The following written homework problems are due on 1/15 (Wednesday) or 1/16 (Thursday).

(1.1) The velocity of a moving particle at time t is given by $v(t) = \sin(t)$.

(a) Find the *net distance* traveled by the particle from $t = 0$ to $t = 3\pi/2$.

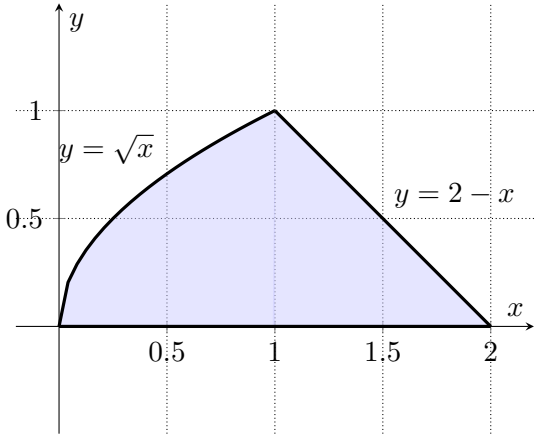
(b) Find the *total distance* traveled by the particle from $t = 0$ to $t = 3\pi/2$.

(1.2) Algebraically evaluate the integral $\displaystyle\int_{-1}^{2} \left(x^2 + |x|\right)\, dx$.

(1.3) Find the area of the shaded region below

(a) by evaluating two integrals with respect to x,

(b) by evaluating one integral with respect to y.

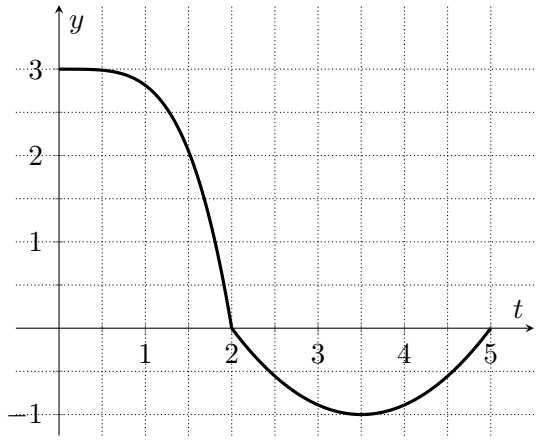


(1.4) Professional Problem.

Let

$$F(x) = \int_{2}^{x} f(t)\, dt,$$

where f is the function whose (trustworthy) graph is given below. Determine the *largest* and *smallest* values on this list: $F(0), F(2), F(3), F(4), F(5)$. Explain your answer.



As always, refer to the "Professional Problem information" handout to create a *professionally written* solution. This week, you should especially focus on:

Mathematical Details: There are two functions in this problem, $f(t)$ and $F(x)$. Don't confuse them! Be careful to interpret the integral correctly. Watch your variables closely.

Explanation: A completely justified solution will not only indicate which values are largest and smallest, but also explain why the others are *not* larger or smaller than your choices. Note that we do *not* ask you to actually calculate values for $F(x)$, and your answer should not rely on "counting boxes" to estimate areas.

Details: Pay attention to the values on the y-axis. They're there for a reason!

You should have questions! When you do, here's what to do:

1. Post your question on Canvas: `http://canvas.umn.edu/`
   The answers you get will help everyone in the class!
2. Email *all* of the instructors with your question. Their email addresses can be found on the syllabus on Canvas.
3. Write your solution (even if you're unsure about it) and bring it to the study session. Ask an instructor specific questions about it.

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