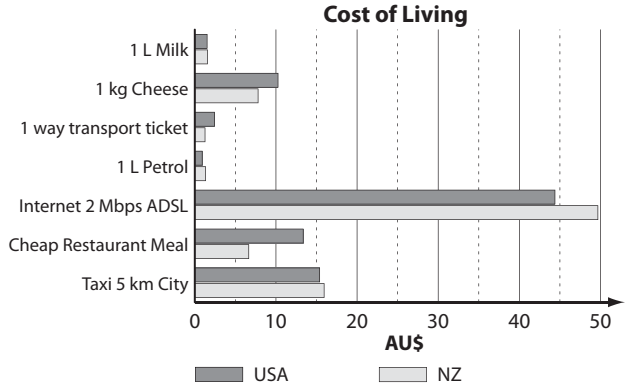
29. [Statistics]

Skill 29.1 Interpreting data in column or bar graphs (1).

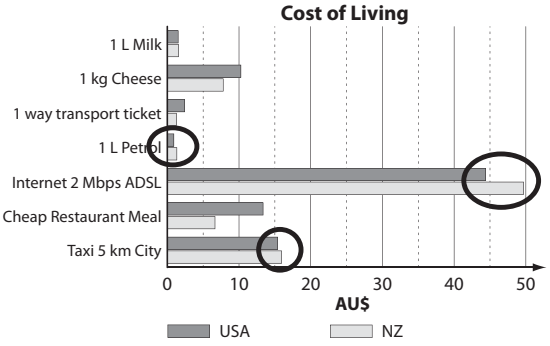
Q. How many of the cost of living items are more expensive in New Zealand than the USA?



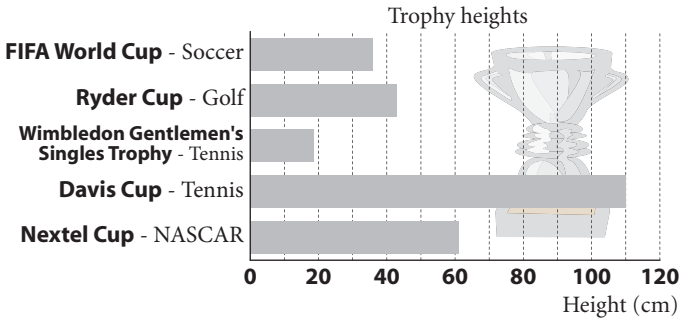
A. *3*

Find the New Zealand bars in the graph.

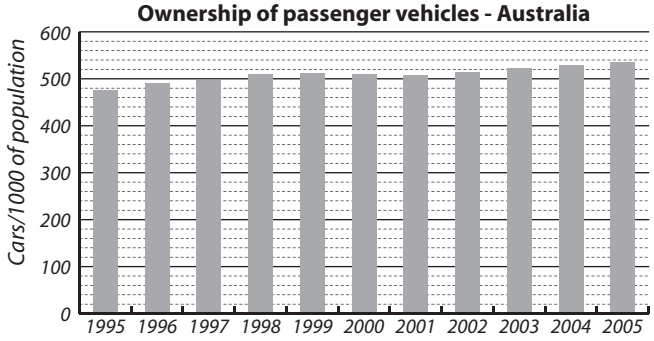
Measure which ones are longer than their USA equivalents.



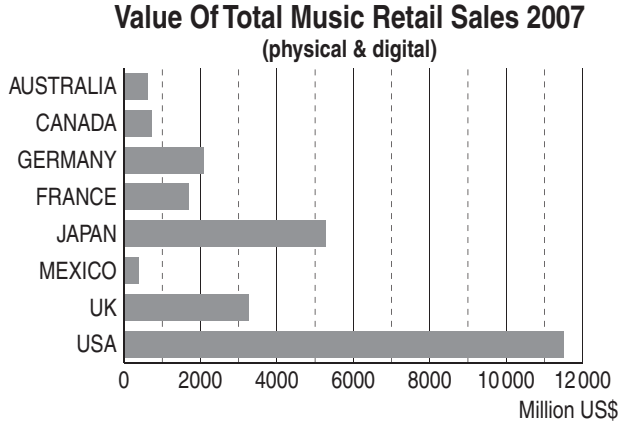
a) Of the trophies listed below, which sport has the 3rd highest trophy?



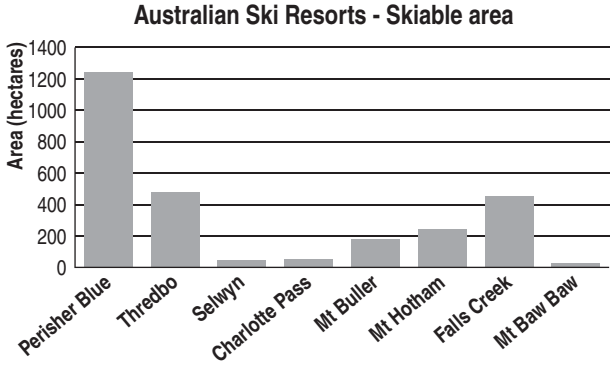
b) In which year did Australian car ownership first exceed 50%?



c) How many of the countries listed below had retail music sales in 2007 greater than US$3000 million?

