Name: _____ Period: ____

Date: _____ Row: _____

DIFFERENTIAL EQUATIONS MULTIPLE CHOICE QUESTIONS

Show work when necessary.

1)

If $dy/dt = -2y$ and if $y = 1$ when $t = 0$, what is the value of t for which $y = 1/2$?

(A) $-\frac{\ln 2}{2}$ (B) $-\frac{1}{4}$ (C) $\frac{\ln 2}{2}$ (D) $\frac{\sqrt{2}}{2}$ (E) $\ln 2$

2)

At each point on a certain curve, the slope of the curve is $3x^2y$. If the curve contains the point (0,8), then its equation is

(A) $y = 8e^{x^3}$ (B) $y = x^3 + 8$ (C) $y = e^{x^3} + 7$

(D) $y = \ln(x+1) + 8$ (E) $y^2 = x^3 + 8$

3)

If $dy/dx = y \cdot \sec^2 x$ and $y = 5$ when $x = 0$, then $y =$

(A) $e^{\tan x} + 4$ (B) $e^{\tan x} + 5$ (C) $5e^{\tan x}$

(D) $\tan x + 5$ (E) $\tan x + 5e^x$

4)

Bacteria in a certain culture increase at a rate proportional to the number present. If the number of bacteria doubles in three hours, in how many hours will the number of bacteria triple?

(A) $\frac{3\ln 3}{\ln 2}$ (B) $\frac{2\ln 3}{\ln 2}$ (C) $\frac{\ln 3}{\ln 2}$ (D) $\ln\left(\frac{27}{2}\right)$ (E) $\ln\left(\frac{9}{2}\right)$

5)

If $dy/dx = 2y^2$ and if $y = -1$ when $x = 1$, then when $x = 2$, $y =$

(A) –2/3 (B) –1/3 (C) 0 (D) 1/3 (E) 2/3

6)

A puppy weighs 2.0 pounds at birth and 3.5 pounds two months later. If the weight of the puppy during its first 6 months is increasing at a rate proportional to its weight, then how much will the puppy weigh when it is 3 months old?

(A) 4.2 pounds (B) 4.6 pounds (C) 4.8 pounds

(D) 5.6 pounds (E) 6.5 pounds

7)

If $dy/dx = x^2y$, then y could be

(A) $3\ln\left(\frac{x}{3}\right)$ (B) $e^{\frac{x^3}{3}}+7$ (C) $2e^{\frac{x^3}{3}}$ (D) $3e^{2x}$ (E) $\frac{x^3}{3}+1$

8)

During a certain epidemic, the number of people that are infected at any time increases at a rate proportional to the number of people that are infected at that time. If 1,000 people are infected when the epidemic is first discovered, and 1,200 are infected 7 days later, how many people are infected 12 days after the epidemic is first discovered?

(A) 343 (B) 1,343 (C) 1,367 (D) 1,400 (E) 2,057

9)

If $dy/dt = ky$ and k is a nonzero constant, then y could be

(A) $2e^{kty}$ (B) $2e^{kt}$ (C) $e^{kt}+3$ (D) $kty+5$ (E) $\frac{1}{2}ky^2+\frac{1}{2}$

10)

Population y grows according to the equation $dy/dt = ky$, where k is a constant and t is measured in years. If the population doubles every 10 years, then the value of k is

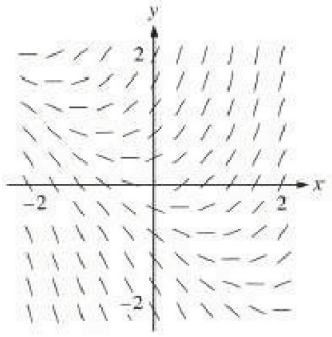
(A) 0.069 (B) 0.200 (C) 0.301 (D) 3.322 (E) 5.000

11)

If $dy/dx = \sin x \cos^2 x$ and if $y = 0$ when $x = \pi/2$, what is the value of y when $x = 0$?

(A) –1 (B) –1/3 (C) 0 (D) 1/3 (E) 1

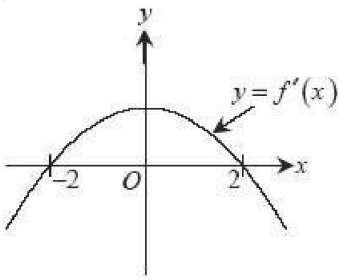
12)



Shown above is a slope field for which of the following differential equations?

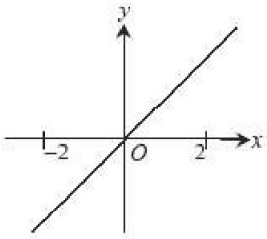
(A) $\frac{dy}{dx} = 1 + x$ (B) $\frac{dy}{dx} = x^2$ (C) $\frac{dy}{dx} = x + y$ (D) $\frac{dy}{dx} = \frac{x}{y}$ (E) $\frac{dy}{dx} = \ln y$

13)

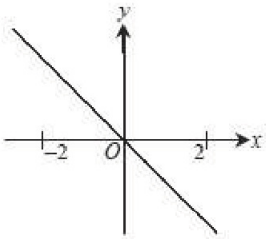


The graph of the derivative of f is shown in the figure above. Which of the following could be the graph of f?

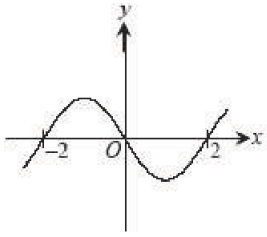
(A)



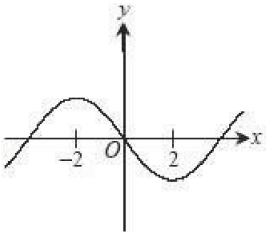
(B)



(C)



(D)



(E)