set 78

Calc

1. A rectangle whose sides are changing in length has a constant area of 1000 square meters. Find the length of the rectangle when its width is decreasing at a rate of 1 m/sec and its length is increasing at a rate of 10 m/sec.

2. The interest was compounded continuously, so the growth of the money in the bank account was exponential. The initial deposit was \$1000, and a year later \$1100 was in the account. How much money would be in the account 10 years from the time of the initial deposit?

Use integration by parts to compute the following integrals:

3. $\int xe^x\,dx$ 4. $\int \ln x\,dx$ 5. $\int x\ln x\,dx$

6. $\int 2x\cos x\,dx$ 7. $\int x\sin x\,dx$

8. Determine whether the following function is even, odd, or neither:

$$y = \frac{\sin x\cos x}{x^2}$$

9. Is the graph of $y = x^2 + \cos x$ symmetric about the y axis, the origin, or neither?

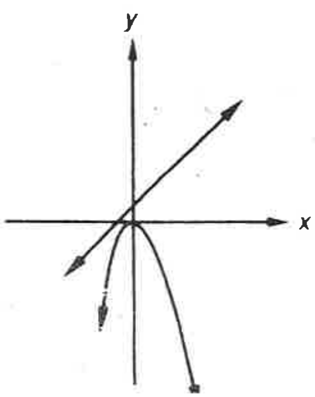
10. Find: $\frac{d}{dx}\frac{xe^{\cos 3x}}{x^3+1}$

11. If $y = \arcsin x^2$, find y'.

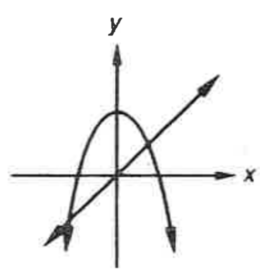
12. Integrate: $\int \frac{\cos x}{\sqrt{\sin x + 1}}\,dx + \int x^{-5}\,dx$

13. Evaluate by using the change of variable method: $\int_0^{\pi/4} (\cos 2x)(e^{\sin 2x})\,dx$

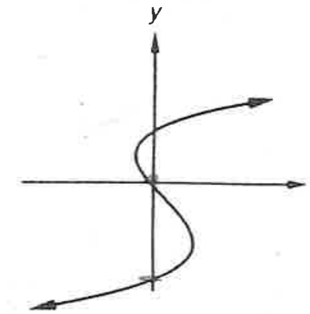
14. Find the area of the region bounded by the graphs of $y = 1 + x$, $y = -x^2$, and the lines $x = 1$ and $x = 3$.



15. Find the area of the region completely enclosed by the graphs of $y = 2 - x^2$ and $y = x$.



16. Write a definite integral whose value equals the area of the region in the fourth quadrant bounded by $x = y(y-1)(y+2)$.



17. Evaluate $f^{-1}(3)$ if $f(x) = 4x - 12$.

18. If $\int_{-1}^{5} f(x)\,dx = 7$ and $\int_{-1}^{3} f(x)\,dx = -3$, find $\int_{3}^{5} f(x)\,dx$.

19. The function $f(x) = \ln(\cos x)$ is defined for all x in which of the followin intervals?

(a) $0 < x < \frac{\pi}{2}$ (b) $-\frac{\pi}{2} \le x \le \frac{\pi}{2}$ (c) $0 < x \le 2\pi$

(d) $-\pi \le x \le \frac{\pi}{2}$

20. Indicate which of the following equations describes a curve which satisfies th following property: For every point (x, y) which lies on the curve, $(-x, -y)$ als lies on the curve.

(a) $x^2 + y = x$ (b) $x^2 + y^2 = 1$ (c) $y = 2x + 1$ (d) $x^3 + y^3 =$