Name: _____ **Class:** _____ **Date:** _____ **ID: A**

CHAPTER 2 PRACTICE PROBLEMS

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. The differential equation $\left(x^2 + y^2\right)y' = xy$ is
Select the correct answer and solve it.

a. linear
b. homogeneous
c. separable
d. exact
e. Bernoulli

____ 2. The solution of the differential equation $y' = xy$ is
Select the correct answer. Show all work.

a. $y = ce^{x}$
b. $y = ce^{x^2}$
c. $y = c + e^{x}$
d. $y = ce^{x^2/2}$
e. $y = c + e^{x^2/2}$

____ 3. The solution of the differential equation $y' - y = x$ is
Select the correct answer. Show all work.

a. $y = x - 1 + ce^{-x}$
b. $y = x^2/2 + e^{x}$
c. $y = x^2/2 + e^{-x}$
d. $y = x - 1 + ce^{x}$
e. $y = -x - 1 + ce^{x}$

____ 4. The differential equation $\left(x + 2y\right)dx + ydy = 0$ can be solved using the substitution
Select the correct answer and solve it.

a. $u = x + 2y$
b. $u = y$
c. $u = xy$
d. $u = y/x$
e. it cannot be solved using a substitution

____ 5. An integrating factor for the linear differential equation $x^2y' + xy = 1$ is
Select the correct answer and solve it.

a. 0
b. 1
c. x
d. $1/x$
e. e^x

____ 6. The solution of the differential equation $y' + y/x = y^2$ is
Select the correct answer. Show all work.

a. $y = c/x - x/2$
b. $y = 1/(c/x - x/2)$
c. $y = (cx - x\ln x)$
d. $y = 1/(cx - x\ln x)$
e. $y = 1 + ce^x$

____ 7. The differential equation $y' = xe^y / y$ is
Select the correct answer and solve it.

a. linear
b. homogeneous
c. separable
d. exact
e. Bernoulli

____ 8. The differential equation $\left(y^3 + 6xy^4\right)dx + \left(3xy^2 + 12x^2y^3\right)dy = 0$ is
Select the correct answer. Show all work.

a. exact with solution $y^4/4 + 6xy^5/5 + 3x^2y^2/2 + 4x^3y^3 + c$
b. exact with solution $y^4/4 + 6xy^5/5 + 3x^2y^2/2 + 4x^3y^3 = c$
c. exact with solution $xy^3 + 3x^2y^4 = c$
d. exact with solution $xy^3 + 3x^2y^4 + c$
e. not exact

____ 9. The differential equation $(x-2y)dx+ydy=0$ can be solved using the substitution
Select the correct answer. Solve it.

a. $u=xy$
b. $u=y/x$
c. $u=x-2y$
d. $u=y$
e. it cannot be solved

____ 10. The solution of $(x-2y)dx+ydy=0$ is
Select the correct answer and solve it.

a. $\ln(y-x)-x/(y-x)=c$
b. $\ln(y-x)-x/(y-x)+c$
c. $\ln x+\ln(y-x)=c$
d. $\ln((y-x)/x)=c$
e. it cannot be solved