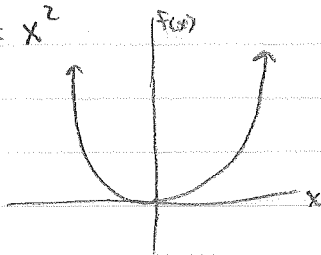


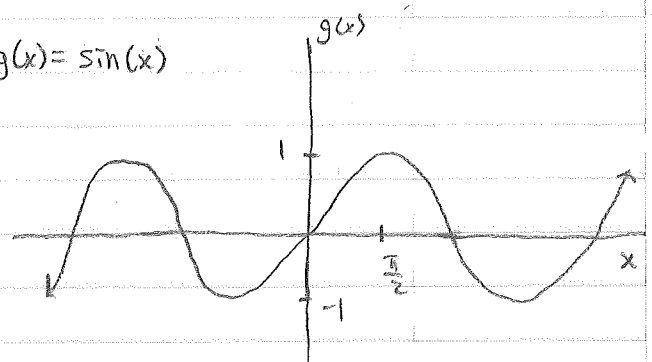
ep 21)

a) Smooth & continuous:

$$f(x) = x^2$$

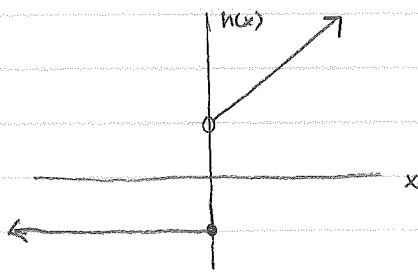


$$g(x) = \sin(x)$$



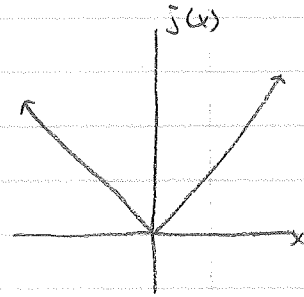
b) Not continuous:

$$h(x) = \begin{cases} 1+x & x > 0 \\ -1 & x \leq 0 \end{cases}$$



c) Continuous, not smooth:

$$j(x) = |x|$$



ep 22)

a)

$$m = 0.3 \text{ kg}$$

$$h_1 = 5 \text{ m}$$

$$h_2 = 2 \text{ m}$$

$$h_3 = 4 \text{ m}$$

$$E_2 = E_3$$

$$KE + U_g = mgh_3$$

$$KE = mgh_3$$

$$KE = (0.3 \text{ kg})(9.8 \text{ m/s}^2)(4 \text{ m})$$

$$KE = 11.76 \text{ J}$$

b) If the cart's kinetic energy is less than 11.76 J at point 2 it will roll back down the hill instead of reaching point 3.