Sec.3.5

p.199 - 200:
Definition of Limits at Infinity; Definition of a Horizontal Asymptote
Theorem 3.10 - Limits at Infinity; Examples 1 & 2

p.202-204:
Guidelines for Finding Limits at Infinity of a Rational Function; Examples 3 - 5

p.205: Definition of Infinite Limits at Infinity; Examples 7 & 8

p.206-207: Find the limit.

34:

$$\lim_{x\to\infty} cos\frac{1}{x} = cos0 = 1$$

H.A: $y=1$

36:

$$\lim_{x\to\infty} \frac{x-cosx}{x} = \lim_{x\to\infty}(1-\frac{cosx}{x}) = 1-0 = 1$$

$\frac{\infty}{\infty}$ $\quad -1<\cos x<1$

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

42: $\infty \cdot 0$

$$\lim_{x\to\infty} xtan\frac{1}{x}$$

$$= \lim_{x\to\infty} \frac{tan\frac{1}{x}}{\frac{1}{x}} = \lim_{x\to\infty} \frac{sin\frac{1}{x}}{\frac{1}{x}}\cdot\frac{1}{cos\frac{1}{x}} = \lim_{\frac{1}{x}\to 0} \frac{sin\frac{1}{x}}{\frac{1}{x}}\cdot\lim_{x\to\infty}\frac{1}{cos\frac{1}{x}} = 1\cdot\frac{1}{cos0} = 1$$

$\frac{0}{0}$ $\quad x\to\infty$, $\frac{1}{x}\to 0$

44: $\infty - \infty$

$$\lim_{x\to\infty}(x-\sqrt{x^2+x})$$

$A^2 - B^2$

$$= \lim_{x\to\infty} \frac{(x-\sqrt{x^2+x})(x+\sqrt{x^2+x})}{x+\sqrt{x^2+x}} = \lim_{x\to\infty} \frac{x^2-(x^2+x)}{x+\sqrt{x^2+x}}$$

$$= \lim_{x\to\infty} \frac{-x}{x+\sqrt{x^2+x}} = \lim_{x\to\infty} \frac{\frac{-x}{x}}{\frac{x+\sqrt{x^2+x}}{x}} = \lim_{x\to\infty} \frac{-1}{1+\frac{\sqrt{x^2+x}}{x}}$$

$\frac{x}{x} + \frac{\sqrt{x^2+x}}{x}$

$x\to\infty$, $x>0$, $x=\sqrt{x^2}$

$\sqrt{x^2}$

$$= \lim_{x\to\infty} \frac{-1}{1+\sqrt{\frac{x^2+x}{x^2}}} = \lim_{x\to\infty} \frac{-1}{1+\sqrt{1+\frac{1}{x}}} = -\frac{1}{2}$$

$\frac{x^2}{x^2} + \frac{x}{x^2}$

$\frac{-1}{1+\sqrt{1}}$ $\quad \frac{1}{x}\to 0$

H.A. $y=-1/2$