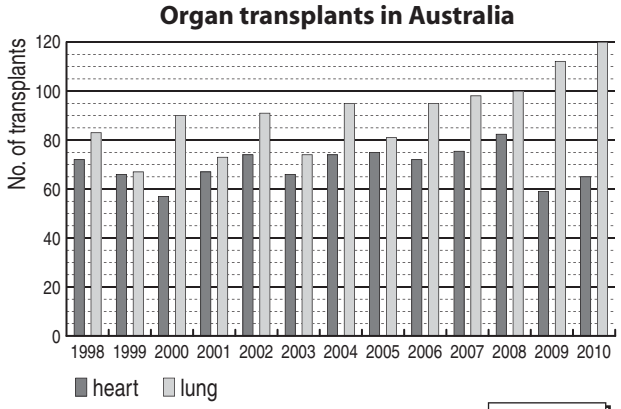


d) Which Australian ski resort listed below has an area closest to 400 hectares?

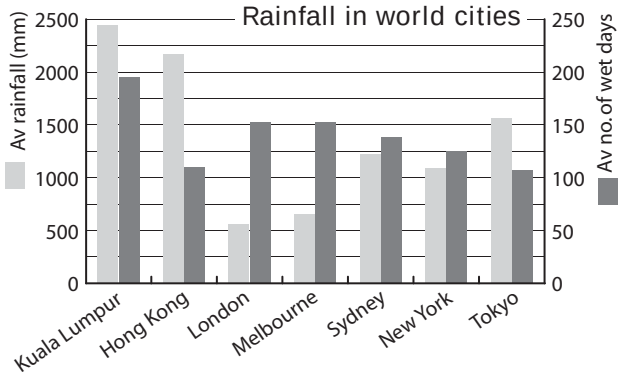


Skill 29.1 Interpreting data in column or bar graphs (2).

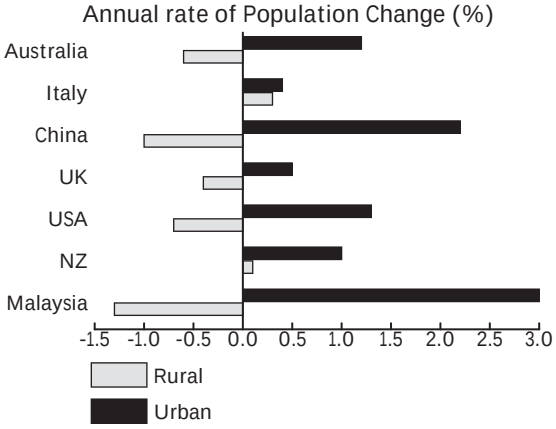
e) In which year were the number of heart and lung transplants most similar?



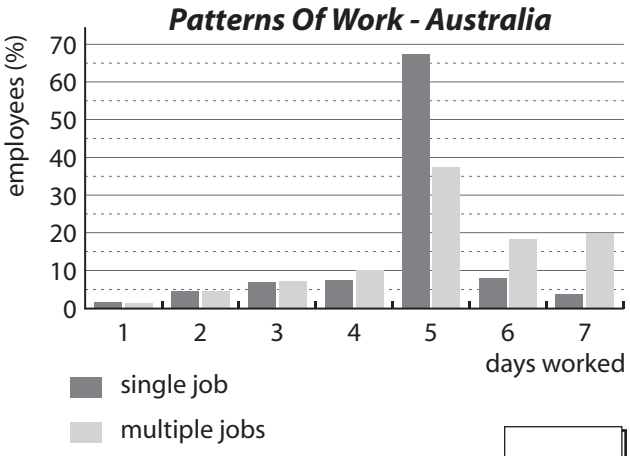
f) Which city has the most wet days compared to the amount of rainfall?



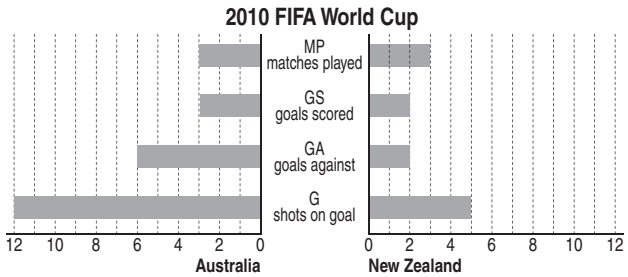
g) Of the countries shown below which have an increasing population in both rural and urban areas?



h) What percentage of multiple job employees work 4 days a week?

