Quiz 4

Davis
M212

Name:
Pledge:

(9pts.) 1. A big oil company locates a vast oil reserve under the ocean. After 5 years of development, they expect to begin extracting oil at the rate of $q(t) = 5 + t$ million barrels of oil per year (t is measured in years from discovery). If oil costs \$20 per barrel, compute the present value of the oil that will be sold over the first 15 years of production.

(NOTE: USE 5% AS INTEREST RATE)

Present Value $= \int_5^{20}(5+t)(20)e^{-.05t}dt = 20e^{-.05t}/(-.05)(5+t+20)|_5^{20} = 20(45e^{-1}/(-.05) - 30e^{-.25}/(-.05)) = 2723.8$ million dollars.

(11pts.) 2. Match the slope fields with their differential equations. Then choose two of the differential equations to solve algebraically by separation of variables.

a. $\frac{dy}{dx} = y + x^2y$

$y = e^{x+x^3/3+C}$

b. $\frac{dy}{dx} = xy^2 \sin(x^2)$

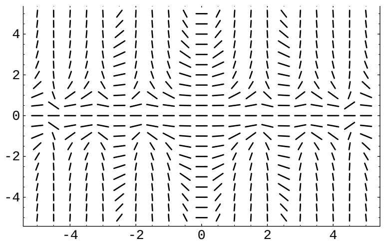
$1/y = -1/2\cos(x^2) + C$

c. $\frac{dy}{dx} = y + xy$

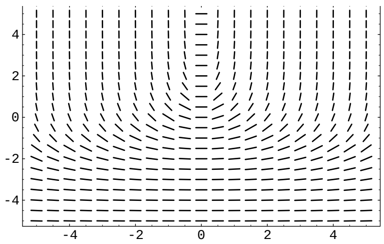
$y = e^{x+x^2/2+C}$

d. $\frac{dy}{dx} = xe^y$

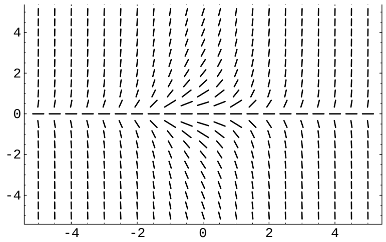
$-e^{-y} = x^2/2 + C$



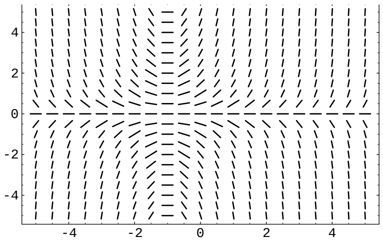
b.



d.



a.



c.