6) $[0,1]$

a) $f(x) = e^x \Rightarrow f'(x) = e^x$

$$f'(c) = \frac{(f(b) - f(a))}{b-a}$$

$$= \frac{e^1 - e^0}{1-0} = \frac{e^1 - 1}{1} = e^1 - 1 = e - 1$$

$f'(x) = e^x$

Solve $e^c = e - 1 = \ln(e^c) = \ln(e-1)$

$$c = \ln(e-1) = 0.5413$$

b) $f(x) = x^2 \Rightarrow f'(x) = 2x$

$$f'(c) = \frac{(f(b) - f(a))}{b-a} = \frac{1-0}{1} = 1$$

$f'(x) = 2x$

Solve $2c = 1$

$$c = \frac{1}{2} = 0.5$$

c) $f(x) = \frac{1}{x+1} \Longrightarrow f'(x) = \frac{-1}{(x+1)^2}$

$f'(c) = \frac{f(b) - f(a)}{b - a}$

$f(b) = 0.5$

$f(a) = 1$

$= \frac{0.5 - 1}{1 - 0} = \frac{-0.5}{1} = -0.5$

Solve $\frac{-1}{(c+1)^2} = -0.5 =$

$\frac{1}{(c+1)^2} = 0.5 =$

$1 = 0.5 \times (c+1)^2$

$2 = (c+1)^2$

$\sqrt{2} = c+1$

$\sqrt{2} - 1 = c$

$0.4142 = c$

✓✓✓ in interval

$-\sqrt{2} = c+1$

$-\sqrt{2} - 1 = c$

$-2.4142 = c$ ✗ less than 0