NAME: _____

SECTION:     001     $\boxed{or}$     003

**Instructions:**

1. Notes, your text and other books, cell phones, and other electronic devices are not permitted, except as needed to view and upload your work, and except calculators.

2. Calculators are permitted.

3.

**Problem 2**. (28 points)  A University library has thirteen laptops available for student use. Three are considered good for creators $C$

(c) (8 points) Let $S$ be the event that the saliva test is positive. $P(H_j|BS) = \frac{(.1)(.8)(.7)}{[(.1)(.8)(.7)+(.9)(.2)(.3)]} = \frac{.056}{.11} \approx .5091$

(d) (8 points) $P(H_1 \cup H_2 \cup H_3) =$

Let A be the event that the first ace appears on the 8*th* draw.
Let S be the event that the 10*th* card drawn is the ace of spades.

$$P(A) = \frac{\binom{48}{7}\,7!\,\binom{4}{1}}{\binom{52}{8}\,8!}$$

$$P(AS) = \frac{\binom{48}{7}\,\binom{3}{1}\,\binom{43}{1}\,7!}{\binom{52}{10}\,10!}$$

$$P(S|A) = \frac{P(AS)}{P(A)}$$

$$= \frac{\frac{\binom{48}{7}\binom{3}{1}\binom{43}{1}7!}{\binom{52}{10}10!}}{\frac{\binom{48}{7}7!\binom{4}{1}}{\binom{52}{8}8!}}$$

$$= \frac{3}{(4)(44)}$$

$$= \frac{3}{176}$$

An equivalent way to find P(AS)

$$P(AS) = \frac{\binom{48}{8}\,\binom{3}{1}\,8! + \binom{48}{7}\,\binom{3}{1}\,\binom{2}{1}\,7!}{\binom{52}{10}\,10!}$$