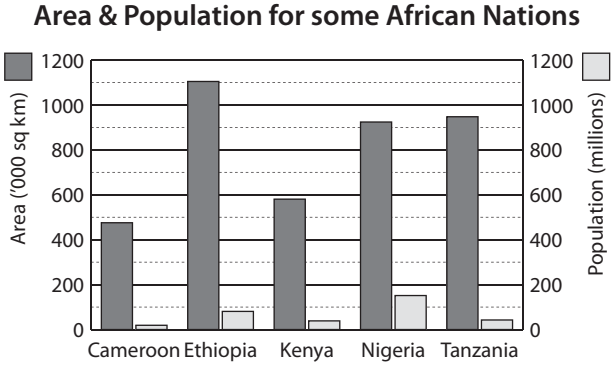


i) What percentage of Australia's shots on goal in the 2010 FIFA world cup were actually converted to goals?



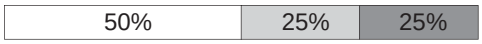
%

j) Which of the African nations shown is the most densely populated? [Hint: people/area]

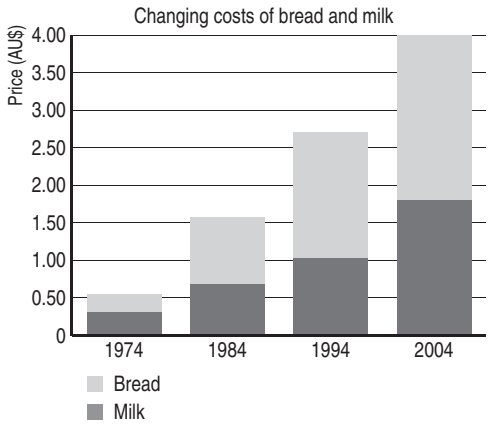


Skill 29.2 Interpreting data in stack graphs.

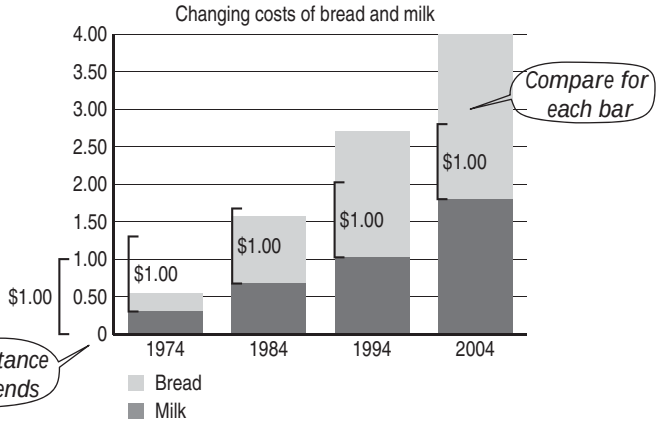
- Read such that each piece of the bar represents a percentage or proportion of the total.
  Example:



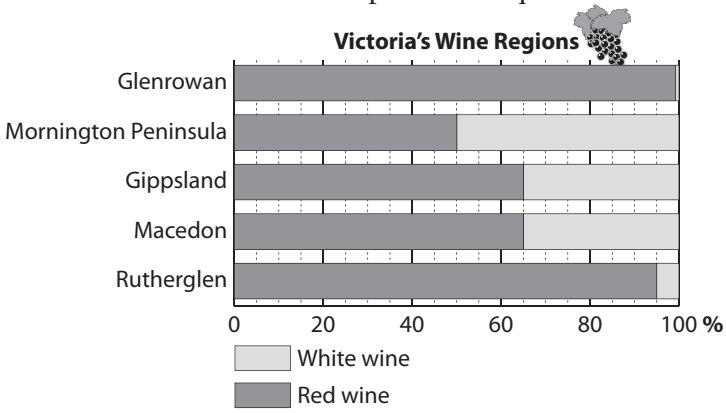
Q. In which of the years shown was the price of bread in Australia closest to $1.00?



