Calculus 1, February 3, 2020

1. Find each of the following limits (if they exist).

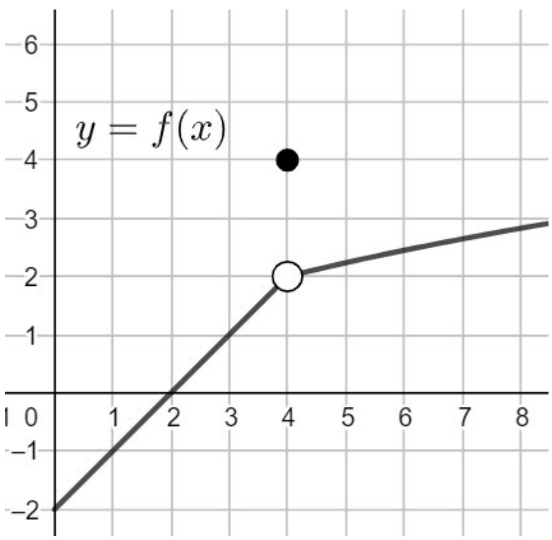
a. $\lim_{x \to 2} (5 - x)$

b. $\lim_{x \to 0} (x^2 + 4)$

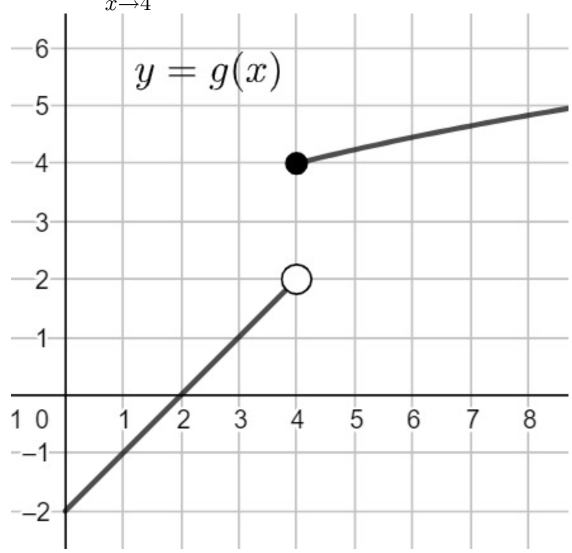
c. $\lim_{x \to 2} \left(\frac{x^2 - 4}{x - 2} \right)$

d. $\lim_{x \to 1} \left(\frac{1}{(x-1)^2} \right)$

e. $\lim_{x \to 4} f(x)$



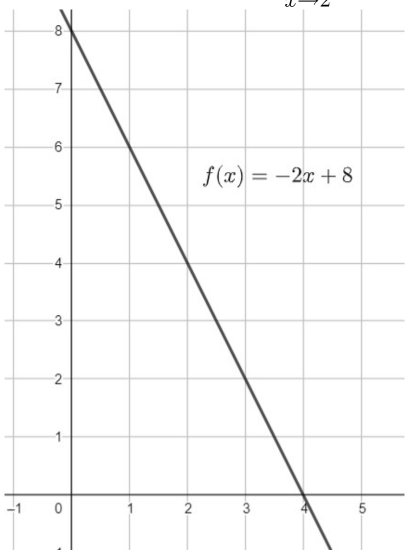
f. $\lim_{x \to 4} \mathrm{g}(x)$



2. A Rubik's cube has side lengths that are 2.25 inches. If you were to 3D print a Rubik's cube, how accurate would the side length have to be to ensure the area of each face of the cube is within 0.1 square inch of the actual area of the face?

Link to class demos: geogebra.org/m/exsewekb

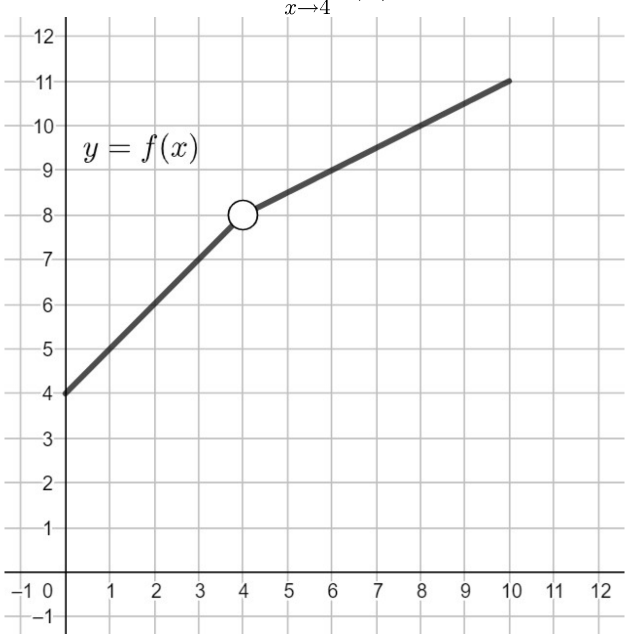
3a. Fill in the blank: $\lim_{x \to 2} f(x) = L =$ __________



b. We are going to formalize the idea of a limit, starting with some examples. For each value of ϵ given in the table, use the graph above to find the largest value of $\delta > 0$ such that $|f(x) - L| < \epsilon$ whenever $0 < |x - 2| < \delta$. Put your answers in the table: Do you notice a relationship between ϵ and δ?

ϵ	δ
2	
4	

4a. Fill in the blank: $\lim_{x \to 4} f(x) = L =$ __________



b. For each value of ϵ given in the table, use the graph above to find the largest value of $\delta > 0$ such that $|f(x) - L| < \epsilon$ whenever $0 < |x - 2| < \delta$. Put your answers in the table.

ϵ	δ
1	
2	
3	

Do you notice a relationship between ϵ and δ?