

EDDE TEST 1 PREPARATION & HOMEWORK

1. Solve the following (separable) differential equation

$$\begin{cases} y'(x) &= 4\sqrt{y(x)} \\ y(2) &= 9. \end{cases}$$

2. Solve the following (linear) differential equation

$$\begin{cases} x^2 y'(x) - 3xy(x) &= x^3 \\ y(1) &= 2. \end{cases}$$

3. Solve the following (Bernoulli, but there are also other methods of solving it) differential equation

$$\begin{cases} x^2 \cdot (y(x))^2 + x \cdot y'(x) + y(x) &= 0 \\ y(1) &= 2. \end{cases}$$

4. Solve the following (exact, but first check that it is actually exact) differential equation

$$\begin{cases} (2xy^5 - 4x^3y - 1)dx + (5x^2y^4 - x^4 + 2)dy &= 0 \\ y(1) &= 2. \end{cases}$$

ANSWERS: 1.  $y(x) = 4x^2 - 4x + 1$ , 2.  $y(x) = 3x^3 - x^2$ , 3.  $y(x) = \frac{2}{2x^2 - x}$ ,  
4.  $x^2y^5 - x^4y - x + 2y = 33$ .