

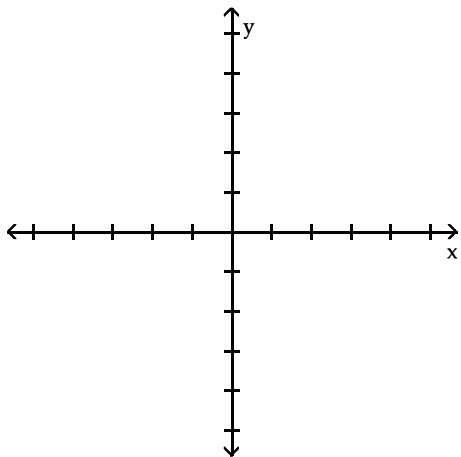
12) Set up a Riemann sum to approximate the area under the graph of $f(x)$ on the given interval. Use the midpoints (Do not compute the sum.) 12) _____
 $f(x) = \ln(x + 1); 0 \leq x \leq 1, n = 3$

13) Calculate: $\int_1^2 5x \, dx$ 13) _____

14) Compute $\int_2^5 \left(e^{4x} - \frac{1}{x} \right) dx$. 14) _____

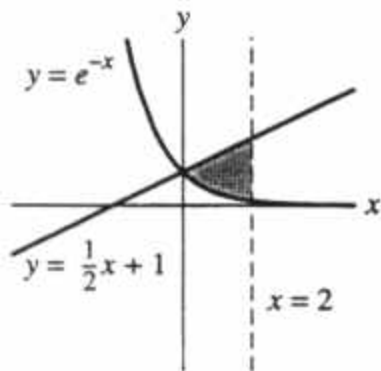
15) Suppose that at time t ($0 \leq t \leq 2$, t in months), the sales of a certain commodity are decreasing at a rate of $1000e^{-0.05t}$ units per month. Calculate the total change in sales from $t = 0$ to $t = 2$. 15) _____

16) Make a sketch of the region between the two curves $f(x) = x^2$, $g(x) = x^3$ and then find this area. 16) _____



17) Find the area of the region bounded by the curve $f(x) = x^2$ and the line $y = x$. 17) _____

18) Use the graph below to determine the area of the shaded region. 18) _____



MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 19) Suppose that a colony of fruit flies is growing exponentially with growth constant .04 . If there are currently 30,000 flies present, what will be the average population over the next 6 months? 19) _____
- A) $60,000(e^{.24} - 1)$
B) $30,000(e^{.02} - 1)$
C) $1,500,000(e^{.02} - 1)$
D) $75,000(e^{.24} - 1)$
E) none of the above
- 20) A certain commodity has demand curve $p = \frac{20}{x + 5} - 1$ at sales level x . What is the consumers' surplus if 5 units are currently being sold? 20) _____
- A) $20(\ln 10) - 10$
B) $\frac{1}{20}(\ln 3) - 20$
C) $20(\ln 15 - \ln 5) - 10$
D) $20(\ln 15 + \ln 5) - 10$
E) none of the above

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 21) A region is bounded above by the graph of $y = x - x^3$ and below by the x -axis on the interval from $x = 0$ to $x = 1$. Find the volume of the solid of revolution generated by revolving the region about the x -axis. 21) _____

Answer Key

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1) A

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2) $\frac{24 \ln 4}{\ln 3} \approx 30.3$ days later

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3) $P'(t) = \frac{1}{2}P(t); P(t) = 200e^{0.5t}$

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4) 6.93 years in both cases

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5) $1000 + 1000e^{1.6(1 - \ln 2)} \approx \2633.89

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6) $944.20 + 944.20 e^{0.9} \approx \$3,266.56$

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7) $\frac{x^{16}}{16} + C$

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8) $\frac{x^4}{4} + x + C$

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9) 17.3 seconds to reach the ground;

554.3 feet per second

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10) (a) 21; (b) 41; (c) 30.75

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11) (a) 2.197; (b) 5.416; (c) 4.158

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12) $\frac{1}{3} \left[\ln \left(\frac{7}{6} \right) + \ln \left(\frac{3}{2} \right) + \ln \left(\frac{11}{6} \right) \right]$

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13) $\frac{15}{2}$

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14) $\frac{1}{4}(e^{20} - e^8) + \ln \frac{2}{5}$

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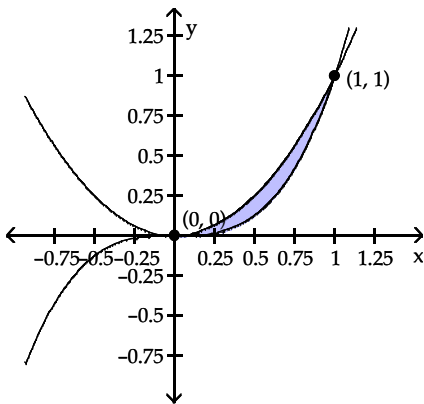
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15) $20,000(1 - e^{-0.1})$ decrease

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16) $\frac{1}{12}$



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17) $\frac{1}{6}$

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18) $2 + \frac{1}{e^2}$

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19) C

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20) E

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Answer Key

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21) $\frac{8\pi}{105}$

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