1. A differential equation relates a function to its...

   ☐ inverse

   ☐ derivatives

   ☐ reciprocal

   ☐ domain

2. To verify a candidate solution, you...

   ☐ graph it and compare by eye

   ☐ plug in one value of x and compare

   ☐ differentiate it and substitute it back

   ☐ integrate both sides of the equation

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

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7. For a positive initial amount, 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

1. **derivatives**

   It involves the function and its derivative(s).

2. **differentiate it and substitute it back**

   Differentiate the candidate, substitute, check both sides match.

3. **5**

   Substitute both coordinates: $dy/dx = x + y = 2 + 3 = 5$, so the dash at $(2, 3)$ has slope 5.

4. **tangent to the dashes**

   It follows the tangent directions.

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

   xy factors as (x-part)×(y-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**

   $\frac{dy}{dx} = 3e^{3x} = 3y$. ✓

10. **True**

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

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