

Math 4753-12

Exam 1

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R $\{$ table(MTBE\$WellClass, MTBE\$Aguifier)

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

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

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

4)

	Positive	Negative
yes	0.91	
NO		0.82

$$P(+|U) = 0.91$$

$$P(-|NU) = 0.82$$

$$P(U) = 0.05$$

$$P(+|NU) = 1 - P(-|NU) = 0.18$$

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

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

$$P(U|+) = 0.2102$$

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
```

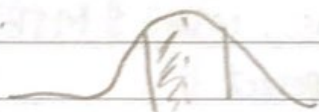
```
z = (mpg - mean(mpg)) / sd(mpg)
```

```
P = length(mpg[abs(z) <= 3]) / length(z)
```

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

39.4119

U = $\mu + \sigma$



8) $\int_0^2 C y^2 dy = 1$

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

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

9) 0 b/c continuous

10) $\int_0^2 \frac{3}{4} y^2 dy + \int_0^1 \frac{3}{4} y^2 dy + \int_2^3 \frac{3}{4} y^2 dy$

= 1

$$\begin{cases} \frac{3}{4} y^2 & \text{for } 0 \leq y \leq 2 \\ 0 & \text{for others} \end{cases}$$

So, it is one because y covers all the data for which $f(y) = \frac{3}{4} y^2$

$$11) P_{\text{norm}}(13, 12, 4) - P_{\text{norm}}(8, 12, 4) = 0.4401$$

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

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

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