

Course

MATH 2A

Student ID

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Test

QUIZ 1

Question

2

3

4

5

Points

4

MAX: 5

MAX: 4

MAX: 5

MAX: 4

Total

MAX: 18

Self Assessment [2 POINTS]

Based on your work on the prerequisites review packet and your performance on this test, what prerequisite skills should you improve on ?

DIFFERENTIATION (ESPECIALLY CHAIN RULE)

USING CALCULATOR (ESPECIALLY PARENTHESES)

$$[2] \quad y = 3x^2 \sin(\ln x) - x^2 \cos(\ln x) + 2x^{-2}$$

$$y' = 6x \sin(\ln x) + 3x^2 \cos(\ln x) - 6x^{-4} + x^2 \sin(\ln x) - 2x \cos(\ln x)$$

$$= (x^2 + 6x) \sin(\ln x) + (3x^2 - 2x) \cos(\ln x) - 6x^{-4}$$

$$y'' = (2x + 6) \sin(\ln x) + (x^2 + 6x) \cos(\ln x) + 24x^{-5} - (3x^2 - 2x) \sin(\ln x) + (6x - 2) \cos(\ln x)$$

$$= (-3x^2 + 4x + 6) \sin(\ln x) + (x^2 + 12x - 2) \cos(\ln x) + 24x^{-5}$$

$$\begin{aligned} x^2 y'' - 3xy' + 5y &= \left[\begin{aligned} &(-3x^4 + 4x^3 + 6x^2) \sin(\ln x) + (x^4 + 12x^3 - 2x^2) \cos(\ln x) + 24x^{-3} \\ &+ (-3x^3 - 18x^2) \sin(\ln x) + (-9x^3 + 6x^2) \cos(\ln x) + 18x^{-3} \\ &+ 15x^2 \sin(\ln x) - 5x^2 \cos(\ln x) + 10x^{-3} \end{aligned} \right] \end{aligned}$$

$$\neq 13x^{-3}$$



NO, THE FUNCTION IS NOT A SOL'N

$$[3] \quad \frac{dP}{dt} = k \sqrt{|P - P_s|}$$

$$\textcircled{\frac{1}{2}} \quad |P - P_s| > 0 \rightarrow |P - P_s| = P - P_s \text{ AND } P > P_s \text{ (SURVIVE} \rightarrow P \text{ INCR)}$$

$$\textcircled{\frac{1}{2}} \quad \left| \frac{dP}{dt} > 0 \right| \text{ AND } \sqrt{P - P_s} > 0 \rightarrow k > 0$$

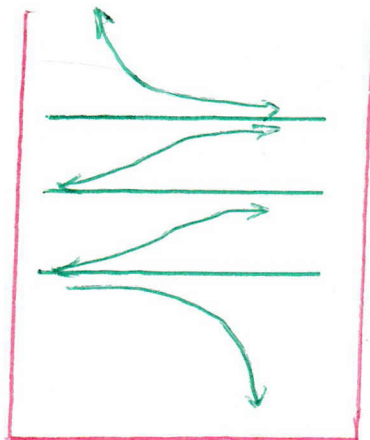
$$\textcircled{\frac{1}{2}} \quad |P - P_s| < 0 \rightarrow |P - P_s| = P_s - P \text{ AND } P < P_s \text{ (EXTINCT} \rightarrow P \text{ DECR)}$$

$$\textcircled{\frac{1}{2}} \quad \left| \frac{dP}{dt} < 0 \right| \text{ AND } \sqrt{P_s - P} > 0 \rightarrow k < 0$$

$$\text{IF } P > P_s, \quad \frac{dP}{dt} = k \sqrt{P - P_s} \quad \textcircled{1}$$

$$\text{IF } P < P_s, \quad \frac{dP}{dt} = -k \sqrt{P_s - P} \quad \textcircled{1}$$

[4][a]



(*)

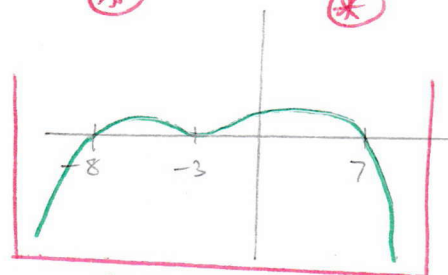
[b] SEMI-STABLE (1/2)

[c] [i] 7 [ii] -3

(*)

(*)

[d]



(1/2) INTERCEPTS

(*)

[5] $\frac{dy}{dx} = \frac{x+2}{y}$ (1/2)

[a] $y(-5.5) \approx -2 + \frac{-4}{-2}(0.5)$ (1/2) $= -1$

$y(-5) \approx -1 + \frac{-3.5}{-1}(0.5)$ (1/2) $= 0.75$

[b] $-6 \rightarrow X : -2 \rightarrow Y : , 2 \rightarrow H$

$Y + (X+2/Y)H \rightarrow Y : X+H \rightarrow X : Y$ (*)

(1/2)

X	Y
-5.8	-3.4
-5.6	-4.6776
-5.4	-5.8832
-5.2	-7.0312
-5	-8.128