BC Calculus
Differential Equations

Name_____Pd.__
Additional Differential Equations Day 2

Do these problems **without** a calculator.

1. Use Euler's method with step size 0.5 to compute the approximate y-values $y_1, y_{2,}, y_3, \text{and } y_4$ of the solution of the initial – value problem $y' = xy - x^2$, $y(1) = 0$.

2. Use Euler's method with step size 0.2 to estimate y(0.4), where y(x) is the solution of the initial-value problem $y' = x + y^2$, $y(0) = 0$.

Do these problems without a calculator and check with a calculator

3. Use Euler's method with step size 0.2 to estimate y(1), where y(x) is the solution of the initial-value problem $y' = xy - x^2$, $y(0) = 1$.

4. Use Euler's method with step size 0.1 to estimate y(0.5), where y(x) is the solution of the initial-value problem $y' = y + xy$, $y(0) = 1$.

BC Calculus Name_____Pd.__

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5. Use Euler's method with step size 0.1 to estimate y(0.4), where y(x) is the solution of the initial-value problem $y' = x + y^2$, $y(0) = 0$.

6. Use Euler's method with step size 0.5 to estimate y(2), where y(x) is the solution of the initial-value problem $y' = xy - x$, $y(0) = 1$.

Review Questions:

7. If f(x) = x + sin x, then f'(x) =

A. 1 + cosx B. 1 – cosx C. cosx D. sinx – xcosx E. sinx + xcosx

8. If $y = \cos^2 3x$, then $\frac{dy}{dx} =$

A. – 6sin3xcos3x B. -2cos3x C. 2cos3x D. 6cos3x E. 2sin3xcos3x

9. If $y = \cos^2 x - \sin^2 x$, then y' =

A. -1 B. 0 C. -2sin2x D. -2(cosx + sinx) E. 2(cosx – sinx)

Answers:

1. $y_1 = -0.5$, $y_2 = -2$, $y_3 = -6$, $y_4 = -16.625$
2. $y(.4) \approx 0.04$
3. $y(1) \approx 1.1949$
4. $y(0.5) \approx 1.7616$
5. $y(0.4) \approx 0.0601$
6. $y(2) \approx 1$
7. A
8. A
9. C