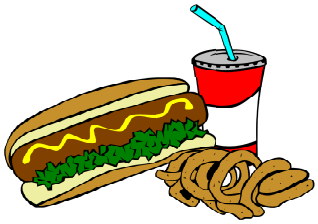
Problem

Hakim has received $30.00 as a birthday gift and wants to spend it on treating three friends and himself to lunch. The menu includes:



Main		**Sides**		**Drinks**	
Hamburger	$4.00	French Fries	$2.00	Regular	$1.25
Cheeseburger	$4.50	Onion Rings	$2.50	Large	$1.75
Veggie Burger	$3.50				

a) If each of the four boys orders 1 main, 1 side and 1 drink, in how many different ways could the boys select their lunch items?

b) Suppose each boy orders the same three items. Which combinations can Hakim afford to pay for with his birthday money?

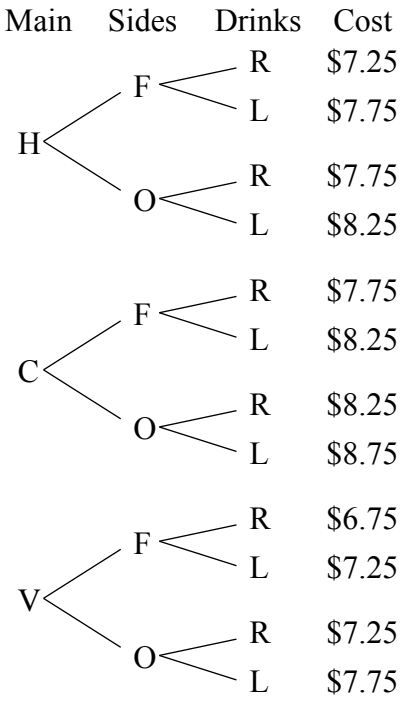
Hints

Hint 1 - Make a tree to see how many combinations exist.

Solution

a) Represent the different food choices as follows:
H - hamburger, C - cheeseburger, V - veggie burger,
F - french fries, O - onion rings,
R - regular drink, L - large drink.

Creating the tree as shown at right, we see that there is a total of 12 different ways the boys could select their lunch items.



b) If each boy selects the same three items, each lunch will cost the same. Since Hakim has only \$30, each lunch can cost at most \$30 $\div 4$ = \$7.50. Assigning costs to each of the choices reveals that the only combinations Hakim could afford are:

- hamburger + french frieds + regular drink (\$7.25);
- veggie burger + french frieds + regular drink (\$6.75);
- veggie burger + french frieds + large drink (\$7.25); or
- veggie burger + onion rings + regular drink (\$7.25).