

Math 31 – Workshop #3

1. Graphs for the following problems are on the last page.

(a) Suppose $\int_1^4 f(x) dx = 7.25$. On the graph, shade (in pencil) the region whose area is 7.25.

(b) Suppose $\int_1^4 g(x) dx = 4.75$. On the same graph, shade (in pen) the region whose area is 4.75.

(c) What is the area of the shaded region in the second graph?

(d) Which of the following integrals computes the area of the shaded region in the second graph?

$$\int_1^4 (f(x) - g(x)) dx \qquad \int_1^4 (f(x) + g(x)) dx \qquad \int_1^4 (g(x) - f(x)) dx$$

2. Graphs for the following problems are on the last page.

(a) Suppose $\int_1^4 f(x) dx = 4.5$. On the graph, shade (in pencil) the region whose area is 4.5.

(b) Suppose $\int_1^4 g(x) dx = -1.5$. The area of a shape cannot be negative. Does this integral tell us anything about the area of a particular region on the graph? If so, shade (in pen) the region. What is the area of that region?

(c) What is the area of the shaded region in the second graph?

(d) Which of the following integrals computes the area of the shaded region in the second graph?

$$\int_1^4 (f(x) - g(x)) dx \qquad \int_1^4 (f(x) + g(x)) dx \qquad \int_1^4 (g(x) - f(x)) dx$$

3. Graphs for the following problems are on the last page.

(a) Suppose $\int_1^2 f(x) dx = 1.2$ and $\int_1^2 g(x) dx = 0.5$. Can you now determine the area of any particular regions on the graph? If so, which regions and what are the areas? If not, why not?

(b) Suppose $\int_2^5 f(x) dx = 5.6$ and $\int_2^5 g(x) dx = -1.1$. Can you now determine the area of any particular regions on the graph? If so, which regions and what are the areas? If not, why not?

(c) Suppose $\int_5^7 f(x) dx = 5.1$ and $\int_5^7 g(x) dx = 2.4$. Can you now determine the area of any particular regions on the graph? If so, which regions and what are the areas? If not, why not?

(d) Does $\int_1^7 (f(x) - g(x)) dx$ compute the area of any particular region on the graph? If so, shade the region and determine the area. If not, why not?

4. Graphs for the following problems are on the last page.

(a) Use the information given below to find the area of the shaded region.

$$\int_1^3 f(x) \, dx = 4.5 \qquad \int_1^3 g(x) \, dx = 2.5$$

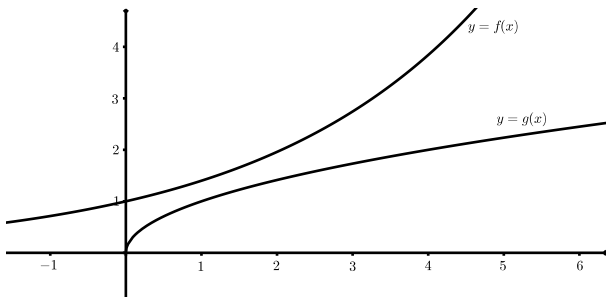
$$\int_3^4 f(x) \, dx = 0.5 \qquad \int_3^4 g(x) \, dx = 0.8$$

(b) Why doesn't $\int_1^4 (f(x) - g(x)) \, dx$ compute the area of the shaded region?

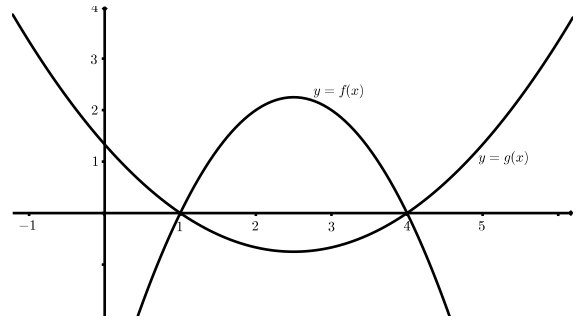
(c) Write an expression involving integrals that would find the area of the shaded region.

5. Find the area of the region bounded by the graphs of $y = 2x^2 - 13x$ and $y = -2(2x^2 + 3)$.

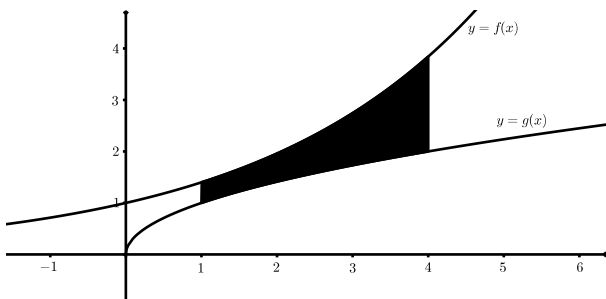
Graphs for Problem 1a and 1b



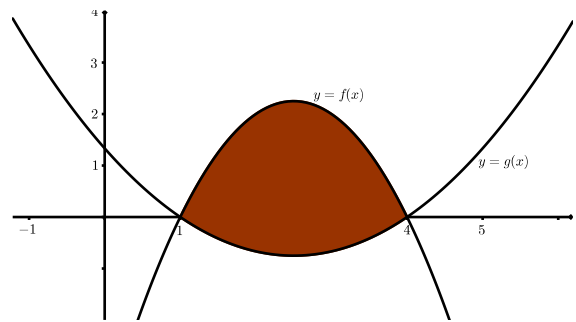
Graphs for Problem 2a and 2b



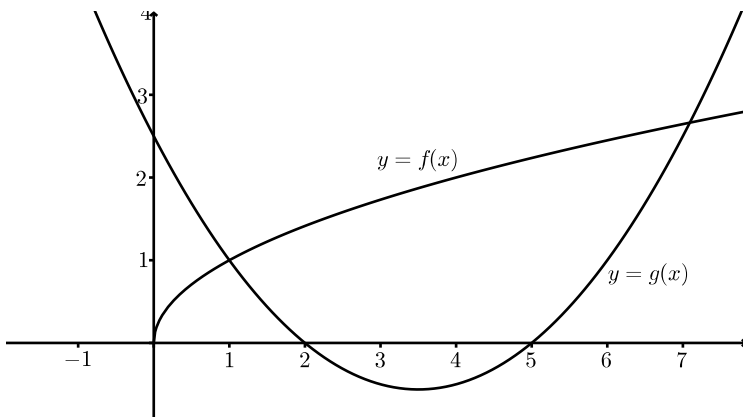
Graphs for problem 1c



Graphs for problem 2c



Graphs for Problem 3



Graphs for Problem 4

