Quiz #6

1. $\lim\limits_{x\to 2} \dfrac{x^2-x-2}{x-2} = \lim\limits_{x\to 2} \dfrac{2x-1}{1} = 2(2)-1 = 3$

$\lim\limits_{x\to 2} \dfrac{(x-2)(x+1)}{x-2} = 2+1 = 3$

2. $\lim\limits_{x\to 0} \dfrac{e^x-1}{x} = \lim\limits_{x\to 0} \dfrac{e^x}{1} = e^0 = 1$

3. $\lim\limits_{x\to\infty} \dfrac{\ln x}{x^2} = \lim\limits_{x\to\infty} \dfrac{\frac{1}{x}}{2x} = \lim\limits_{x\to\infty} \dfrac{1}{2x^2} = 0$

10. x = edge length

$\dfrac{dx}{dt} = 3\ \text{cm/s}$

$\dfrac{dV}{dt} = ?$ when $x = 10\ \text{cm}$

$V = x^3$

$\dfrac{dV}{dt} = 3x^2 \cdot \dfrac{dx}{dt} = 3(10)^2 \cdot 3 = 900\ \text{cm}^3/\text{s}$

7.7

43. $\lim_{x\to\infty} x^{1/x} = y$

$$\lim_{x\to\infty} \frac{1}{x}\ln x = \ln y$$

$$\lim_{x\to\infty} \frac{\ln x}{x} = \ln y$$

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

$$\lim_{x\to\infty} \frac{1}{x} = \ln y \qquad \boxed{y=1}$$

$$0 = \ln y$$

$$\lim_{x\to 5^-} \begin{cases} 2x^2-4x+3, & x\geq 5 \\ 4-x, & x<5 \end{cases}$$

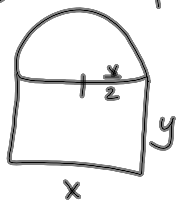
$$= \boxed{-1}$$

3.7

23

$A = \max$

$P = 16\text{ ft}$



$$A = xy + \frac{\pi\left(\frac{x}{2}\right)^2}{2}$$

$$16 = x + 2y + \frac{x}{2}\pi$$

$$y = \frac{16 - x - \frac{\pi}{2}x}{2}$$

$$A(x) = x\frac{\left(16 - x - \frac{\pi}{2}x\right)}{2} + \frac{\pi x^2}{8}$$

$$A = 8x - \frac{x^2}{2} - \frac{\pi}{4}x^2 + \frac{\pi x^2}{8}$$

$$A = 8x - \frac{x^2}{2} - \frac{\pi}{8}x^2$$

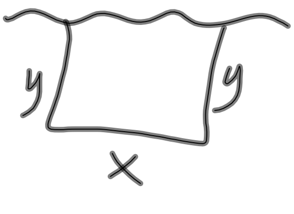
$$A' = 8 - x - \frac{\pi}{4}x = 0$$

$$8 = x\left(\frac{\pi}{4} + 1\right)$$

$$\frac{8}{\frac{\pi}{4} + \frac{4}{4}} = x$$

$$\frac{32}{\pi + 4} = x$$

$y = $ ~



$$x = P - 2y$$

$$P = x + 2y$$

$$A = xy$$

$$A = (P - 2y)y$$

$$A = Py - 2y^2$$

$$A' = P - 4y = 0$$

$$P = 4y$$

$$\frac{P}{4} = y$$

$x, \frac{1}{x}$

$S = x + \frac{1}{x}$

$S' = 1 - \frac{1}{x^2}$

$1 = \frac{1}{x^2}$

$x = \pm 1$

1 & 1

$\lim_{x \to 4} 5x - 7 = 5(4) - 7 = 13$

$f(x) = 5x - 7;\ c = 4;\ L = 13;\ \delta = ?$

$|f(x) - L| = |5x - 7 - 13| = |5x - 20|$

$5|x - 4| < \varepsilon$

$|x - 4| < \varepsilon/5 = \delta$