

Relative Magnitude WS

$$1) \lim_{x \rightarrow +\infty} \frac{-9x^2 \leftarrow \text{faster}}{\ln x} = -\infty$$

$$2) \lim_{x \rightarrow +\infty} \frac{e^x}{100^x \leftarrow \text{faster}} = 0$$

$$3) \lim_{x \rightarrow +\infty} \frac{2^x - x^3}{\sqrt{x^{16} - 3x}} = \lim_{x \rightarrow +\infty} \frac{2^x \leftarrow \text{faster}}{\sqrt{x^{16}}} = +\infty$$

$$4) \lim_{x \rightarrow +\infty} \frac{-x^2 + 3x - 9 \leftarrow \text{faster}}{e} = -\infty$$

$$5) \lim_{x \rightarrow -\infty} \frac{9x^2 \uparrow \text{pos} \cdot e^x \uparrow \text{neg}}{e^x \leftarrow \text{faster}} = \lim_{x \rightarrow \infty} \frac{9x^2}{e^x} = 0$$

$$6) \lim_{x \rightarrow -\infty} \frac{2^x \leftarrow \text{neg} + x^3 \leftarrow \text{neg}}{2^x} = \lim_{x \rightarrow \infty} \frac{1}{2^x} + x^3 = 0 + -\infty = -\infty$$

$$7) \lim_{x \rightarrow +\infty} \frac{-e}{\ln x \leftarrow \text{faster}} = 0$$

$$8) \lim_{x \rightarrow +\infty} \frac{\sqrt{x^{16} - 3x}}{-4x^{3/2}} \stackrel{8 \leftarrow \text{faster}}{=} \lim_{x \rightarrow +\infty} \frac{x}{-4x^{3/2}} = -\infty$$

$$9) \lim_{x \rightarrow -\infty} \frac{e^{x+1} \leftarrow \text{neg}}{e^{x+1}} = \lim_{x \rightarrow -\infty} \frac{1}{e^{x+1}} = 0 \leftarrow \text{faster}$$

$$10) a) \lim_{x \rightarrow +\infty} x/x = \infty \cdot \infty = +\infty$$

$$b) \lim_{x \rightarrow -\infty} x e^{-x} = -\infty \cdot \infty = -\infty$$

$$c) \lim_{x \rightarrow 0^+} x/\ln x = 0 \leftarrow \text{from table function on calculator.}$$