

6. $\int_a^b \left(\frac{2e^3 + \pi}{e^6} \right) dx$

7. Find all asymptotes and holes found when graphing $f(x) = \frac{-(x-6)(x+5)}{(2x+1)(x^2-3x-18)}$

8. Find the derivative of $f(x) = \sqrt{e^{(x^8)} + (\ln(x^6 + 4) + 12)^3}$

9. Find the absolute extrema of $f(x) = 2x^3 + 3x^2 - 45$ on $[0, 4]$.

10. Solve for x : $\log x^3 = 729$

11. Find the function representing the average cost of producing x coonskin caps, given that the cost of producing x caps is $C(x) = 3.2x + 5.4$.

12. Bob wins a lottery that is worth \$10,000 and chooses to invest 50% of it. If the 50% is invested in an account paying 4.75% interest compounded quarterly, how much is the investment worth in 10 years?

13. $\int (8x + 16)e^{x^2+4x+5} dx$

14. Mr. Barker is adding onto his dog kennel. He needs to fence in 12 equally-sized yard lots (all in a row, connected side-by-side). If Mr. Barker has 400 feet of fencing, what should the dimensions of each dog yard be in order to maximize the total yard area?

15. $\lim_{x \rightarrow \infty} \frac{4x^3 - 1}{x + 3}$

16. Find the derivative of $f(x) = e^{4x} \ln |5x^2 + 2x|$

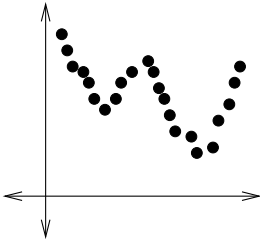
17. $\lim_{x \rightarrow -\infty} \frac{10e^x + 12}{9 + 5e^x}$

18. Solve for x : $(123)(3^x) = 400$

19. Suppose water is being pumped out of a well at a rate given by $y = 300e^{-0.3t}$, where t is the number of years since the pumping began and y is measured in millions of gallons/year. At this rate, how much water will be pumped out during the fourth year?

20. Find the vertex of $f(x) = -(ex^2 + 5)$

21. Which type of model would be a good choice for modeling the data in the scatterplot below?



22. $\lim_{x \rightarrow 6} \frac{x^2 + x - 42}{x - 6}$

23. $\int \frac{\sqrt{x} + \sqrt[6]{x}}{\sqrt[9]{x}} dx$

24. Compute the arc elasticity if $p_1 = 20$, $p_2 = 23$, $q_1 = 350$, and $q_2 = 223$.

25. Sketch a graph of a function with the following properties:

$$f'(x) > 0 \text{ on } (-\infty, -3) \text{ and } (0, \infty)$$

$$f'(x) < 0 \text{ on } (-3, -1) \text{ and } (-1, 0)$$

$$f''(x) < 0 \text{ on } (-\infty, -1)$$

$$f''(x) > 0 \text{ on } (-1, \infty)$$

$$\text{VA: } x = -1$$

26. Given $g(x) = x^2 + 4$ and $f(x) = \sqrt{x} + 20$, find the following:

(a) $(g \circ f)(x)$

(b) $(f \circ g)(x)$

(c) $(g \circ g)(x)$

27. $\lim_{x \rightarrow \infty} \frac{x + 5}{x^2 - 2x - 3}$

28. Find the net and gross areas under $f(x) = x^3 + 2x^2 + 1$ over the interval $[-3, 2]$.

29. Find the derivative of $f(x) = \frac{6}{(3x^3 + 4x^2 - 2x + 10)^3}$

30. Solve for x : $2 \cdot 15^{5x} = 26$

31. Evaluate the end behavior of $f(x) = 12x^5 + Kx^3 - Lx^2 + Bx - 100$

32. Given $f(x) = 4x^5 - x^4$, find all values of x where there is a horizontal tangent line to $f(x)$.

33. Find the value(s) of k that make $f(x)$ continuous on $(-\infty, \infty)$.

$$f(x) = \begin{cases} 4x^3 - 6 & , x \geq 1 \\ x^2 + k & , x < 1 \end{cases}$$

34. The rate at which the fanbase of a certain band is growing is given by $f = 3.7^x + 3$ for $1 \leq x \leq 10$, where x is the number of years since the band began touring in 1993 and $f(x)$ is measured in tens of fans/year. Evaluate and interpret $\int_1^5 f(x) dx$

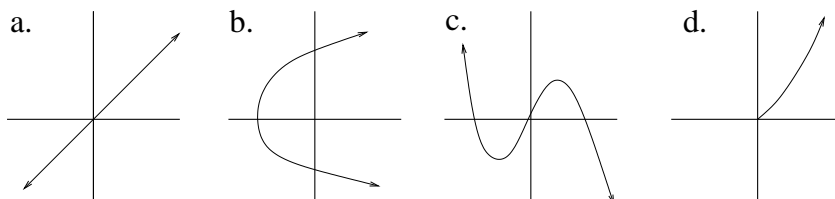
35. The following table gives the percentage of the ozone that is damaged for some selected years.

