Chance and data practice

Skill 9.1 Stem and leaf plots

Sharon and Bruce play a game where they role 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:

(a) rank the data from smallest to highest

(b) find the mean value

(c) find the mode

(d) 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}

Find the:

1 range of the scores

2 mean of the scores

3 standard deviation of the scores

Skill 9.4 Interquartile range and box and whisker plots

Find the interquartile range of this data and display it 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

(a) the mean (b) the modal class

2 Construct a cumulative frequency table and

(a) draw the cumulative frequency diagram

(b) 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.

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}

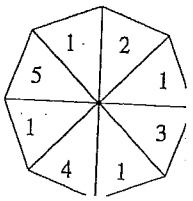
1 Find the probability of selecting an even numbered disk.

2 Describe the event which is complementary to selecting an even numbered disk and find its probability.

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

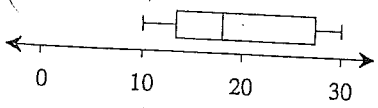
2 $242 \div 112 = 2.16$

Skill 9.3

1 42 2 20 3 15

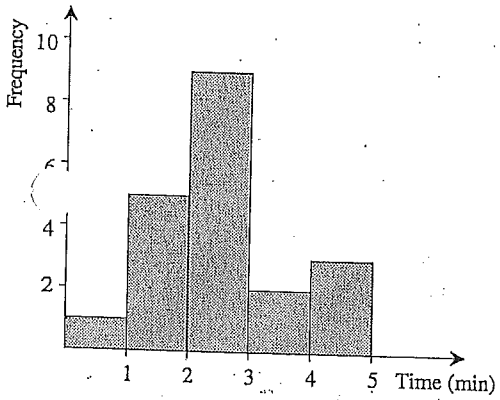
Skill 9.4

{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

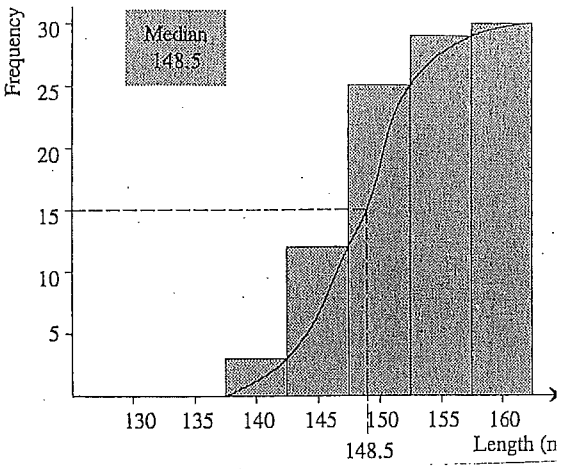


Skill 9.6

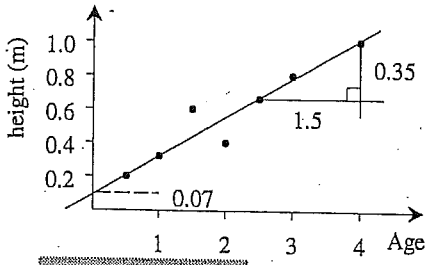
1 (a) 148.5 (b) (148 to <152)

2

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



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

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

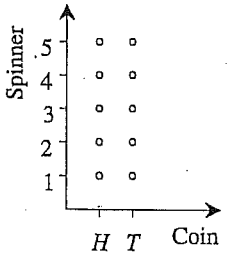
Skill 9.8

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 $3 \times \frac{49}{612} = \frac{49}{204}$

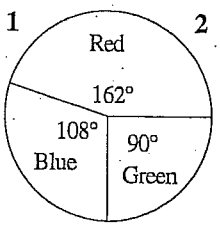
Skill 9.12

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

1



2

Balls colours	Numbers
Blue (6)	0 – 299
Green (5)	300 – 549
Red (9)	550 – 999

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:8