



### Quiz 3

NAME: \_\_\_\_\_ ROLL NO: \_\_\_\_\_

In a study conducted at Virginia Tech, the plasma ascorbic acid levels were compared for smokers versus nonsmokers. Thirty-two people, free of major health disorders and ranging in age from 15 to 32 years, were selected for the study. Prior to the collection of 20 ml of blood, the participants were told to avoid breakfast, forgo their vitamin supplements, and avoid foods high in ascorbic acid content. From the blood samples, the following plasma ascorbic acid values were determined, in milligrams per 100 milliliters:

Plasma Ascorbic Acid Values		
Nonsmokers		Smokers
0.97	1.16	0.48
0.72	0.86	0.71
1.00	0.85	0.98
0.81	0.58	0.68
0.62	0.57	1.18
1.32	0.64	1.36
1.24	0.98	0.78
0.99	1.09	1.64
0.90	0.92	
0.74	0.78	
0.88	1.24	
0.94	1.18	

Is there sufficient evidence to conclude that there is a difference between plasma ascorbic acid levels of smokers and nonsmokers at significance level 0.05? Assume that the two sets of data came from normal populations with unequal variances.

**Solution:**

The hypotheses are

$$H_0 : \mu_S = \mu_N,$$

$$H_1 : \mu_S \neq \mu_N.$$

Degrees of freedom is calculated as

$$v = \frac{(0.391478^2/8 + 0.214414^2/24)^2}{(0.391478^2/8)^2/7 + (0.214414^2/24)^2/23} = 8.44,$$

which is rounded down to 8.

Computation:  $t = \frac{0.97625 - 0.91583}{\sqrt{0.391478^2/8 + 0.214414^2/24}} = -0.42$ . Since  $0.3 < P(T < -0.42) < 0.4$ , we obtain  $0.6 < P\text{-value} < 0.8$ .

Decision: Fail to reject  $H_0$ .