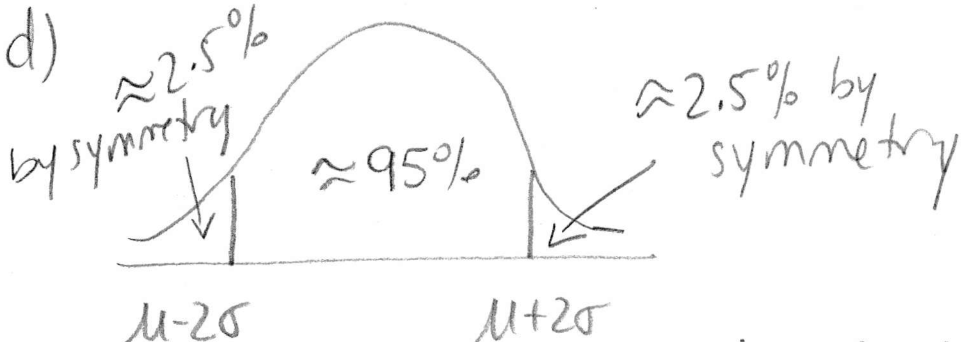
1. a) All data sets

b) $\geq 75\%$ of data lies in $\mu \pm 2\sigma$
therefore $\leq 25\%$ of data lies outside this interval.
$\leq 25\%$ of data can be more than 2σ above the mean.

c) Data sets that are roughly mound-shaped

d)



Approximately 2.5% of data will be more than 2σ above the mean.

2. a) The total of test scores from Section A is 25×72.
" " B is 35×78

The mean is $\dfrac{25 \times 72 + 35 \times 78}{60} = 75.5$

b) Skewed left when mean < median
Median should be > 75.5

3. $s^2 = 3.25$ $\quad \sigma^2 = 2.6$

Recall $s^2 = \dfrac{\text{sum of } (X-\mu)^2}{n-1}$

$$\sigma^2 = \frac{\text{sum of } (X-\mu)^2}{n}$$

So $$\frac{s^2}{\sigma^2} = \frac{\text{sum of } (X-\mu)^2}{n-1} \cdot \frac{n}{\text{Sum of } (X-\mu)^2}$$

$$\frac{s^2}{\sigma^2} = \frac{n}{n-1}$$

$$\frac{3.25}{2.6} = \frac{n}{n-1}$$

$$1.25 = \frac{n}{n-1}$$

$$1.25(n-1) = n$$

$$1.25n - 1.25 = n$$

$$0.25n = 1.25$$

$$\boxed{n = 5}$$

(4) a) $y = -2.38x + 7.53$

b) For Data Set A $r \approx -0.91$

" B $r \approx -0.98$

Data Set B fits better to a line since $|r|$ is closer to 1.

(5) a) ordered: 28 28 31 36 36 37 38 48 62

median = 36

Q_1: median of $28, \underbrace{28, 31}, 36$

$Q_1 = 29.5$

Q_3: median of $37, \underbrace{38, 48}, 62$

$Q_3 = 43$

5-# Summary

Min = 28 $Q_1 = 29.5$ Median = 36 $Q_3 = 43$ Max = 62

b) $IQR = Q_3 - Q_1 = 13.5$

Whisker length $\leq 1.5\,IQR = 20.25$

A measurement could be as big as $Q_3 + 20.25 = 63.25$ without being an outlier.

" small as $Q_1 - 20.25 = 9.25$ without being an outlier.

