

My Ch 6 & 7 AP Calculus AB Quiz _____

A CALCULATOR MAY NOT BE USED ON THIS PART OF THE QUIZ

Directions: Solve each of the following problems, using the available space for scratch work. After examining the form of the choices, decide which is the best of the choices and circle it. No credit will be given for anything written in your scratch work. Do not spend too much time on any one problem

1. The solution to the differential equation $\frac{dy}{dx} = \frac{x^3}{y^2}$, where $y(2) = 3$, is

(A) $y = \sqrt[3]{\frac{3}{4}x^4}$

(B) $y = \sqrt[3]{\frac{3}{4}x^4} + \sqrt[3]{15}$

(C) $y = \sqrt[3]{\frac{3}{4}x^4} + 15$

(D) $y = \sqrt[3]{\frac{3}{4}x^3 + 5}$

(E) $y = \sqrt[3]{\frac{3}{4}x^3 + 15}$

2. If $\frac{dy}{dx} = \frac{y}{x}$, then $y =$

(A) $y = Cx$

(B) $y = x + C$

(C) $y = \pm\sqrt{x^2 + C}$

(D) $y = Ce^{xt}$

(E) $y = x$

(3) If $\frac{dy}{dx} = \frac{x}{y}$, then $y =$

- (A) $y = Cx$
- (B) $y = x + C$
- (C) $y = \pm\sqrt{x^2 + C}$
- (D) $y = Ce^{xt}$
- (E) $y = x$

(4) If $\frac{dy}{dt} = ky$, then $y =$

- (A) $y = \ln t + C$
- (B) $y = Ce^{kt}$
- (C) $y = e^{kt} + C$
- (D) $y = \ln(t + C)$
- (E) $y = e^t + kC$

BONUS MULTIPLE CHOICE (B1)

The rate of change of the volume V , of water in the tank with respect to time, t , is directly proportional to the square root of the volume. Which of the following is a differential equation that describes this relationship?

- (A) $V(t) = k\sqrt{t}$
- (B) $V(t) = k\sqrt{V}$
- (C) $\frac{dV}{dt} = k\sqrt{t}$
- (D) $\frac{dV}{dt} = \frac{k}{\sqrt{V}}$
- (E) $\frac{dV}{dt} = k\sqrt{V}$

FREE RESPONSE

You should write all work for each part of each problem in the space provided. Be sure to write clearly and legibly. **SHOW ALL STEPS!** You will be graded on the correctness and completeness of your methods as well as your final solution. Answers without supporting work will not receive credit.

5. Consider the differential equation $\frac{dy}{dx} = x^4(y - 2)$.

(A) On the axes provided, sketch a slope field at the 12 points given.

(B) While the slope field in part (A) is drawn at only 12 points, it is defined at every point in the xy -plane. Describe all points in the xy -plane for which the slopes are negative.

(C) Find the particular solution $y = f(x)$ to the given differential equation with the initial Condition $f(0) = 0$.