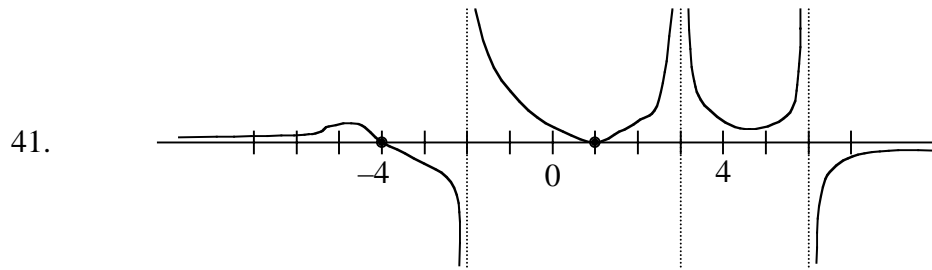


BC Calculus Test # 2 (1–60) Review Answers



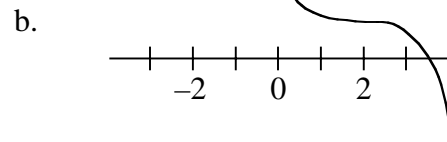
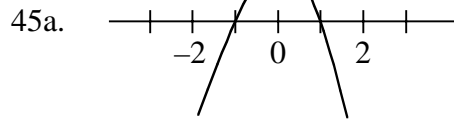
42a. $\frac{dy}{dx} = \frac{2x+3}{\ln x} - \frac{x^2+3x+2}{x(\ln x)^2}$

b. $\frac{dy}{dx} = \frac{\cos x}{x} - \frac{\sin x}{x^2}$

43. $A = \frac{20}{3} \text{ units}^2$

44. $\frac{dy}{dx} = -\frac{1}{2}e^x \cdot \frac{1}{2}x^{-\frac{3}{2}}$

b. 1



46. 2 in/sec

47a. $77\frac{1}{3} \text{ units}^2$

b. 19.5645 units²

48a. i) The derivative of the sine of a function is the cosine of the function times the derivative of the function.

$$\frac{d}{dx} \sin(f(x)) = \cos(f(x)) \cdot f'(x)$$

ii) The derivative of the cosine of a function is the negative sine of the function times the derivative of the function.

$$\frac{d}{dx} \cos(f(x)) = -\sin(f(x)) \cdot f'(x)$$

iii) The derivative of the tangent of a function is the secant squared of the function times the derivative of the function.

$$\frac{d}{dx} \tan(f(x)) = \sec^2(f(x)) \cdot f'(x)$$

iv) The derivative of the cotangent of a function is the negative cosecant squared of the function times the derivative of the function.

$$\frac{d}{dx} \cot(f(x)) = -\csc^2(f(x)) \cdot f'(x)$$





v) The derivative of the secant of a function is the secant of the function times the tangent of the function times the derivative of the function.

$$\frac{d}{dx} \sec(f(x)) = \sec(f(x)) \cdot \tan(f(x)) \cdot f'(x)$$

vi) The derivative of the cosecant of a function is the negative cosecant of the function times the cotangent of the function times the derivative of the function.

$$\frac{d}{dx} \csc(f(x)) = -\csc(f(x)) \cdot \cot(f(x)) \cdot f'(x)$$

b. $\frac{dy}{dx} = \cos x$

49a.  b.  c.  d.  e. max: $x = -3$, min: $x = 2$

50a. $\frac{dy}{dx} = e^{\sin(x^2+3x-4)} \cos(x^2+3x-4)(2x+3)$ b. $\frac{dy}{dx} = 2e^{2x}(x^2+2)^{49}(x^2+50x+2)$

51a. $(3x^2+6)^5 + C$ b. $\cos^4 t + C$ c. $\sqrt{2x^3+4} + C$
 d. $e^{4\sin x} + C$ e. $\ln|3x^4+3x| + C$

52. 75 feet \times 150 feet

53a. 6.444 b. 0.654

54a. $x(4) = 38$, $v(4) = 20$, $a(4) = 6$ b. 101.63 m, 8.64 sec, -9.8 m/sec^2

55a. $-x - \frac{x^2}{2} - \frac{x^3}{3} - \frac{x^4}{4} - \dots$ b. $\sum_{n=1}^{\infty} -\frac{x^n}{n}$ c. $p(\pm 0.1) \approx 0.095\bar{3}$

56a. $-\frac{1}{4} \cos(4t) + C$ b. $\frac{1}{24}(3x^2+2)^4 + C$ c. $\frac{1}{3} \sqrt{3x^2+2} + C$
 d. $\frac{1}{12} \sin^4(3t) + C$ e. $-\frac{1}{2} e^{\cos(2t)} + C$ f. $\frac{1}{3} \ln|x^3+3x| + C$

57a. 0 b. $\frac{a}{b}$ c. $\frac{k}{d}$ d. 4
 e. minimum value of the function 4

58a. one to one horizontal line test vertical line test increasing decreasing
 b. the line $y = x$ c. (b, a) d. $f^{-1}(4) = \frac{10}{3}$

59a. $\frac{253}{12} \text{ units}^2$ b. $\frac{7}{3} \text{ units}^2$ 60a. $\frac{4}{15} \text{ units}^2$ b. $2\sqrt{2} \text{ units}^2$