

Note: Don't forget to homework problems that are assigned in **Section 5.3** in the book. Keep your work in this homework for later use in Section 7.3.

1. The velocity of a car in mph is given by $v(t) = 30t - 10t^2$ where t is in hours. Approximate the distance traveled during the first 3 hours ($t = 0$ to $t = 3$, using $\Delta = 0.5$). (Find the left and right sums, then average them).

2. Sketch the region bounded by the graphs of the following functions and approximate the area of the region in the indicated: (Find the left and right sums, then average them)

a. $y = 4 - x^2$, x -axis, in $[0, 2]$ using $n = 4$.

b. $y = x^2 - 2x - 3$, x -axis in $[0, 2]$ using $\Delta = 1$

For problems #3 - 15, sketch the region bounded by the graphs of the following functions. Write the definite integral needed to compute the Total Area. (No need to find the final answer).

3. $y = x^2$, $y = x + 2$

4. $y = x^2 - 1$, $y = x + 1$

5. $y = 4 - x^2$, x -axis

6. $y = 4 - x^2$, $y = x^2 - 1$

7. $y = x^3$, $y = x^2$

8. $y = x^2 + 1$, $y = x - 2$, $x = -1$, $x = 2$

9. $y = x^2$, $y = 2x$

10. $y = 2x - 1$, $y = x^2 - 4$

11. $y = 2x - 1$, $y = x^2 - 4$, $x = 1$, $x = 2$

12. $y = \sqrt{x}$, $y = x$

13. $y = x^2 - 1$, x -axis

14. $y = x^2 + x - 6$, x -axis,

15. $y = x^2 - 9$, x -axis in $[-2, 1]$

For problems #16 - 25, sketch the region bounded by the graphs of the following functions. Show where the graphs cross the x -axis, or each others. Write the definite integral needed to compute the Total Area. (No need to find the final answer).

16. $y = x^2 - 4$, x -axis in $[0, 4]$

17. $y = x^2 - 2x$, x -axis , $x = -1$, $x = 1$

18. $y = 3x^2$, $y = 1 - x^2$ in $[0, 1]$

19. $y = x^3 - 2x$, $y = x^2$

20. $y = x^3 - 4x$, $y = 5x$

21. $y = x^2 - 2x$, $x = 0$, $x = 6$

22. $y = x^2$, $y = \sqrt{x}$ in $[0, 2]$

23. $y = x^3$, x -axis in $[-1, 1]$

24. $y = x^3 - 3x + 3$, $y = x + 3$

25. $y = 4 - x^2$, x -axis in $[-2, 3]$

Answers:

1. 43.75

2. a. 5.25

b. 7

The final answers for problems 3 - 25 are given for information only, but will be needed for section 7.3 homework. It is helpful to use the program Gramatica to check your graphs. You must find the intersection points manually.

$$3. A = \int_{-1}^2 (-x^2 + x + 2) dx = 4.5$$

$$4. A = \int_{-1}^2 (-x^2 + x + 2) dx = 4.5$$

$$5. A = \int_{-2}^2 (4 - x^2) dx = 10.67$$

$$6. A = \int_{-1.58}^{1.58} (-2x^2 + 5) dx = 10.54$$

$$7. A = \int_0^1 (x^2 - x^3) dx = \frac{1}{12}$$

$$8. A = \int_{-1}^2 (x^2 - x + 3) dx = 10.5$$

$$9. A = \int_0^2 (2x - x^2) dx = 1.33$$

$$10. A = \int_{-1}^3 (-x^2 + 2x + 3) dx = 10.67$$

$$11. A = \int_1^2 (-x^2 + 2x + 3) dx = 3.67$$

$$12. A = \int_0^1 (\sqrt{x} - x) dx = 0.167$$

$$13. A = \int_{-1}^1 (-x^2 + 1) dx = 1.33$$

$$14. A = \int_{-3}^2 (-x^2 - x + 6) dx = 20.83$$

$$15. A = \int_{-2}^1 (9 - x^2) dx = 24$$

$$16. A = \int_0^2 (-x^2 + 4) dx + \int_2^4 (x^2 - 4) dx = 16$$

$$17. A = \int_{-1}^0 (x^2 - 2x) dx + \int_0^1 (2x - x^2) dx = 2$$

$$18. A = \int_0^{1/2} (1 - 4x^2) dx + \int_{1/2}^1 (4x^2 - 1) dx = 1$$

$$19. A = \int_{-1}^0 (x^3 - 2x - x^2) dx + \int_0^2 (x^2 - x^3 + 2x) dx = 3.08$$

$$20. A = \int_{-3}^0 (x^3 - 9x) dx + \int_0^3 (9x - x^3) dx = 40.5$$

$$21. A = \int_0^2 (2x - x^2) dx + \int_2^6 (x^2 - 2x) dx = 38.67$$

$$22. A = \int_0^1 (\sqrt{x} - x^2) dx + \int_1^2 (x^2 - \sqrt{x}) dx = 1.45$$

$$23. A = \int_{-1}^0 (-x^3) dx + \int_0^1 (x^3) dx = 0.5$$

$$24. A = \int_{-2}^0 (x^3 - 4x) dx + \int_0^2 (4x - x^3) dx = 8$$

$$25. A = \int_{-2}^2 (4 - x^2) dx + \int_2^3 (x^2 - 4) dx = 13$$