

Math 101 - Homework 12

Due Monday, December 2

1. A particle moves with velocity $v(t) = 3 - t$ along the x -axis, with time t in seconds, $0 \leq t \leq 4$. (5.1 #22)

- (a) Use $\Delta t = 1$ to give upper and lower estimates for the total displacement. What is their average?
- (b) Graph $v(t)$. Give the total displacement.

- *Example 3 on p275.*
- *Further practice: 5.1 #21, 23, 25.*

2. For $g(x) = 4x - 1$, evaluate the sums. *Hint: Try drawing the function. Let your first endpoint be x_0 and go right by steps of Δx .* (5.2 #20a,b)

(a) $\sum_{i=0}^3 g(x_i) \Delta x$, where $\Delta x = 3$ and $x_0 = 2$.

(b) $\sum_{i=1}^4 g(x_i) \Delta x$, where $\Delta x = 2$ and $x_0 = 4$.

- *See Sigma Notation on p283.*
- *Further practice: 5.2 #19, 21.*

3. A bungee jumper leaps off the starting platform at time $t = 0$ and rebounds once during the first 5 seconds. With velocity measured downwards, for t in seconds and $0 \leq t \leq 5$, the jumper's velocity is approximated by $v(t) = -4t^2 + 16t$ meters/second. *Hint: Check where $v(t)$ is positive and negative before you start.* (5.3 #26)

- (a) How many meters does the jumper travel during the first 5 seconds?
- (b) Where is the jumper relative to the starting position at the end of 5 seconds?
- (c) What does $\int_0^5 v(t) dt$ represent in terms of the jump?

- *See Example 3 on p295.*
- *Further practice: 5.3 #15, 21, 22.*

4. Find the indefinite integrals.

(a) $\int (5x^2 + 2\sqrt{x}) dx$ (6.2 # 48)

(b) $\int (e^x + 5) dx$ (6.2 # 52)

- *See Example 1 on p324.*
- *Further practice: 6.2 # 43, 45, 51.*