MHF4U – p. 155 MHR #13

The force required to lift an object is inversely proportional to the distance of the force from the fulcrum of a lever. A force of 200N is required at a point 3m from the fulcrum to lift a certain object.

(a) Determine a function to represent the force as a function of the distance.

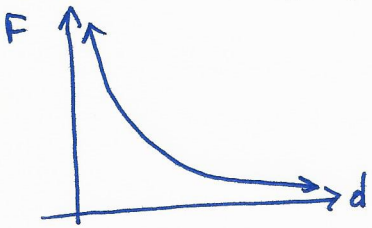
$F = \frac{K}{d}$, where K is a constant to be determined.

$200 = \frac{K}{3} \rightarrow K = (200)(3)$

$K = 600$

$F = \frac{600}{d}$

(b) Sketch a graph of this function



(c) How much force is required to lift this object at a point 2m from fulcrum?

$F = \frac{600}{2} = 300N.$

(d) What is the effect on the force needed as distance from the fulcrum is doubled?

$F = \frac{600}{(\text{distance})} \rightarrow F_{new} = \frac{600}{2d}, F_{new} = \frac{300}{d}$

$F_{old} = \frac{600}{d} \rightarrow F_{new} = \frac{1}{2} F_{old}$

The force is halved.