

EQUITY

LEARNING PLACE

Sec 4 Elementary Mathematics WA2

1) The table below shows that ages of 16 employees who work part-time at a café.

20	21	16	23
22	17	19	65
23	22	17	22
23	19	19	18

a) Complete the dot diagram to show the distribution of the ages of the employees. [2]



b) Find the median age.

$$\frac{20 + 21}{2} = 20.5$$

Answer: 20.5 [1]

c) Calculate the mean age.

Answer: 22.875 [1]

d) Pranav said that “The mean is the most accurate way to determine the average age of the employees.” Is he correct? Explain.

No, there is an extreme value, 65, in the set

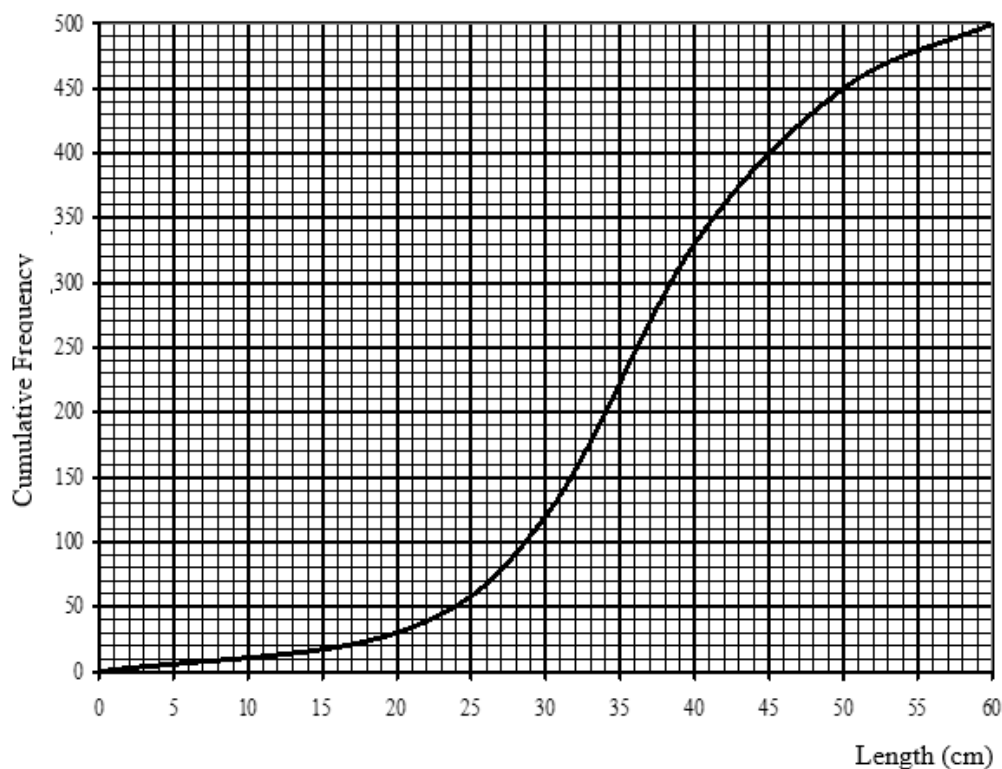
of data causing mean to be unreliable. [2]

EQUITY

LEARNING PLACE

Sec 4 Elementary Mathematics WA2

2) The diagram below illustrates the cumulative frequency curve for the length of 500 fishes which are reared in Pond A.



Use the graph to find,

a) the percentage of fishes that are more than 50 cm,

$$\frac{50}{500} \times 100\% = 10\%$$

Answer: _____ [1]

b) the median length of fishes,

Answer: 36 cm [1]

c) the interquartile range.

$$43 - 30.5 = 12.5$$

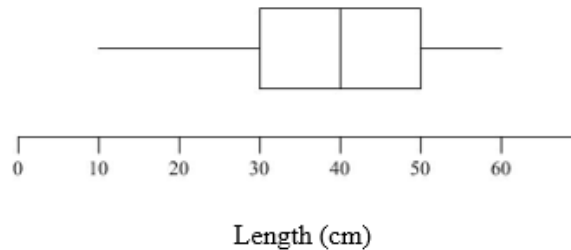
Answer: _____ [1]

EQUITY

LEARNING PLACE

Sec 4 Elementary Mathematics WA2

d) Another 500 fishes are reared in Pond B. The box and whisker diagram below illustrates the length of the fishes.



If you are interested to invest in a fishpond. Based on the above given statistics for Pond a and Pond B, give 2 reasons, which pond would you invest in?

Pond B, median is higher means fish is bigger.

The interquartile range is larger also meaning the sizes of fish varies more which may include more young fish. [2]

e) If a fish, of length 25 cm, is taken out of Pond B, state and explain the possible effect of this on the median.

The median will increase because the fish taken

out has a length lesser than the median [2]

EQUITY

LEARNING PLACE

Sec 4 Elementary Mathematics WA2

3) The table below gives information about the ages of the members in the Any Time Fitness Club.

