

Quiz 10 — 11/30/17

Name: _____ Section and/or TA: _____

Answer all questions in a clear and concise manner. Unsupported answers will receive *no credit*.

1. (2 points) For what values of r does the function $y = e^{rx}$ satisfy the differential equation $2y'' + y' - y = 0$?

Solution:

$$y = e^{rx} \quad y' = re^{rx} \quad y'' = r^2 e^{rx}$$

Next we look at

$$2r^2 e^{rx} + re^{rx} - e^{rx} = 0$$

$$2r^2 + r - 1 = 0$$

$$(2r - 1)(r + 1) = 0$$

This gives two solutions for r : $r = \frac{1}{2}$, $r = -1$.

2. In the direction field below, sketch the graphs of the solutions that satisfy the given initial conditions.

- (a) $y(0) = 1$
- (b) $y(0) = 2.5$
- (c) $y(0) = 3.5$

