

Worksheet: Definite Integrals

This worksheet has questions on the calculation of definite integrals and how to use definite integrals to find areas on graphs. Before attempting the questions below, you could read the study guide: *Definite Integrals*.

Definite Integrals
study guide



Model Answers
to this sheet



1. Look at the definite integrals below. Evaluate them and give your answer to two decimal places where applicable.

a. $\int_1^3 2 dx$

b. $\int_0^2 x dx$

c. $\int_4^7 x^3 dx$

d. $\int_2^5 x^{-1} dx$

e. $\int_0^{\pi} \sin(x) dx$

f. $\int_0^{\frac{\pi}{2}} \cos(x) dx$

g. $\int_1^2 e^x dx$

h. $\int_1^4 \ln(x) dx$

2. What is the area of the region enclosed by the x -axis, $f(x) = x^2$, and the limits $x = -1$ and $x = 1$.
3. What is the area of the region enclosed by the x -axis, $f(x) = -x^2$, and the limits $x = -1$ and $x = 1$. What do you notice comparing your response to your response to question 2?
4. Find the area of the region enclosed by the x -axis, $f(x) = x^3$, and the limits $x = -1$ and $x = 1$.

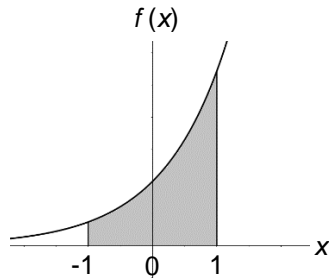
5. You are given the following definite integrals:

a. $\int_1^{4.5} \ln x \, dx$

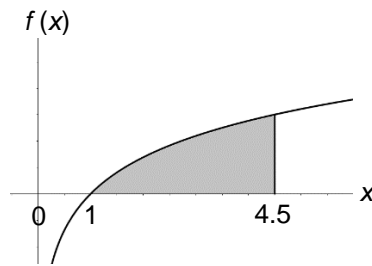
b. $\int_{-1}^1 e^x \, dx$

c. $\int_0^\pi \sin x \, dx$

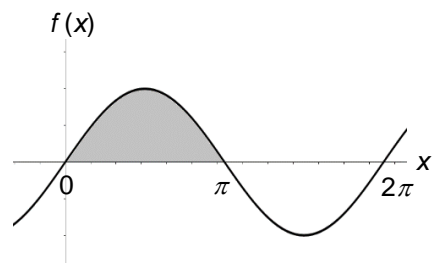
Can you identify the definite integral that represents the area of the shaded region for each of the following graphs? And then calculate the shaded area.



Graph 1

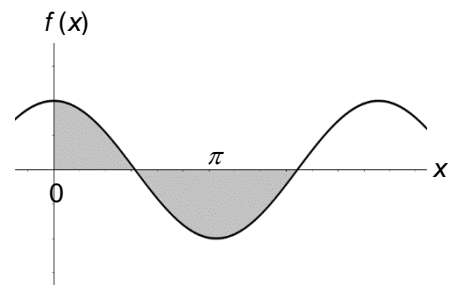


Graph 2

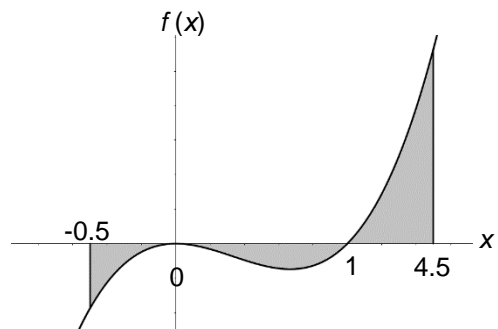


Graph 3

6. The graph to the right is the function $f(x) = \cos x$. Can you calculate the shaded area using a single definite integral? If not how many do you need and what limits will they have? Considering this, calculate the shaded area.



7. In the graph to the right you have the function $f(x) = x^3 - x^2$. Can you calculate the shaded area using a single definite integral? If not how many do you need and what limits will they have? Considering this, calculate the shaded area.



This worksheet is one of a series on mathematics produced by the Learning Enhancement Team with funding from the UEA Alumni Fund. Scan the QR-code with a smartphone app for [more resources](#).



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