# EECS 42 – Introduction to Electronics for Computer Science

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## Problem Set # 1 Solutions (by Farinaz Koushanfar)

**1.1 Flow.** area(hula-hoop) = $\pi r^2 = \pi (0.8)^2 = 2.0106$ (m$^2$)

number of oranges in a second = density × area(hula-hoop) × distance in one second = density × area(hula-hoop) × velocity = $100 \times 2.0106 \times 0.2 = 40.21$ oranges/s

b)      $6(40.21)/32 = 1.2566 = 7.54$ quartz/hr

c)      100 gallons =     12800 ounces
       $t = 12800/(6 \times 40.21) = 53$ (s)

**1.2 Potential**.

     $(1,-1) \Rightarrow h = 150$
     $(1,3) \Rightarrow h = 550$
     $(4,3) \Rightarrow h = 1300$
     $(4,5) \Rightarrow h = 1500$

a)      increase 1: 550 -150 = 400; increase 2: 1300-550 = 750; increase 3: 1500 -1300 = 200;
       height climbed = 200 + 400 + 750 = 1350

b)      decrease 1: = -400; decrease 21: = -750; decrease 3: = -200;
       height climbed = -(-400-750-200) = 1350

c)      my path is: $(1,-1) \Rightarrow (1,0) \Rightarrow (4,2) \Rightarrow (4,5)$
       $(1,0) \Rightarrow h = 250$; $(4,2) \Rightarrow h = 1200$
       increase 1: 250 -150 = 100; increase 2: 1200-250 = 950; increase 3: 1500 -1200 = 300;
       height climbed = 100 + 950 + 300 = 1350

**1.3 Truth Tables**.

a)

| A | B | A+B | A(A+B) |
|---|---|-----|--------|
| 0 | 0 | 0   | 0      |
| 0 | 1 | 1   | 0      |
| 1 | 0 | 1   | 1      |
| 1 | 1 | 1   | 1      |

b)

| A | B | AB | (AB)' |
|---|---|----|-------|
| 0 | 0 | 0  | 1     |
| 0 | 1 | 0  | 1     |
| 1 | 0 | 0  | 1     |
| 1 | 1 | 1  | 0     |

c)

| A | B | A' | B' | A'+B' |
|---|---|----|----|-------|
| 0 | 0 | 1  | 1  | 1     |
| 0 | 1 | 1  | 0  | 1     |
| 1 | 0 | 0  | 1  | 1     |
| 1 | 1 | 0  | 0  | 0     |

A'+B' and (AB)' are equal

d) the assignments for

**1.4 Graphical Solutions.**

d) As can be seen on the graph, intersection of $y_1(x)$ and $y_3(x)$ is at x=0.74.

e) Intersection of $y_2(x)$ (k=2) and $y_3(x)$ is at x=3.5.

NOTE: there were typos in the homework handout. Points will not be subtracted for people who solved the original form.