

Chance and data practice

Skill 9.1 Stem and leaf plots

Sharon and Bruce play a game where they roll a die twelve times, which gives them the total score. Set up a back-to-back stem and leaf plot to decide who is the luckier playing.

Sharon's scores: {51, 34, 53, 59, 53, 67, 22, 59, 21, 65}

Bruce's scores: {55, 69, 48, 49, 69, 23, 34, 49, 35, 36}

Skill 9.2: Measures of central tendency

- 1 A survey of the number of toothbrushes present in the houses visited gave the following results:

{4, 3, 0, 4, 9, 5, 10, 0, 1, 4, 4, 11}

From the data set:

- rank the data from smallest to highest
 - find the mean value
 - find the mode
 - find the median
- 2 Use the information displayed in this frequency table to find the mean of the data:

Data	Frequency
0	12
1	18
2	22
3	60

Skill 9.3 Measures of spread

The following numbers are the last five inning by Mike Garnett in the under-14 cricket competition: {16, 22, 0, 42, 20}

- 2 Construct a cumulative frequency table and
- draw the cumulative frequency diagram
 - find the median value

Skill 9.7 Scatter plots and line of best fit

The following information relates the age of a sample of people to their height.

Age (years)	Height (m)
0.5	0.2
2	0.4
1	0.35
4	1
3	0.8
1.5	0.6
2.5	0.65

Plot the data on a scatter plot and find the equation of the line of best fit.

Find the:

- range of the scores
- mean of the scores
- standard deviation of the scores

Skill 9.4 Interquartile range and box and whisker plots

Find the interquartile range of this data and display using a box and whisker plot.

{30, 21, 10, 14, 14, 15, 13, 27, 23, 29}

Skill 9.5 Displaying continuous data

Tabulate these times taken to complete the 400 m walk-a-thon into a frequency table and display the results using a bar graph.

Use the ranges (in minutes):

0 to < 1, 1 to < 2, 2 to < 3, 3 to < 4, 4 to 5.

{1.4, 3.8, 4.7, 4.2, 2.3, 2.8, 2, 1.3, 1.9, 2.7, 2.65, 4.2, 2.3, 0.7, 1.5, 2.6, 2.5, 3.8, 1.38, 2.7}

Skill 9.6 Working with continuous data

The following data refer to the annual brick throwing competition by the U/13 brick throwing team.

Distance thrown (m)	Frequency
138 to < 142	3
142 to < 148	9
148 to < 152	13
152 to < 158	4
158 to < 162	1

- 1 Use this information to find
- the mean
 - the modal class

Skill 9.8 Probability and complementary events

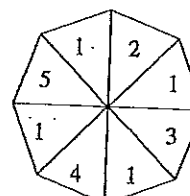
Disks with the following numbers on them are placed in a hat

{1, 1, 2, 2, 2, 3, 3, 4, 4, 4, 4}

- Find the probability of selecting an even numbered disk.
- Describe the event which is complementary to selecting an even numbered disk and find its probability.
- Find the probability of choosing a disk with a number less than 3 or equal to 4 on it.

Skill 9.9 Displaying sample spaces

Display the sample space obtained when this spinner is spun together with tossing a fair coin.



Skill 9.10 Probability of multiple independent events

A box contains 3 red marbles, 4 blue marbles and 6 green marbles. A game is played where a marble is chosen, its colour noted, and it is then replaced. A second marble is then chosen.

Find the probability of choosing

- 1 two red marbles 2 two blue marbles
- 3 two green marbles
- 4 a red one followed by a green one
- 5 a blue one followed by a red one
- 6 a green and red in any order
- 7 a blue and green in any order

Skill 9.11 Probability of multiple dependent events

7 red, 3 blue and 8 green marbles are placed in a bag. Three marbles are chosen one at a time without replacing them.

Find the probability of selecting:

- 1 three blue 2 three green
- 3 one red, green, blue in that order
- 4 a green, red, green in that order
- 5 a green, red and green in any order

Skill 9.12 Probability and gambling odds

- 1 Express the following racing odds as a probability of the horse winning:
Go Puckle 10 : 1, Bully Boy 16 : 1,
Will's Thrill 8 : 5, Jenny's Joy 1 : 2,
Henry's Hooray 33 : 1
- 2 Find the expected payout for a ten-dollar bet on the horses in the above race.

Skill 9.13 Simulating experiments

- 1 Design a spinner to model the selection of a ball from a bag containing 6 blue, 5 green and 9 red.
- 2 Assign random numbers generated by the calculator (0-999) to model the selection of a ball from a bag containing 6 blue, 5 green and 9 red and simulate the drawing of 20 ball selections.

Skill 9.1

Sharon	Bruce
1, 2	3
4	4, 5, 6
1, 3, 5, 9	8, 9, 9
5, 7, 9	5
	9, 9

Sharon's scores appear to be consistently higher than Bruce's.

