8 \cdot \sqrt[3]{y})$

(b) $\ln\left(\frac{\sqrt[4]{x}}{y^3}\right)$

(c) $\ln(\sqrt{x^5} \cdot y^7)$

8. Find the domain, asymptotes, and x-intercepts of the function, and then sketch its graph.

(a) $\ln(3x - 7)$

(b) $\log(11 - 6x)$

(c) $\log_2(7x + 5)$