

Mat 218 Practice Problems #5

1. Find $\int \left(\frac{x^3}{2} - \frac{4}{x^2} + \sqrt{x} - 4 \right) dx$

2. Find $\int \frac{x^4 - 1}{x^2} dx$

3. Find $\int \frac{x^2 - 4x + 1}{\sqrt[3]{x}} dx$

4. Find $\int \left(\sqrt[3]{x^2} - \frac{1}{x^2} \right) dx$

5. Find $\int 4x(2x^2 + 1)^7 dx$

6. Find $\int e^{-x}(1 + e^{-x}) dx$

7. Find $\int \frac{8(\ln 4x)^5}{5x} dx$

8. Find $\int \frac{4}{x(\ln x)^2} dx$

9. Find $\int_1^3 \frac{2}{3x} dx$

10. Find $\int_{-3}^{-2} e^{2t+4} dt$

11. Find $\int_1^3 x\sqrt{3x^2 - 2} dx$

12. Find $\int_0^2 \frac{x}{\sqrt{x^2 + 5}} dx$

13. Find the area of the region under the graph of $f(x) = 4x - x^2$ on the interval $[0, 4]$.
14. The daily marginal cost function associated with producing x units of a certain product is given by $C'(x) = .0003x^2 - .10x + 30$ where $C'(x)$ is measured in dollars per unit. Daily fixed costs are \$500 per day. Find the total daily cost for producing the first 200 units.
15. Find the average value of the function $f(x) = e^{-x}$ on the interval $[0, 4]$.
16. Roughly sketch the graphs of $y = -x^2 + 3$ and $y = 2x$. Shade the region that is completely enclosed by these two graphs. Find the area of this region.
17. Roughly sketch the graphs of $y = -x^2 + 4x$ and $y = 2x - 3$. Shade the region that is completely enclosed by these two graphs. Find the area of this region.
18. Solve $\ln x + \ln (2x) = 3$.

ANSWERS

1. $\frac{x^4}{8} + \frac{4}{x} + \frac{2x^{\frac{3}{2}}}{3} - 4x + C$

2. $\frac{x^3}{3} + \frac{1}{x} + C$

3. $\frac{3x^{\frac{8}{3}}}{8} - \frac{12x^{\frac{5}{3}}}{5} + \frac{3x^{\frac{2}{3}}}{2} + C$

4. $\frac{3x^{\frac{5}{3}}}{5} + \frac{1}{x} + C$

5. $\frac{(2x^2 + 1)^8}{8} + C$

6. $\frac{-(1 + e^{-x})^2}{2} + C$

7. $\frac{4(\ln 4x)^6}{15} + C$

8. $\frac{-4}{\ln x} + C$

9. $\frac{2 \ln 3}{3} \approx .7324$

10. $\frac{1}{2} - \frac{1}{2e^2} \approx .432$

11. $\frac{124}{9} \approx 13.78$

12. $3 - \sqrt{5} \approx .764$

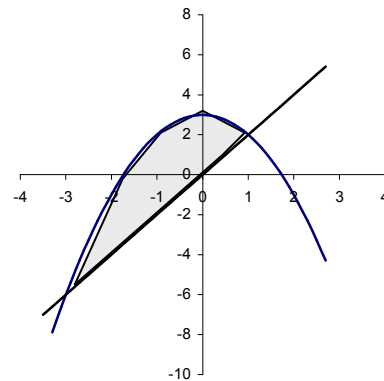
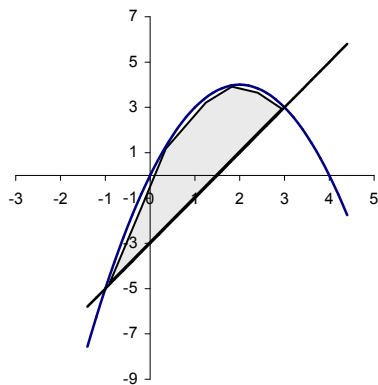
13. $\frac{32}{3} \approx 10.67$

14. \$5300

15. $\frac{1}{4} - \frac{1}{4e^4} \approx .2454$

16. $\frac{32}{3} \approx 10.67$

17. $\frac{32}{3} \approx 10.67$



18. $\sqrt{\frac{e^3}{2}} \approx 3.17$