

Term: Winter, 2021

Name: _____

Instructor: Patricia Wrean

Math 252-DX02

Test 1

Total = $\overline{20}$

- **Show your work.** All of the work on this test must be your own. While writing this test, you may not consult any other person, website, or other resource not listed below. If you have a question during the test, you may email me.
- Here is a list of the resources that you are allowed to use during this test:
 - your own notes
 - lecture notes, videos, handouts, practice questions, and practice tests from either my website at <http://wrean.ca/math252> or the Math 252 websites of any of the other instructors linked on the landing page of my site
 - your textbook (Zill), or any of the texts listed on the Textbook page at http://wrean.ca/math252/math252_textbook.htm
 - the Math 252 D2L website
 - the Math 252 WeBWorK online homework site
 - a scientific calculator. You may not use a calculator with graphing capability. If you like, you may use a scientific calculator app like the one at Desmos: <https://www.desmos.com/scientific>
 - a handy reference is the Math 252 Formula Sheet at http://wrean.ca/math252/tests/math252_formula.pdf
 - if you have questions during the test, you may email me
- To submit this test, please use the Dropbox feature in the Assignments tab of D2L. Please assemble your answers into a single PDF or Word document, unless you've made other arrangements with me beforehand. Helpful software:
 - Genius Scan app at <https://www.thegrizzlylabs.com/genius-scan/>
 - CombinePDF at <https://combinepdf.com/>

GOOD LUCK!

1. (5 points) Consider the following DE.

$$y' + 4xe^y = e^y \cos x$$

(a) Solve this DE, giving an explicit solution.

(b) Is your answer to part (a) a particular solution? Circle one:

Yes / No

2. (5 points) Consider the following DE. You may assume that $x > 0$.

$$\left(\frac{2y^2}{x} + 6x\right) dx = k(1 - y \ln x) dy$$

- (a) Find the value of k for which this DE is exact.

- (b) Solve this DE using the value of k you found in part (a).

3. (5 points) Solve the following DE.

$$y' = y + \frac{6e^{-x}}{y}, \quad y(0) = 2$$

4. (5 points) After washing your clothes, you are hanging them up to dry. You think that the damp clothes lose their water at a rate proportional to the amount of water still present in the clothes. If after 45 minutes, the clothes have 65% of their original water content left, after how long will half of the water have evaporated?

Start by setting up and solving the associated DE. Show your work.