

AP Calculus AB

Name: _____ Score: _____

1. A differential equation relates a function to its...
 - ☐ inverse
 - ☐ derivatives
 - ☐ reciprocal
 - ☐ domain
2. To verify a candidate solution, you...
 - ☐ graph it
 - ☐ plug in one value of x
 - ☐ differentiate it and substitute into the equation
 - ☐ integrate both sides
3. For $\frac{dy}{dx} = x + y$, find the slope of the dash at the point $(2, 3)$.

4. A solution curve through the slope field must always stay...
 - ☐ perpendicular to the dashes
 - ☐ tangent to the dashes
 - ☐ horizontal
 - ☐ a straight line
5. Which equation is separable?
 - ☐ $\frac{dy}{dx} = x^2 + y^2$
 - ☐ $\frac{dy}{dx} = xy$
 - ☐ $\frac{dy}{dx} = x + y$
 - ☐ $\frac{dy}{dx} = \sin(x + y)$
6. You apply the initial condition to find C ...
 - ☐ before integrating
 - ☐ it does not matter when
 - ☐ instead of integrating

☐ after integrating the general solution

7. Exponential decay occurs when k is _____ (its sign).

8. $y = kt$ (with no derivative) is a differential equation.

☐ True ☐ False

9. $y = e^{3x}$ is a solution of $\frac{dy}{dx} = 3y$.

☐ True ☐ False

10. If $\frac{dy}{dx}$ depends only on x , the dashes in each vertical column are parallel.

☐ True ☐ False

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1. **derivatives**

It involves the function and its derivative(s).

2. **differentiate it and substitute into the equation**

Differentiate the candidate, substitute, check both sides match.

3. **5**

$$2 + 3 = 5.$$

4. **tangent to the dashes**

It follows the tangent directions.

5. $\frac{dy}{dx} = xy$

xy factors as $(x\text{-part}) \times (y\text{-part})$; a sum does not.

6. **after integrating the general solution**

Get the general solution first, then use the point for C .

7. **negative**

$k < 0$ makes e^{kt} shrink toward 0.

8. **False**

A differential equation must involve a derivative.

9. **True**

$$\frac{dy}{dx} = 3e^{3x} = 3y. \checkmark$$

10. **True**

Same $x \rightarrow$ same slope down the column.