1a. $x\cos x - 2x^2 + 3x - 1 = 0, [0.2, 0.3]$ & $[1.2, 1.3]$

$.2\cos(.2) - 2(.2)^2 + 3(.2) - 1 = -.284$
$.3\cos(.3) - 2(.3)^2 + 3(.3) - 1 = .0066$

$.0066 > 0 > -.284$

$Y = 0$ @ $X = .29753023$

$1.2\cos(1.2) - 2(1.2)^2 + 3(1.2) - 1 = .15483$
$1.3\cos(1.3) - 2(1.2)^2 + 3(1.2) - 1 = -.1323$

$Y = 0$ @ $X = 1.256623$

1b. $(x-2)^2 - \ln(x) = 0, [1, 2]$ & $[e, 4]$

$(1-2)^2 - \ln(1) = 1$
$(2-2)^2 - \ln(2) = -.6931$

$1 > 0 > -.6931$

$Y = 0$ @ $X = 1.4123912$

$(e-2)^2 - \ln(e) = -.4841$
$(4-2)^2 - \ln(4) = 2.6137$

$2.6137 > 0 > e$

$Y = 0$ @ $X = 3.0571035$

1c. $2x\cos(2x) - (x-2)^2 = 0$, $[2,3]$ & $[3,4]$

$2(2)\cos(2(2)) - (2-2)^2 = -2.615$

$2(3)\cos(2(3)) - (3-2)^2 = 4.761$

$-2.613 < 0 < 4.761$

$Y = 0$ @ $X = 2.370689$

$2(4)\cos(2(4)) - (4-2)^2 = -5.164$

$-5.164 < 0 < 4.761$

$Y = 0$ @ $X = 3.722128$

1d. $x - (\ln(x))^x = 0$, $[4,5]$

$4 - (\ln(4))^4 = .30664$

$5 - (\ln(5))^5 = -5.709$

$-5.709 < 0 < .30664$

$Y = 0$ @ $X = 4.094258$

3a. $f(x) = 1 - e^x + (e-1)\sin((\pi/2)x), \quad [0,1]$

$f'(x) = \frac{\pi(e-1)}{2}\cos\left(\frac{\pi x}{2}\right) - e^x$

$f'(0) \simeq 1.6991$

$f'(1) \simeq -2.718$

$-2.718 < 0 < 1.6991$

$y = 0 \quad @ \quad x = .5539550a$

3b. $f(x) = (x-1)\tan x + x\sin \pi x, \quad [0,1]$

$f'(0) \simeq -1.00$

$f'(1) \simeq 1.54$

$-1.00 < 0 < 1.54$

$y = 0 \quad @ \quad x = .55$

3c. $f(x) = x\sin\pi x - (x-2)\ln x, \ [1,2]$

$f'(x) = \frac{-x-2}{x} - \ln(x)$

$f'(1) = 1.01$
$f'(2) = -0.69$

$-0.69 < 0 < 1.01$

$y = 0 \quad @ \quad x = 1.454332$

3d. $f(x) = (x-2)\sin x \ln(x+2), \ [-1,3]$

$f'(x) = \frac{x\sin(x) - 2\sin(x) + x\sin(x)\ln(x+2) + x^2\cos(x)\ln(x+2) - 4\cos(x)\ln(x+2)}{2}$

$y = 0 \quad @ \quad x = 2$