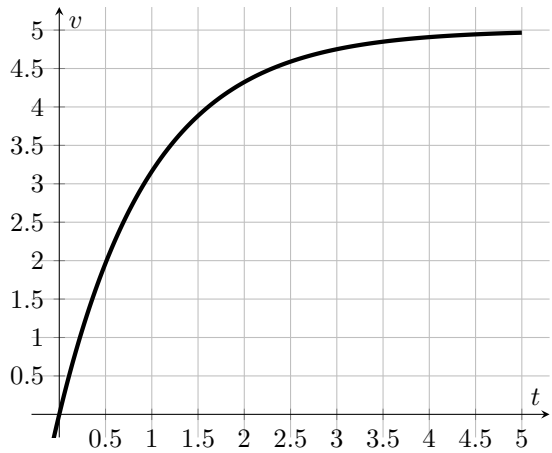
Math 132 - August 31, 2016

Warm-up Problems

1. $\boxed{\textbf{Clicker}}$ For the graph below, the units of the horizontal axis, t, is in seconds. The units of the vertical axis, $v(t)$, is in feet per second.



Shade in the area under the curve and above the horizontal axis between $t = 1$ and $t = 5$.
The units of the area is:

(a) ft^2

(b) ft

(c) sec

(d) ft/sec

(e) I don't know but Prof Thornton is awesome

2. Estimate the area you shaded in Problem 1.

3. Compute the following:

(a) $\displaystyle\sum_{i=1}^{5} \pi =$

(b) $\displaystyle\sum_{i=1}^{5} i =$

(c) $\displaystyle\sum_{i=1}^{5} i^2 =$

(d) $\displaystyle\sum_{i=1}^{5} (i + i^2) =$

Class Problems

4. $\boxed{\textbf{Clicker}}$ Compute $\displaystyle\int_{-1}^{2} |x|\, dx$

   (a) 1.5
   (b) 2
   (c) 2.5
   (d) 3

5. $\displaystyle\int_{-5}^{0} \sqrt{25 - x^2}\, dx =$

6. For this problem, we're going to compute $\displaystyle\int_{1}^{3} x^2\, dx$ using a Riemann Sum.

   (a) $a =$
   (b) $b =$
   (c) $\Delta x =$
   (d) $x_i =$
   (e) RiemannSum $=$
   (f) Simplify the Riemann sum (goal: have an algebraic expression without any $\sum$ symbols)
   (g) The definite integral is the limit of your Riemann sums as $n \to \infty$. Find this.

Properties of the Definite Integral

I. $\displaystyle\int_a^b c\, dx = c(b-a)$

II. $\displaystyle\int_a^b f(x) + g(x)\, dx = \int_a^b f(x)\, dx + \int_a^b g(x)\, dx$

III. $\displaystyle\int_a^b cf(x)\, dx = c\int_a^b f(x)\, dx$

IV. $\displaystyle\int_a^b f(x); dx = -\int_b^a f(x)\, dx$

V. $\displaystyle\int_a^b f(x)\, dx = \int_a^c f(x)\, dx + \int_c^b f(x)\, dx$

7. Suppose $\displaystyle\int_1^b f(x)\, dx = 1 - \frac{1}{b}$. Using properties of integrals, compute:

   (a) $\displaystyle\int_1^5 f(x)\, dx =$
   (b) $\displaystyle\int_{1/2}^1 f(x)\, dx =$
   (c) $\displaystyle\int_1^6 3f(x) - 4\, dx =$
   (d) $\displaystyle\int_3^5 f(x)\, dx =$