	Members aged under 50	Members aged 50 or over
Male	50	34
Female	36	30

a) One of these members is selected at random. Find, as a fraction in its lowest term, the probability that he or she is under 50.

$$P(\text{under 50}) = \frac{86}{150} = \frac{43}{75}$$

Answer: _____ [1]

Two of the members are selected at random. Find the probability that,

b) both members are female

$$P(\text{both female}) = \frac{66}{150} \times \frac{65}{149} = \frac{429}{2235} = \frac{143}{745}$$

Answer: _____ [1]

c) they are both aged 50 or over, but only one is male member.

$$P(\text{only 1 male}) = \frac{34}{150} \times \frac{30}{149} + \frac{30}{150} \times \frac{34}{149} = \frac{68}{745}$$

Answer: _____ [2]

EQUITY

LEARNING PLACE

Sec 4 Elementary Mathematics WA2

4) Ahmad and Beng Hai want to rent lockers in school. The lockers are in two levels. Locker 1A to 1C on the lower level and Locker 2A to 2C are on the next level. Lockers are assigned to each student randomly.

a) Using a possibility diagram, represent the two lockers that the two boys can be allocated.

[2]

	1A	1B	1C	2A	2B	2C
1A		1B1A	1C1A	2A1A	2B1A	2C1A
1B	1A1B		1C1B	2A1B	2B1B	2C1B
1C	1A1C	1B1C		2A1C	2B1C	2C1C
2A	1A2A	1B2A	1C2A		2B2A	2C2A
2B	1A2B	1B2B	1C2B	2A2B		2C2B
2C	1A2C	1B2C	1C2C	2A2C	2B2C	

b) Find the probability that Ahmad and Beng Hai are randomly allocated lockers next to each other on Level 2.

$$P(\text{next to each other on L2}) = \frac{4}{30} = \frac{2}{15}$$

Answer: _____ [1]

c) Find the probability that Ahmad and Beng Hai are randomly allocated lockers on different levels.

$$P(\text{different level}) = \frac{18}{30} = \frac{3}{5}$$

Answer: _____ [1]

d) If the locker 2C was not available, find the probability that the friends will be allocated lockers next to each other at any level.

$$P(\text{next to each other}) = \frac{6}{20} = \frac{3}{10}$$

Answer: _____ [2]

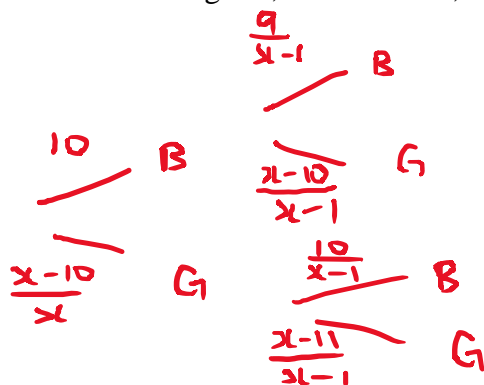
EQUITY LEARNING PLACE

Sec 4 Elementary Mathematics WA2

5) There are x students in a class. 10 are boys while the rest are girls.

2 students are selected at random.

a) Draw a tree diagram, in terms of x , to show the probabilities of the possible outcomes. [2]



b) The probability that 2 girls are selected is $\frac{1}{8}$. Form an equation in terms of x and show that it reduces to $7x^2 - 167x + 880 = 0$. [2]

$$\frac{x-10}{x} \times \frac{x-11}{x-1} = \frac{1}{8}$$

$$\frac{x^2 - 21x + 110}{x^2 - x} = \frac{1}{8}$$

$$8x^2 - 168x + 880 = x^2 - x$$

$$7x^2 - 167x + 880 = 0$$

(shown)

c) Solve the equation $7x^2 - 167x + 880 = 0$

$$(7x - 55)(x - 16) = 0$$

$$x = \frac{55}{7} \text{ or } x = 16$$

Answer: _____ [1]

d) Find, as a fraction, the probability that one boy and one girl are selected.

$P(\text{one boy and one girl})$

$$= \frac{10}{16} \times \frac{6}{15} + \frac{6}{16} \times \frac{10}{15}$$

$$= \frac{1}{2}$$

Answer: _____ [2]

EQUITY

LEARNING PLACE

Sec 4 Elementary Mathematics WA2

6) Amanda, Karen and Doris took a multiple choice test consisting of 50 questions. The result of the tests are shown in the table below.

	Correct	Incorrect	Not attempted
Amanda	42	4	4
Karen	x	$50 - x$	0
Doris	32	8	10

In the test, 2 marks are awarded for each correct answer but 1 mark is deducted for each incorrect answer. No mark is penalised for non-attempt of any question.

a) Write down a 3×3 matrix **A** and 3×1 matrix **B** such that **AB** shows the total score obtained by each girl in the test.

Answer: $A = \begin{pmatrix} 42 & 4 & 4 \\ x & 50-x & 0 \\ 32 & 8 & 10 \end{pmatrix} \quad B = \begin{pmatrix} 2 \\ -1 \\ 0 \end{pmatrix}$ [2]

b) Find the matrix **AB**, in terms of x ,

$AB = \begin{pmatrix} 42 & 4 & 4 \\ x & 50-x & 0 \\ 32 & 8 & 10 \end{pmatrix} \begin{pmatrix} 2 \\ -1 \\ 0 \end{pmatrix} = \begin{pmatrix} 80 \\ 3x-50 \\ 56 \end{pmatrix}$

Answer: _____ [1]

c) If Karen scored the lowest in this test, find the maximum number of correct answers she has.

$$3x - 50 = 55$$

$$3x = 105$$

$$x = 35$$

Answer: _____ [2]