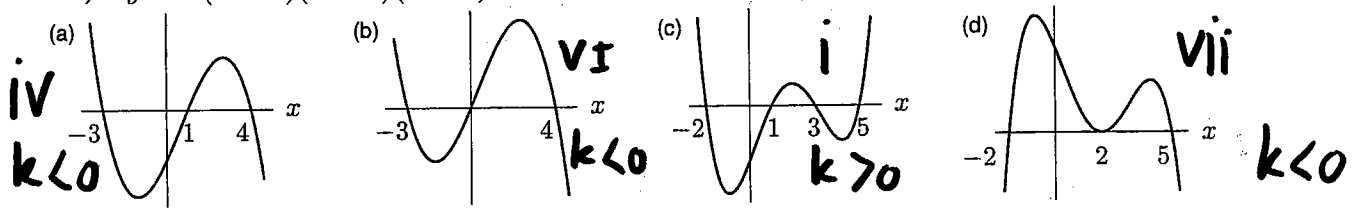
MTH 251 — Lab 1

This lab will help you review powers, polynomials and rational functions. Work and discuss each of the following problems in your groups. Make sure that you all agree on the answers or solutions.

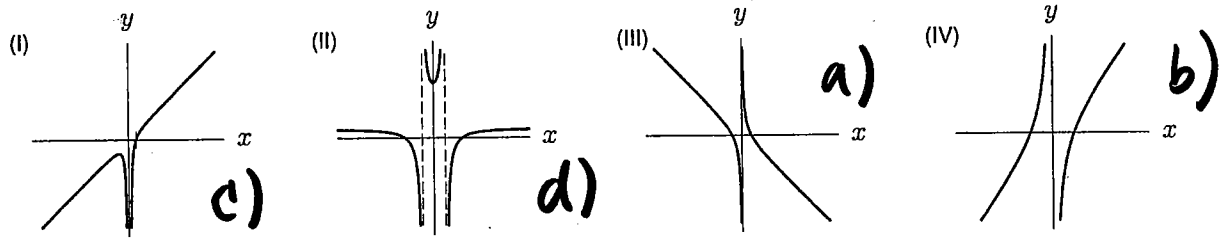
1. Match each graph below with one of the following equations. Decide if the constant k is positive or negative. (Note that the x and y scales may be unequal.)

   i) $y = k(x+2)(x-1)(x-3)(x-5)$
   ii) $y = k(x-2)(x+1)(x+3)(x+5)$
   iii) $y = k(x+3)(x-4)$
   iv) $y = k(x+3)(x-1)(x-4)$
   v) $y = k(x+2)(x-2)(x-5)$
   vi) $y = kx(x+3)(x-4)$
   vii) $y = k(x+2)(x-2)^2(x-5)$
   viii) $y = k(x+2)(x-2)^3(x-5)$

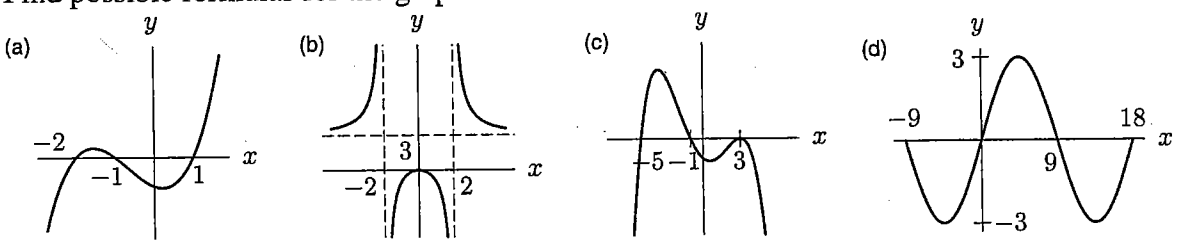


2. Match the following equations with the graphs shown. (Assume $0 < b < a$.)

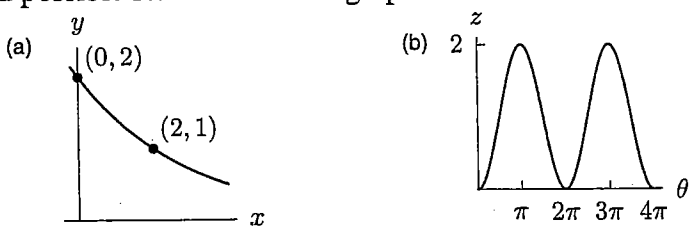
   (a) $y = \dfrac{a}{x} - x$
   (b) $y = \dfrac{(x-a)(x+a)}{x}$
   (c) $y = \dfrac{(x-a)(x^2+a)}{x^2}$
   (d) $y = \dfrac{(x-a)(x+a)}{(x-b)(x+b)}$



3. Find possible formulas for the graphs shown below.



4. If time permits, find possible formulas for the graphs shown below.



3)

a) $y = k(x+2)(x+1)(x-1)$

b) $y = \frac{3x^2}{(x-2)(x+2)}$

c) $y = (x+5)(x+1)(x-3)^2$

d) $y = 3\sin\left(\frac{\pi x}{9}\right)$

4) $y = 2e^{-0.34657x}$

b) = $y = 1 - \cos x$.

Homework 1 Soln.

*40) a) The initial dose is 10 mg

b) Since $0.82 = 1 - 0.18$, the decay rate is 0.18, so 18% leaves the body each hour.

c) When $t = 6$, we have $A = 10(0.82)^6$

$= 3.04$.

The amount in the body after 6 hrs is 3.04 mg.

d) We want to find the value of t when $A = 1$. Using logarithms:

$1 = 10(0.82)^t$

$0.1 = (0.82)^t$

$\ln(0.1) = t \ln(0.82)$

$t = 11.60$ hrs

After 11.60 hrs, the amount is 1 mg.