Year	1967	1970	1975	1980	1987
%	0.25	0.36	0.47	0.59	0.70

- (a) Standardize this data.
 (b) Which model best fits this data?
 (c) Use your unrounded model to estimate the % of the ozone that will be damaged in 2010.

36. Find the exact value of $\int_0^5 \frac{x^2}{\frac{1}{3}x^3 + 5} dx$

37. Which of the following is NOT a function?



38. Find the domain of $f(x) = \frac{(x^2 - 1)^3}{\sqrt{x + 1}}$

39. Find $\lim_{h \rightarrow 0} \frac{f(x + h) - f(x)}{h}$ if $f(x) = \sqrt{x + 4}$

40. $\lim_{x \rightarrow -4} \frac{4x^2 + 3x + 48}{6x^4 + 3x^2 + 20}$

41. Suppose a puppy grows at a rate of $y = 0.16e^t$, where t is the number of years since the beginning of 1999 when the puppy was born and y is measured in inches/year. If the puppy reaches a maximum height of 22 inches at 3 years of age, what is the puppy's height on his first birthday?

42. Solve for x : $\log_5(\log_3(\log 2x)) = 3$

43. The profit from making and selling n lollipops is given by $P(n) = -7n^2 + 83n - 125$. How many lollipops should Leslie's Lollipop Loft make and sell to have a profit gain?

44. How long will it take for money in an account to quadruple if the account pays 5% interest compounded continuously?

45. Rewrite as a single logarithm: $\frac{4}{5}(\log 2x + \log x^3 - (\log y^2 + \log 3y^2))$

46. Find the derivative of $f(x) = 6x^3e^{1/x}$

47. Given demand $d(p) = (225 - 5p)^{1/2}$, determine the point elasticity of demand at $p = 10$. At this point is demand inelastic, elastic, or unitary? Should the price be lowered, raised or kept the same to increase revenue?

48. “Krissy’s Kosmetics” has determined its profit to be given by $P(x) = 500x - x^2$ where $0 \leq x \leq 500$ and x measures the number of tubes of lipstick produced and sold. Find $P'(250)$ and interpret.

49. If $f(x) = \frac{e^x + 3e^{-x}}{5e^x + 5e^{-x}}$, find

(a) $\lim_{x \rightarrow \infty} f(x)$

(b) $\lim_{x \rightarrow -\infty} f(x)$

50. Find $\frac{f(x+h) - f(x)}{h}$ when $f(x) = 4x^2 - 7x - e^2$

51. Rewrite $f(x) = \sqrt[3]{(2 - \frac{1}{x})^4}$ as a function with a rational exponent and then find the domain of the function.

52. For $f(x) = \begin{cases} x & , x \geq 2 \\ -3 + x^2 & , x < 2 \end{cases}$,

(a) find $f(-2)$, $f(2)$, and $f(5)$.

(b) graph $f(x)$.

(c) where is $f(x)$ discontinuous? Non-differentiable? Explain your answers.

53. Billy's parents want to open an account which pays 6.06% interest compounded monthly. They need to have \$15,000 for Billy's first year of college tuition. If they open the account exactly 18 years before they plan to withdraw the money, how much should they invest when they open the account to ensure they can pay for Billy's first year of college tuition?

54. Solve for x : $\log_7(2x + 1) + \log_7 x = 4$

55. Find the derivative of $f(x) = \frac{\ln e^{x^2+2}}{5\sqrt{e}}$

56. $\int \frac{4x^6 - 10x^2}{2x} dx$

57. Given $f(x) = \frac{1}{3}x^3 - x^2 - 8x$, find

- (a) all critical values and relative extrema.
- (b) all inflection points.

58. Find the dimensions of an open box having 1060 in^3 of volume, with a square base and with minimum surface area.

59. A new moped costs \$3500.00 in 2002 and its value depreciates at a rate of \$450.00 per year.

- (a) Find an equation for the value of the moped as a function of time.
- (b) In what year will the moped be worth \$1250.00?

60. Find the equation of the tangent line to the graph of $f(x) = (4x^2 + 6x)(2x - 5x^3)$ at $x = 2$.

61. Given $p = 5.2x + 10.3$ and $C(x) = 372x + 221$, find $MP(x)$.

62. Where is $f(x) = \begin{cases} x + 12 & , x \leq 2 \\ \frac{x - 6}{x + 1} & , x > 2 \end{cases}$ discontinuous?

63. Find the exact value of $\int_1^5 \frac{e^2 - \sqrt{2}}{x} dx$

64. Compute the average rate of change of $f(x) = x^5 + x^4 - x^3 - x^2 + 5 - x^5 - x^4 + x^3$ over $[0, 5]$.

65. Find the exact value of $\int_0^1 x^2 e^{x^3} dx$