Quiz 27   Name: _____ *Key* _____

You must show your work to get full credit.

Consider the S-I-R system

$$S' = -.05SI$$
$$I' = .05SI - .1I$$
$$R' = .1I$$

Assume

$$S(0) = 9{,}980, \quad I(0) = 20, \quad R(0) = 0.$$

Do two steps in Euler's step size 1 to find the following

$S(1) =$ ___2___ $I(1) =$ ___9998___ $R(1) =$ ___2___

$S(2) =$ ___0___ $I(2) =$ ___8998.2___ $R(2) =$ ___1001.8___

Step 1

$S'(0) = -.05(9980)(20) = -9980$

$I'(0) = .05(9980)(20) - .1(20) = 9978$

$R'(0) = .1(20) = 2$

$S(1) \approx S(0) + S'(0)(1) = 9980 - 9980 = 0$

$I(1) \approx I(0) + I'(0)(1) = 20 + 9978(1) = 9998$

$R(1) \approx R(0) + R'(0)(1) = 0 + 2 = 2$

Step 2

$S'(1) \approx -.05(0)(9998) = 0$

$I'(1) \approx .05(0)(9998) - .1(9998) = -999.8$

$R'(1) \approx (.1)9998 = 999.8$

$S(2) \approx S(1) + S'(1)(1) = 0 + 0 = 0$

$I(2) \approx I(1) + I'(1)(1) = 9998 - 999.8 = 8998.2$

$R(2) \approx R(1) + R'(1)(1) = 2 + 999.8 = 1001.8$