$\boxed{\text{NO OUTLIERS}}$

6. $P(\text{passes quality control})$

$= P(\text{passes both Test I and Test II})$

Recall $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

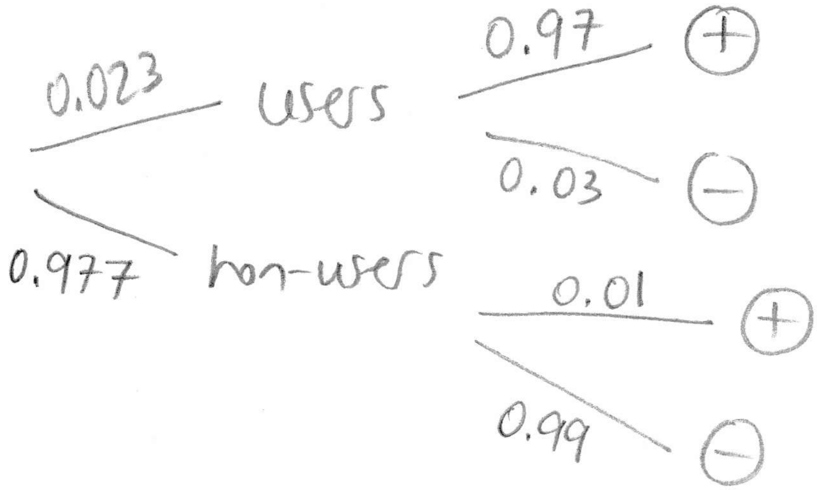
$$P(\text{Passes I or II}) = P(\text{passes I}) + P(\text{passes II}) - P(\text{passes both})$$

$$0.99 = 0.97 + 0.96 - P(\text{passes both})$$

$$P(\text{passes both}) = 0.94$$

$$\boxed{P(\text{passes quality control}) = 0.94}$$

7.



$$P(\text{non-user} \mid +) = \frac{P(\text{non-user and } +)}{P(+)}$$

$$= \frac{0.977 \times 0.01}{[0.023 \times 0.97 + 0.977 \times 0.01]}$$

$$\approx 0.305$$

⑧ $P(\geq 4 \text{ heads}) = 1 - P(\leq 3 \text{ heads})$

Recall: # ways to get k heads in 12 tosses is $12Ck$ [we are choosing which of the 12 tosses are heads]

ways to get ≤ 3 heads

$$= \underbrace{12C0}_{\text{0 heads}} + \underbrace{12C1}_{\text{1 head}} + \underbrace{12C2}_{\text{2 heads}} + \underbrace{12C3}_{\text{3 heads}}$$

OR OR OR

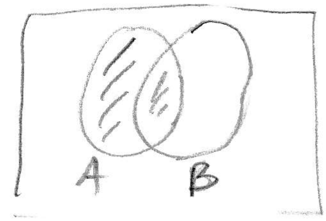
$$P(\geq 4 \text{ heads}) = 1 - \frac{12C0 + 12C1 + 12C2 + 12C3}{2^{12}}$$

$$\approx 0.927$$

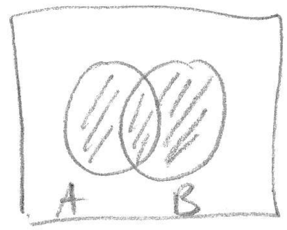
(9) $P(A \mid A \cup B)$

$$= \frac{P(A \cap (A \cup B))}{P(A \cup B)}$$

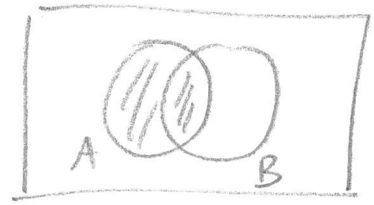
$A \cap (A \cup B) = ?$



A



$A \cup B$



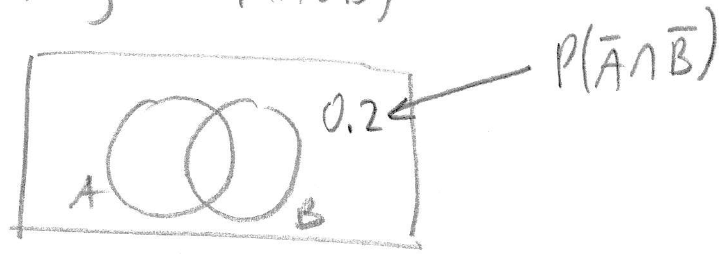
$A \cap (A \cup B) = A$

So $P(A \mid A \cup B)$

$$= \frac{P(A)}{P(A \cup B)}$$

$P(A) = 1 - P(\bar{A}) = 0.7$

To get $P(A \cup B)$:



$P(A \cup B) = 1 - 0.2 = 0.8$

So $P(A \mid A \cup B) = \frac{0.7}{0.8} = 0.875$