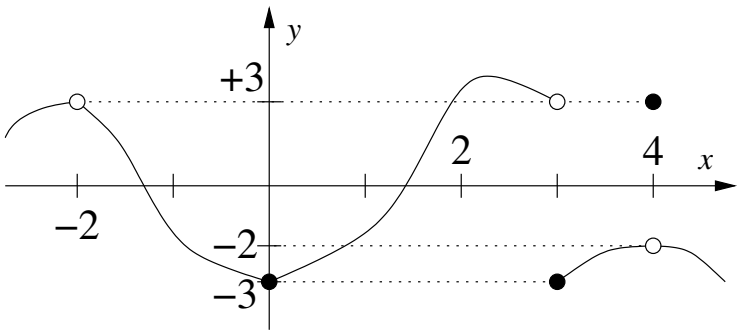
1. Suppose $f(x)$ has the following graph:



   For each of $\lim_{x\to -2} f(x)$, $\lim_{x\to 0} f(x)$, $\lim_{x\to 3} f(x)$, and $\lim_{x\to 4} f(x)$, find the limit (and justify your answer) or explain how you know the limit does not exist.

2. (**Make sure your calculator is in radians mode.**) By trying values of x near 0, find the value of $\lim_{x\to 0} \dfrac{\cos x - 1}{x^2}$. Record the data you collect in a table.

3. (**Make sure your calculator is in degrees mode.**) By trying values of x near 0, find the value of $\lim_{x\to 0} \dfrac{\sin x^\circ}{x}$, where $\sin x^\circ$ is the sine of x degrees. Record the data you collect in a table.

4. By trying values of x near 3, find the value of $\lim_{x\to 3} \dfrac{e^x - e^3}{x - 3}$. Record the data you collect in a table.

5. Consider $\lim_{x\to 0} \cos\left(\dfrac{1}{x}\right)$.

   (a) Calculate $y = \cos\left(\dfrac{1}{x}\right)$ for values of x near 0, and record the data you collect in a table.

   (b) Sketch the graph of $y = \cos\left(\dfrac{1}{x}\right)$ for x near 0.

   (c) What do you think the value of $\lim_{x\to 0} \cos\left(\dfrac{1}{x}\right)$ is? Why?

6. Consider $\lim_{x\to 0} x\cos\left(\frac{1}{x}\right)$.

   (a) Calculate $y = x\cos\left(\frac{1}{x}\right)$ for values of x near 0, and record the data you collect in a table.

   (b) Sketch the graph of $y = x\cos\left(\frac{1}{x}\right)$ for x near 0.

   (c) What do you think the value of $\lim_{x\to 0} x\cos\left(\frac{1}{x}\right)$ is? Why?

7. Consider $\lim_{x\to 0} \sqrt{x}\sin\left(\frac{1}{x}\right)$.

   (a) Calculate $y = \sqrt{x}\sin\left(\frac{1}{x}\right)$ for values of x near 0, and record the data you collect in a table.

   (b) Sketch the graph of $y = \sqrt{x}\sin\left(\frac{1}{x}\right)$ for x near 0.

   (c) What do you think the value of $\lim_{x\to 0} \sqrt{x}\sin\left(\frac{1}{x}\right)$ is? Why?