

1. Match the following direction field with the differential equations given below.

(a) $y' = 2y - 1$

(b) $y' = 2 + y$

(c) $y' = y - 2$

(d) $y' = y(y + 3)$

(e) $y' = y(y - 3)$

(f) $y' = 1 + 2y$

(g) $y' = -2 - y$

(h) $y' = y(3 - y)$

(i) $y' = 1 - 2y$

(j) $y' = 2 - y$

Answer:
Reason:

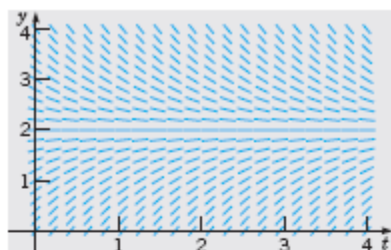


FIGURE 1.1.5 Direction field for Problem 15.

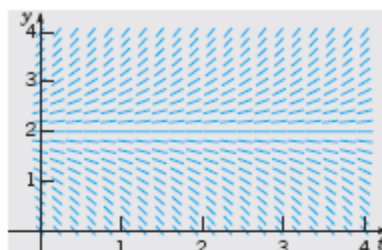


FIGURE 1.1.6 Direction field for Problem 16.

Answer:
Reason:

Answer:
Reason:

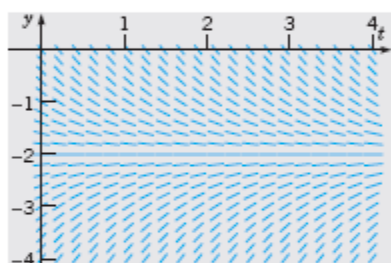


FIGURE 1.1.7 Direction field for Problem 17.

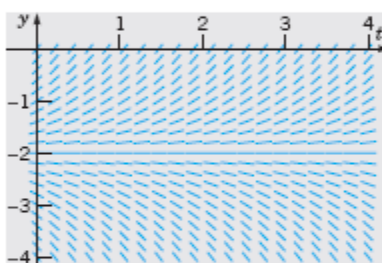


FIGURE 1.1.8 Direction field for Problem 18.

Answer:
Reason:

Answer:
Reason:

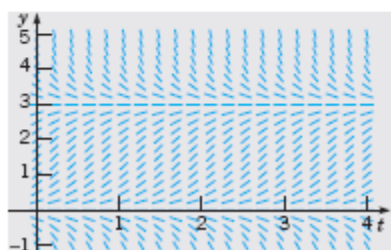


FIGURE 1.1.9 Direction field for Problem 19.

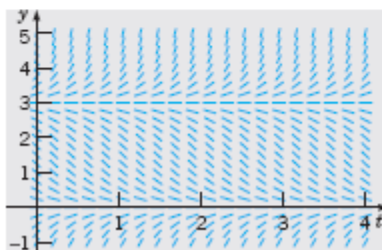


FIGURE 1.1.10 Direction field for Problem 20.

Answer:
Reason:

2. Visit the page <https://homepages.bluffton.edu/~nesterd/java/slopefields.html>, and enter the differential equation in problem 1 (c) and (h) into the slot provided and attach the print. Include **at least three integral curves** in your output.

3. Evaluate the following.

(a) $\int t^3(1+t^4)^3 dt$

(b) $\int \frac{\cos \sqrt{\theta}}{\sqrt{\theta} \sin^2 \sqrt{\theta}} d\theta$

(c) $\int \frac{1}{x^2} \sqrt{1 - \frac{1}{x}} dx$

(d) $\int t^2 e^{4t} dt$

(e) $\int (x^2 - 5x) e^x dx$

(f) $\int \sin(\ln x) dx$

(g) $\int \frac{dx}{x^2 + 2x}$

(h) $\int_4^8 \frac{y dy}{y^2 - 2y - 3}$

(i) $\int \frac{2x^3 - 2x^2 + 1}{x^2 - x} dx.$

More problems at the second page!

4. Differentiate the following.

(a) $y = 3 - 0.7x^3 + 0.3x^7$

(b) $y = (2x - 5)(4 - x)^{-1}$

(c) $y = \frac{1}{\sqrt{t} - 1}$

(d) $y = \frac{1}{\sin^2 x} - \frac{2}{\sin x}$

(e) $s = (\sec t + \tan t)^5$

(f) $r = \sin \sqrt{2\theta}$

(g) $r = \cos(\theta + \sqrt{\theta + 1})$

(h) $y = x^{-2} \sin^2(x^3)$

(i) $y = \left(\frac{2\sqrt{x}}{2\sqrt{x} + 1} \right)^2$

(j) $y = t \tan^{-1} t - \frac{1}{2} \ln t$

(k) $y = \frac{1}{4} x e^{4x} - \frac{1}{16} e^{4x}$

(l) $r = \left(\frac{1 + \sin \theta}{1 - \cos \theta} \right)^2$