Math 4753-12

Exam 1

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R{ table(MTBE$WellClass, MTBE$Aquifier)

	Bedrock	unconsoli	
Private	103	0	103
Public	98	22	120
	201	22	223

1) $P(\text{Bedrock} \mid \text{Public}) = 98/120 = 0.8167$

2) $P(\text{Public}) = 120/223 = 0.538$

R{ table(MTBE$WellClass, MTBE$MTBE.Detect)

	Below	Detect	
Private	81	22	103
Public	72	48	120
	153	70	223

3) $P(\text{Private} \wedge \text{Below}) = 81/223 = 0.3632$

4)

	Positive	Negative
yes	0.91	
NO		0.82

$P(+|U) = 0.91$ $\quad P(-|NU) = 0.82$

$P(U) = 0.05$ $\quad P(+|NU) = 1 - P(-|NU) = 0.18$

$P(NU) = 1 - P(U) = 0.95$

$$P(U|+) = \frac{P(+|U) \cdot P(U)}{P(+|U)P(U) + P(+|NU)P(NU)} = \frac{0.91 \cdot 0.05}{0.91 \cdot 0.05 + 0.18 \cdot 0.95}$$

$P(U|+) = 0.2102$

5) 30

```
EPAGAS = read.csv("EPAGAS.CSV")
mpg = EPAGAS$MPG
Z = (mPG - mean(mpg))/sd(MPG)
mPG[abs(z)>=2 & abs(z)<=3]
```

6) 0.99

```
EPAGAS = read.CSV("EPAGAS.CSV")
mPG = EPAGAS$MPG
z = (MPG - mean(MPG))/sd(MPG)
P = length(mPG[abs(z)<=3])/length(z)
```

7) mean(EPAGAS$MPG) + sd(EPAGAS$MPG)

39.4119

$U = \mu + sd$

8) $\int_0^2 Cy^2\,dy = 1$

$$\frac{Cy^3}{3}\Big|_0^2 = 1 \Rightarrow \frac{C \cdot 2^3}{3} = 1$$

$$C = 3/2^3 = 0.375$$

9) 0 b/c continuous

10) $\int_0^2 3/9\,y^2\,dy + \int_0^1 3/9\,y^2\,dy + \int_2^3 3/9\,y^2\,dy$

$= 1$

$$\begin{cases} 3/9\,y^2 & \text{for } 0 \le y \le 2 \\ 0 & \text{for others} \end{cases}$$

So, it is one because y covers all the data for which $f(y) = 3/9\,y^2$

11) pnorm(13, 12, 4) - pnorm(8, 12, 4) = 0.4401

12) $p = 0.4567$ $\quad q = 1 - p = 0.5433$

$\Rightarrow \sigma_x^2 = p \cdot q = \mu_2' - \mu_1'^2$

$\Rightarrow \mu_2 - \mu_1'^2 = 0.4567 \cdot 0.5433 = 0.2481$