

Integral Applications, Homework Problems

For problems # 1- 10, sketch the region bounded by the graph of the following functions and find its total area (it is strongly recommended to go back and review the handout and homework problems of **Section 5.3**)

1. $y = x^2 - 4$ and the x -axis.

2. $y = x^2 + x - 12$ and the x -axis

3. $y = 3x$ and $y = x^2$

4. $y = x$ and $y = \sqrt{x}$

5. $y = x + 1$ and $y = x^2 + x$

6. $y = 2x + 2$ and $y = x^2 - 2x - 3$

7. $y = x^2 - 4$ and $y = 2x - 1$

8. $y = x^2 - 4$ and $y = 2x - 1$ in $[0, 4]$

9. $y = x^2 - 3x$ in $[0, 4]$ and the x -axis

10. $y = x^3 - x$ and the x -axis

Answers: 1. 10.67 2. 57.167 3. 4.5 4. 0.167 5. 4/3
 6. 36 7. 10.67 8. 11.33 9. 6.33 10. 0.5

11. The marginal profit for a certain refrigerator is given by $P' = 56 - 0.8q$ dollars per unit, where q is the number of refrigerator produced and sold. Find the profit for the first 50 units that are sold. (*Ignore any fixed cost*).

12. The marginal revenue for the price of tickets is given by $R' = 20q - 100$ dollars per ticket, where q is the number of tickets. Find the total revenue from the sale of tickets between $q = 10$ and $q = 30$ tickets.

13. An object starts out from the origin and its velocity is given by: $v(t) = 4t^2 + 2t$.
 How far does it travel between $t = 1$ and $t = 4$ hours?

14. An object starts out from the origin and its velocity is given by: $v(t) = 6t^3 + 2t$.
 How far does it travel the first 3 hours?

Answers: 11. \$1800 12. \$6000 13. 99 14. 130.5

15. Linda has decided to invest \$2000 each year into an IRA account that pays interest of 9% compounded continuously. Find the amount in the account at the end of 15 years.

16. What should A (*annuity*. per year be so that the amount of a continuous money flow over 30 years at interest rate 9%, compounded continuously, will be \$ 40,000?

17. Find the present value of an investment over 10 years period if there is a continuous money flow of \$2700 per year and the current interest rate is 9% compounded continuously

18. Mike has the option of getting paid \$7,200 a year for the next 8 years or to get a one cash payment now. If the interest rate is 7% compounded continuously, how much would he get now if he choose the one cash payment now?

19. What should A (*annuity*. per year be so that the amount of a continuous money flow over 20 years at interest rate 8.5%, compounded continuously, will be \$ 50,000?

20. A family make an investment of \$1000 per year at an interest rate of 7.5% compounded continuously. Find the amount in 40 years

21. An employee has the option of getting a yearly salary of \$34,000 for the next 40 years, or to get a single cash payment now. What will be the cash payment now if the interest rate is 7.5% compounded continuously?

Answers: 15. \$ 63,498.35 16. \$259.37 17. \$17,802.91 18. \$44,104.21
 19. \$949.94 20. \$254,473.83 21. \$430,763.19