Name: *Caleb McWhorter — Solutions* **Quiz 1**
MAT 295 **Fall 2016**

Problem 1: $\lim\limits_{x\to 1}\dfrac{x^2+x-2}{x-1}$

$$\lim_{x\to 1}\frac{x^2+x-2}{x-1}=\lim_{x\to 1}\frac{(x+2)(x-1)}{x-1}=\lim_{x\to 1}(x+2)=3$$

Problem 2: $\lim\limits_{x\to 0}\dfrac{\sin 2x}{3x}$

$$\lim_{x\to 0}\frac{\sin 2x}{3x}=\frac{1}{3}\lim_{x\to 0}\frac{\sin 2x}{x}=\frac{2}{3}\lim_{x\to 0}\frac{\sin 2x}{2x}=\frac{2}{3}\cdot 1=\frac{2}{3}$$

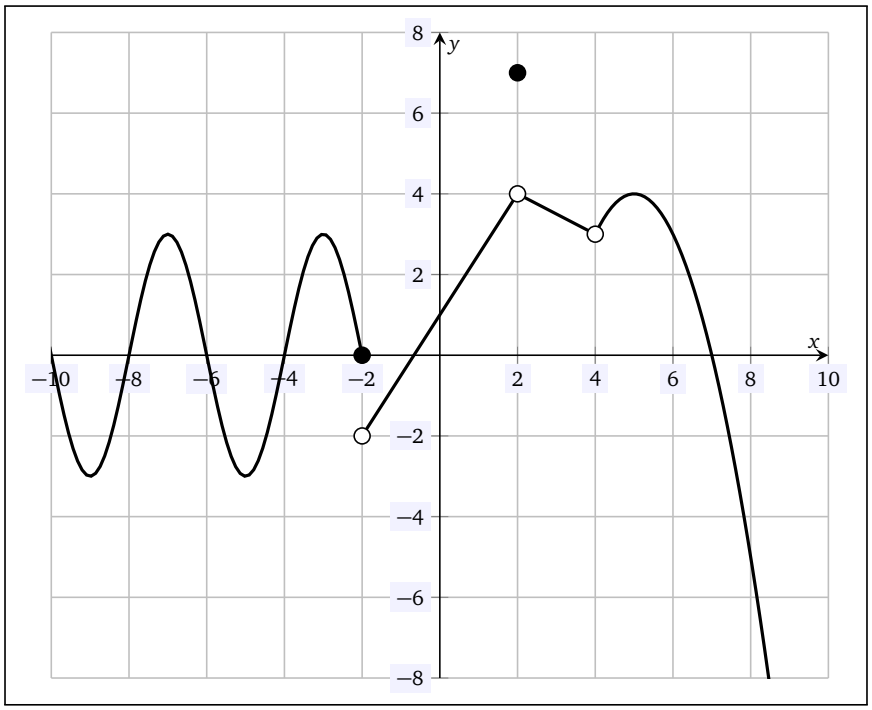
where we have used $\lim\limits_{x\to 0}\dfrac{\sin x}{x}=1$.

Problem 3: $\lim\limits_{x\to 0} x\cot 2x$

$$\lim_{x\to 0} x\cot 2x=\lim_{x\to 0} x\cdot\frac{\cos 2x}{\sin 2x}=\frac{1}{2}\lim_{x\to 0}\frac{2x}{\sin 2x}\cdot\cos 2x=\frac{1}{2}\cdot 1\cdot 1=\frac{1}{2}$$

where we have used $\lim_{x\to 0}\dfrac{x}{\sin x}=1$ *and* $\lim_{x\to 0}\cos x=1$.

Problem 4: A function $f(x)$ is plotted below. Use the plot to find the following values (if the value is not defined or does not exist, write DNE):



(a) $f(0) = 1$

(b) $\lim_{x \to -2^-} f(x) = 0$

(c) $\lim_{x \to -2^+} f(x) = -2$

(d) $\lim_{x \to -2} f(x) = DNE$

(e) $f(-2) = 0$

(f) $\lim_{x \to 2^-} f(x) = 0$

(g) $\lim_{x \to 2^+} f(x) = 4$

(h) $\lim_{x \to 2} f(x) = 4$

(i) $f(2) = 7$

(j) $\lim_{x \to 4^-} f(x) = 3$

(k) $\lim_{x \to 4^+} f(x) = 3$

(l) $\lim_{x \to 4} f(x) = 3$

(m) $f(4) = DNE$