

p. 142

3.)  $\infty$

10.)  $-1$

14.)  $0$

24.)  $0$

27b.)  $500$

27c.)  $N(3) = 250$

p. 148

1b.) For any  $x \neq 0$ ,

$$-1 \leq \cos \frac{1}{x} \leq 1$$

Since  $x^2 \geq 0$ , we can multiply by  $x^2$ :

$$-x^2 \leq x^2 \cos \frac{1}{x} \leq x^2$$

1c.)  $\lim_{x \rightarrow 0} -x^2 = 0$  and  $\lim_{x \rightarrow 0} x^2 = 0$ . So by sandwich theorem,  $\lim_{x \rightarrow 0} x^2 \cos \frac{1}{x}$

4b.) The limit laws do not work because  $\lim_{x \rightarrow \infty} \sin x$  is not defined.

4c.) For  $x > 0$ ,

$$-1 \leq \sin x \leq 1$$

Since  $x > 0$ , we divide through by  $x$  to get

$$-\frac{1}{x} \leq \frac{\sin x}{x} \leq \frac{1}{x}$$

We know  $\lim_{x \rightarrow \infty} -\frac{1}{x} = 0$  and  $\lim_{x \rightarrow \infty} \frac{1}{x} = 0$ . So by sandwich theorem,  $\lim_{x \rightarrow \infty} \frac{\sin x}{x} = 0$

6.)  $\frac{2}{3}$

10.)  $-\frac{\pi}{4}$

17.)  $0$