

# PRECALCULUS REVIEW

## PART 3: LIMITS & RATES OF CHANGE – SOLUTIONS

*The following are the solutions to the **YOUR TURN** problems found in the lesson. All of the other parts of the lesson should have been answered by what was given in the PowerPoint presentation.*

### SECTION A: BASIC LIMITS

1.  $-1$       2.  $78$       3.  $\frac{1}{e}$       4.  $2$       5.  $x$       6.  $4a$

### SECTION B: LIMITS OF RATIONAL FUNCTIONS

1.  $-1$       2.  $0$       3. undefined      4.  $6$       5.  $-13$       6.  $7$
7. undefined      8.  $\frac{1}{10}$       9.  $0$       10.  $\frac{1}{5}$       11.  $\frac{4}{5}$       12.  $-106$

### SECTION C: AVERAGE RATES OF CHANGE

Again, these are problems from pages 220-221 of the Precalculus text book.

2. (a) \$550/year      (b) \$285.71/year      (c)  $-\$100/\text{year}$       (d) \$0/year
5. (a) 250 ties/month      (b) 438 ties/month      (c) 500 ties/month  
(d) 563 ties/month      (e)  $-188$  ties/month      (f)  $-750$  ties/month  
(g)  $-1500$  ties/month      (h)  $-375$  ties/month
7. (a)  $-55.5 \text{ cm/s}^2$       (b)  $-92.5 \text{ cm/s}^2$       (c)  $-462.5 \text{ cm/s}^2$
9.  $-2$       11.  $-1$       13.  $1.5858$

## SECTION D: INSTANTANEOUS RATES OF CHANGE & DERIVATIVES

1.  $f'(x) = 2$

2.  $f'(x) = -4$

3.  $f'(x) = 2x$

4.  $f'(x) = 6x - 4$

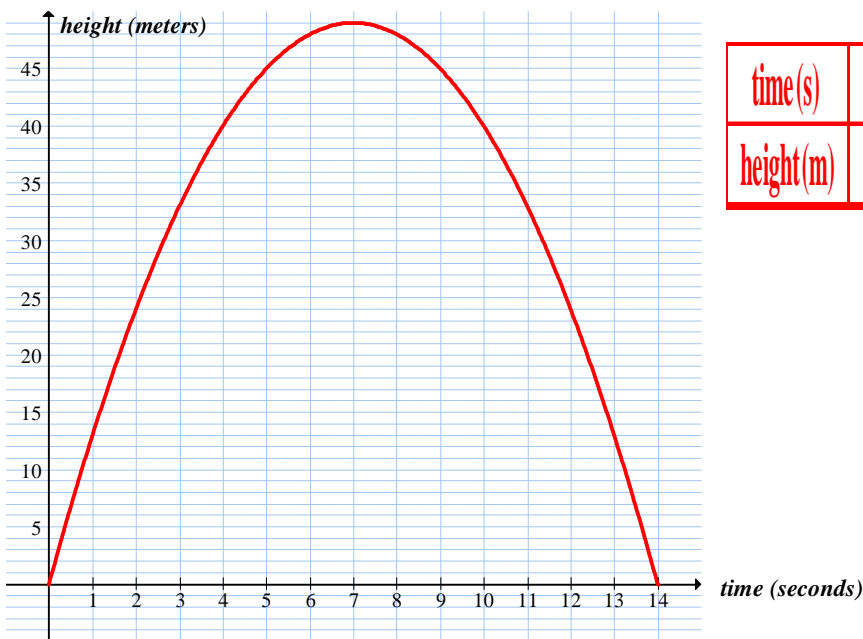
5.  $f'(x) = 3x^2$

6.  $f'(x) = -\frac{4}{x^2}$

7.  $f'(x) = \frac{1}{2\sqrt{x}}$

8.  $f'(x) = \frac{3}{2\sqrt{3x-2}}$

9. (a)



time(s)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
height(m)	0	13	24	33	40	45	48	49	48	45	40	33	24	13	0

(b) Object reaches maximum height when  $t = 7$  seconds.

(c)  $-8$  m/s

(d) Down. The average velocity being negative verifies this.

(e)  $-8$  m/s

(f) horizontal

(g)  $d'(7) = 0$ . This means that the velocity, which is also the slope of the line tangent to the curve at  $t = 7$ , is 0 as well. So the line is horizontal. Because it is at its maximum height, it has to stop in order to go from moving up to moving down.

**10.** (a) 110 ft                      (b) 194 ft                      (c) 42 ft/s

(d) velocity =  $d'(t) = 66 - 11t$                       (e)  $d'(3) = 33$  ft/s

(f) 6 seconds                      (g) 198 ft