2.6.9 As $x \to \infty$ (so $2x \to \infty$), $\sin 2x$ tends to no particular value; still, I know something about it, and that's enough:

$$-1 \leq \sin 2x \leq 1;$$
$$-\frac{1}{x} \leq \frac{\sin 2x}{x} \leq \frac{1}{x};$$
$$\lim_{x\to\infty} \left(-\frac{1}{x}\right) \leq \lim_{x\to\infty} \frac{\sin 2x}{x} \leq \lim_{x\to\infty} \frac{1}{x};$$
$$0 \leq \lim_{x\to\infty} \frac{\sin 2x}{x} \leq 0.$$

Therefore,

$$\lim_{x\to\infty} \frac{\sin 2x}{x} = 0.$$

2.6.27 As $x \to \infty$, both $2\sqrt{x} + x^{-1} \to \infty$ and $3x - 7 \to \infty$, so factor out leading powers of x:

$$\lim_{x\to\infty} \frac{2\sqrt{x} + x^{-1}}{3x - 7} = \lim_{x\to\infty} \frac{\sqrt{x}(2 + x^{-3/2})}{x(3 - 7/x)} = \lim_{x\to\infty} \frac{1}{\sqrt{x}} \frac{2 + x^{-3/2}}{3 - 7/x} = 0\frac{2+0}{3-0} = 0.$$

2.6.41 As $x \to -8^+$, $x + 8 \to 0$, and I can't divide by 0. However, I can still figure out an infinite limit:

$$x \to -8^+;$$
$$x > -8;$$
$$x + 8 > 0.$$

Since $2x \to 16 > 0$ and $x + 8 > 0$, the result is positve:

$$\lim_{x\to -8^+} \frac{2x}{x+8} = \infty.$$