# Quiz 2
# TQS 211

You are welcome to use any written homework from Chapter 2, worksheets you completed, and a calculator but no books or class notes. Show *all* your work (algebraically or geometrically) for each and simplify. No credit is given without supporting work.
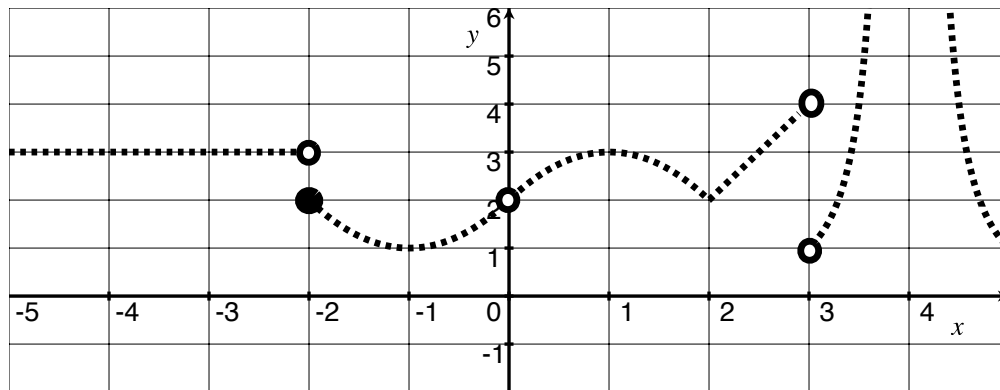
1. Let $f(x) = \dfrac{(5+x)^2 - 25}{x}$

   (a) [3] Use small values of $h$ to estimate $\lim\limits_{x \to 0} f(x)$.

   (b) [3] Use the properties of limits and algebra to find $\lim\limits_{x \to 0} f(x)$.

   (c) [2] Graph $f(x)$ below and verify your answers above.
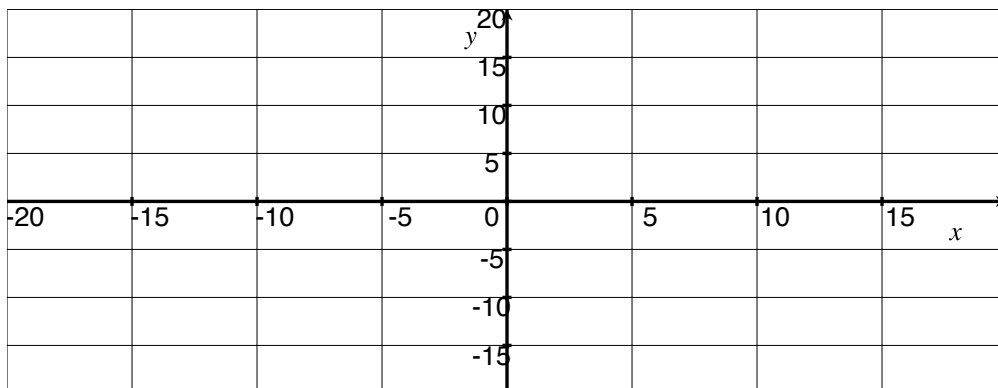
2. Let $g$ be the piece-wise defined function below. This means the graph of $g$ is the *entire* dotted graph shown below.



(a) [6] Find the following *if* it exits:

$$\lim_{x \to 1} g(x) \qquad\qquad \lim_{x \to 0} g(x) \qquad\qquad g(0)$$

$$\lim_{x \to 2} 5g(x) \qquad\qquad \lim_{x \to -2} g(x) \qquad\qquad \lim_{x \to 4} g(x)$$

3. [6] Let $\alpha(x) = 3x^2 - x$. Find the following:

$$\alpha(2) \qquad\qquad \alpha(2 + h) \qquad\qquad \lim_{h \to 0} \frac{\alpha(2 + h) - \alpha(2)}{h}$$