LaPlace Transform Test
Name____________________

1. Given that a LaPlace is defined as: \( F(s) = \int e^{-st} f(t) dt \) find the LaPlace for \( f(t) = e^{at} \) using the definition.

2. A LaPlace has a linear property, use this linear postulate to find the LaPlace of \( \sin^2 3t \).

Using the following table, find the inverse Laplace of:

3. \( \frac{3}{s^2 + 4} \)

4. \( \frac{2}{s^2 + 3s - 4} \)

5. \( \frac{2s + 1}{s^2 - 2s + 2} \)

6. \( \frac{8s^2 - 4s + 12}{s(s^2 + 4)} \)
Solve the following:

7. \( y'' - y' - 6y = 0 \) \quad y(0) = 1 \quad y'(10) = -1

8. \( y'' - 2y' + 2y = \cos t \) \quad y(0) = 0 \quad y'(0) = 0

9. \( \frac{dx}{dt} - 5x + 2y = 3e^{4t} \)
   \( \frac{dy}{dt} - 4x + y = 0 \)

   \( x(0) = 3 \)
   \( y(0) = 0 \)