Skill 9.2

- 1 (a) {0, 0, 1, 3, 4, 4, 4, 4, 5, 9, 10, 11}
 (b) 4.58 (c) 4 (d) 4
 2 $242 \div 112 = 2.16$

Skill 9.3

- 1 42 2 20 3 15

Skill 9.4

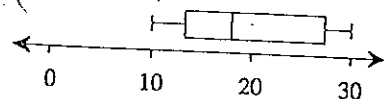
{10, 13, 14, 14, 15, 21, 23, 27, 29, 30}

Median = 18

Lower Quartile = 14

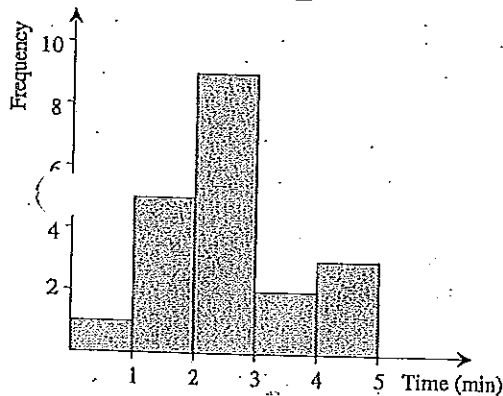
Upper Quartile = 27

Interquartile range = $27 - 14 = 13$



Skill 9.5

Range (min)	Frequency
0 to <1	1
1 to <2	5
2 to <3	9
3 to <4	2
4 to 5	3

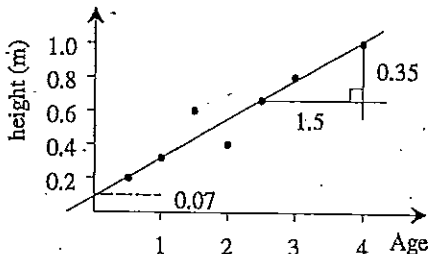


Skill 9.6

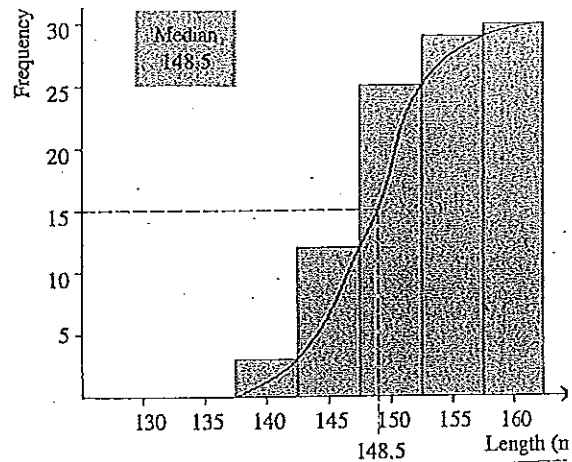
- 1 (a) 148.5 (b) (148 to <152)

Length	Freq.	Cumulative Freq.
137 to <142	3	3
142 to <147	9	12
147 to <152	13	25
152 to <157	4	29
157 to <162	1	30

Skill 9.7



$$h = \frac{7}{30}A + 0.07$$

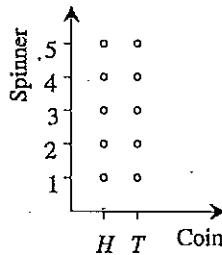


$$m = \frac{0.35}{1.5} = \frac{7}{30}$$

Skill 9.8

- 1 $\frac{7}{11}$
 2 selecting an odd numbered disk = $1 - \frac{7}{11} = \frac{4}{11}$
 3 $\frac{9}{11}$

Skill 9.9



Skill 9.10

- 1 $\frac{9}{169}$ 2 $\frac{16}{169}$ 3 $\frac{36}{169}$ 4 $\frac{18}{169}$ 5 $\frac{12}{169}$
 6 $\frac{36}{169}$ 7 $\frac{48}{169}$

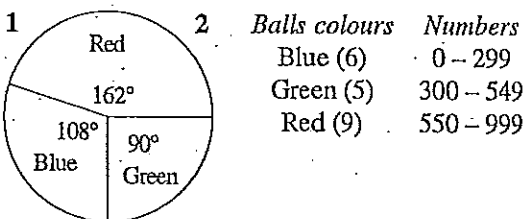
Skill 9.11

- 1 $\frac{3}{18} \times \frac{2}{17} \times \frac{1}{16} = \frac{1}{816}$ 2 $\frac{8}{18} \times \frac{7}{17} \times \frac{6}{16} = \frac{7}{102}$
 3 $\frac{7}{18} \times \frac{8}{17} \times \frac{3}{16} = \frac{7}{204}$ 4 $\frac{8}{18} \times \frac{7}{17} \times \frac{7}{16} = \frac{49}{612}$
 5 $3 \times \frac{49}{612} = \frac{49}{204}$

Skill 9.12

- 1 Go Puckle $\frac{1}{11}$, Jenny's Joy $\frac{2}{3}$, Bully Boy $\frac{1}{17}$,
 Henry's Horray $\frac{1}{34}$, Will's Thrill $\frac{5}{13}$
 2 Go Puckle \$110, Jenny's Joy \$15, Bully Boy \$17,
 Henry's Hooray \$340, Will's Thrill \$26

Skill 9.13



Sample simulation:

742	003	453	839	874
782	073	143	314	533
636	434	831	059	622
456	114	770	284	225

Results

Blue 7 Green 5 Red 0