REVIEW

DATE:_____
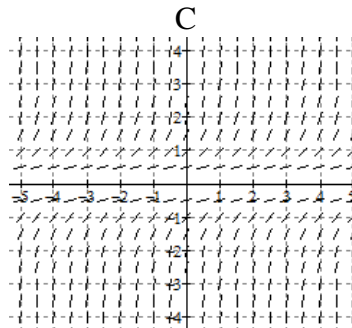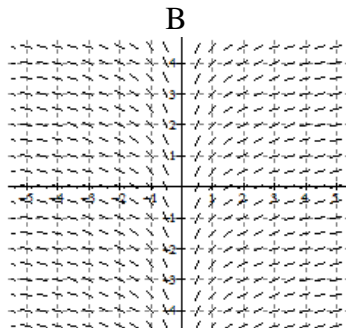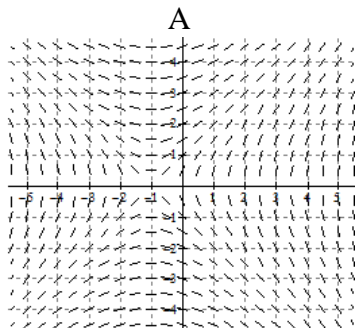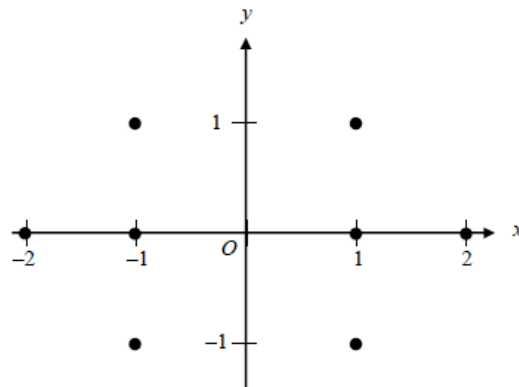
1. Which of the following is the slope field of $\frac{dy}{dx} = \frac{x+1}{y}$?

A

B

C

D
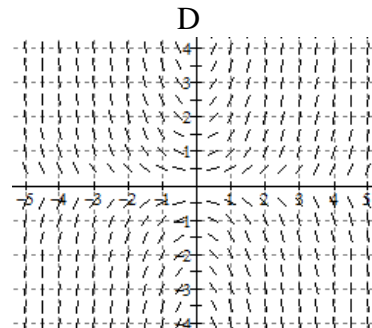
2. Consider the differential equation $\frac{dy}{dx} = \frac{y^2}{x}$, where $x \neq 0$.

a. On the axes provided, sketch a slope field for the given differential equation at the eight points indicated.

b. Find the particular solution $y = f(x)$ to the differential equation with the initial condition $f(-1) = 1$.

c. Write an equation for the tangent line to the curve $y = f(x)$ through the point (1, -1). Then use your tangent line equation to estimate the value of $f(1.2)$.

Find the indefinite integrals.

3. $\int x^5 \sin(x^6 + 2)dx$

4. $\int (x + 1)\sqrt{x^2 + 2x}\, dx$

5. $\int \frac{\cos\sqrt{x}}{\sqrt{x}}\, dx$

Evaluate the definite integrals.

6. $\displaystyle\int_{-1}^{1} x\sqrt{1-x^2}\,dx$

7. $\displaystyle\int_{0}^{\frac{\pi}{6}} \frac{\sin(2x)}{\cos^2(2x)}\,dx$

8. $\displaystyle\int_{e}^{e^2} \frac{1}{x\ln x}\,dx$

TEST PREP

1. If $\int_1^4 f(x)dx = 6$, what is the value of $\int_1^4 f(5-x)dx$?

   (A) 6
   (B) 3
   (C) 0
   (D) −1
   (E) −6

2. $\int \frac{e^{x^2}-2x}{e^{x^2}}\,dx =$

   (A) $x - e^{x^2} + C$
   (B) $x - e^{-x^2} + C$
   (C) $x + e^{x^2} + C$
   (D) $x + e^{-x^2} + C$
   (E) $e^{x^2} + C$

3. $\displaystyle\int_{\pi/4}^{\pi/3} \frac{\sec^2 x}{\tan x}\, dx =$

      (A) $\ln\sqrt{3}$

      (B) $-\ln\sqrt{3}$

      (C) $\ln 2$

      (D) $\sqrt{3} - 1$

      (E) $\ln\frac{\pi}{3} - \ln\frac{\pi}{4}$

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4. $\displaystyle\int_{0}^{5} \frac{dx}{\sqrt{1+3x}} =$

      (A) 4

      (B) $\frac{8}{3}$

      (C) 2

      (D) $\frac{16}{5}$

      (E) 1

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5. $\displaystyle\int_{0}^{4} \frac{2x}{x^2 + 9}\, dx =$

      (A) 25

      (B) 16

      (C) $\ln\frac{25}{9}$

      (D) $\ln 4$

      (E) $\ln\frac{8}{3}$

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6. $\displaystyle\int \frac{e^{\sqrt{x}}}{2\sqrt{x}}\, dx =$

      (A) $\ln\sqrt{x} + C$

      (B) $x + C$

      (C) $e^x + C$

      (D) $\frac{1}{2}e^{2\sqrt{x}} + C$

      (E) $e^{\sqrt{x}} + C$

7. If the substitution $u = \frac{x}{2}$ is made, the integral $\int_2^4 \frac{1+\left(\frac{x}{2}\right)^2}{x} dx =$

   (A) $\int_1^2 \frac{1+u^2}{u} du$

   (B) $\int_2^4 \frac{1+u^2}{u} du$

   (C) $\int_1^2 \frac{1-u^2}{2u} du$

   (D) $\int_1^2 \frac{1-u^2}{4u} du$

   (E) $\int_2^4 \frac{1-u^2}{2u} du$

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8. $\int\limits_0^{\pi/4} \frac{e^{\tan x}}{\cos^2 x} dx =$

   (A) 0

   (B) 1

   (C) $e - 1$

   (D) e

   (E) $e + 1$

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9. $\int\limits_0^1 x^3 e^{x^4} dx =$

   (A) $\frac{1}{4}(e - 1)$

   (B) $\frac{1}{4} e$

   (C) $e - 1$

   (D) e

   (E) $4(e + 1)$

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10. $\int\limits_1^2 \frac{x + 1}{x^2 + 2x} dx =$

   (A) $\ln 8 - \ln 3$

   (B) $\frac{\ln 8 - \ln 3}{2}$

   (C) $\ln 8$

   (D) $\frac{3 \ln 2}{2}$

   (E) $\frac{3 \ln 2 + 2}{2}$