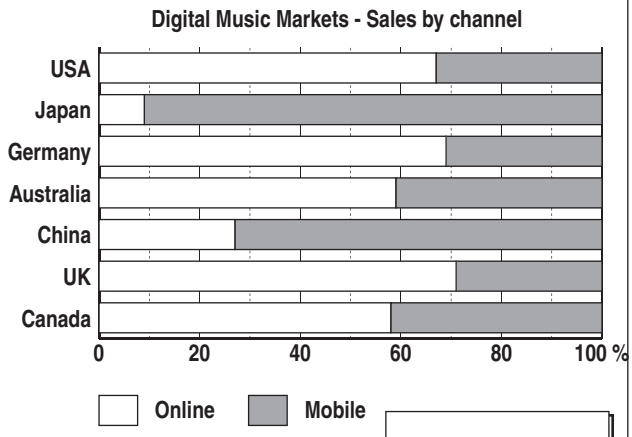
A. ***1984***



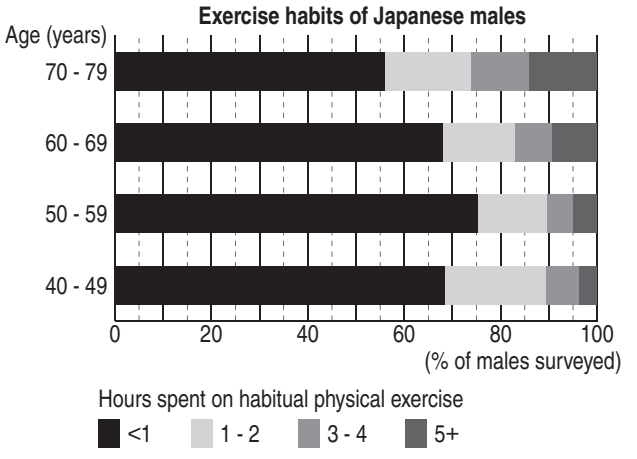
a) In which Victorian wine region does the amount of white wine produced equal 5%?



b) In which country do mobile sales comprise approximately 73% of digital sales?

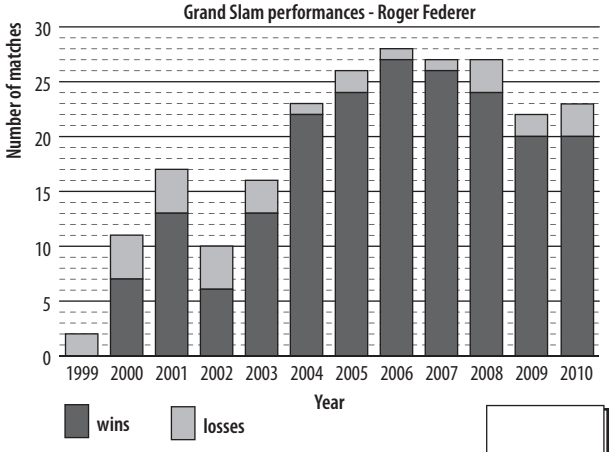


c) In which age bracket did the highest percentage of respondents spend 3 to 4 hours on habitual physical exercise?



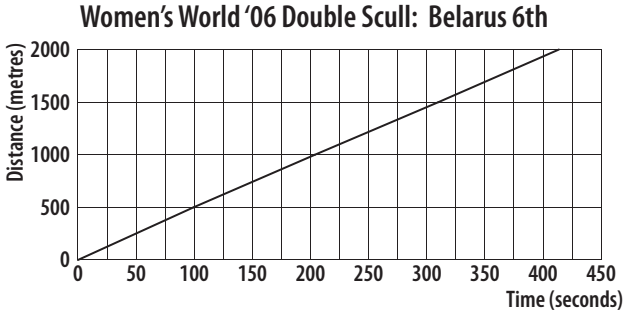
d) Between 2000 and 2010, Roger Federer had played in all 4 grand slam tournaments each year. How many grand slam tournaments has Roger Federer won in that time?

[Hint: The grand slams are knock-out tournaments.]



Skill 29.3 Interpreting data in line graphs (1).

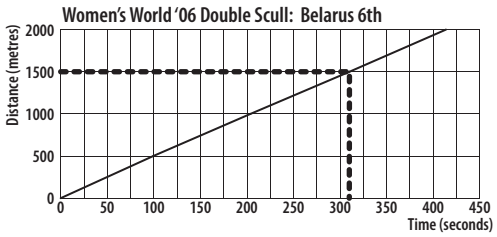
Q. How far into the race was the Belarus team after 5 minutes and 10 seconds?



A. *5 mins + 10 seconds* (Convert to seconds)

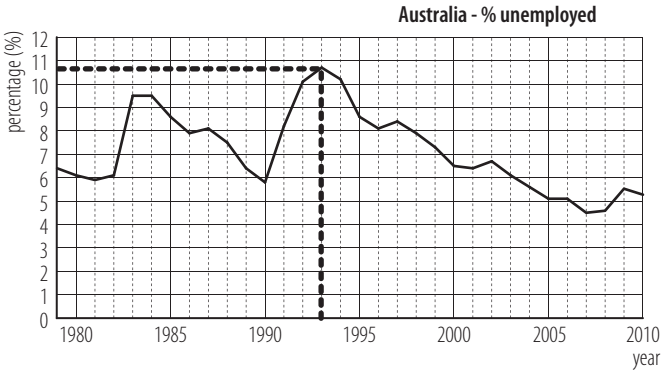
= 5 × 60 + 10

= 310

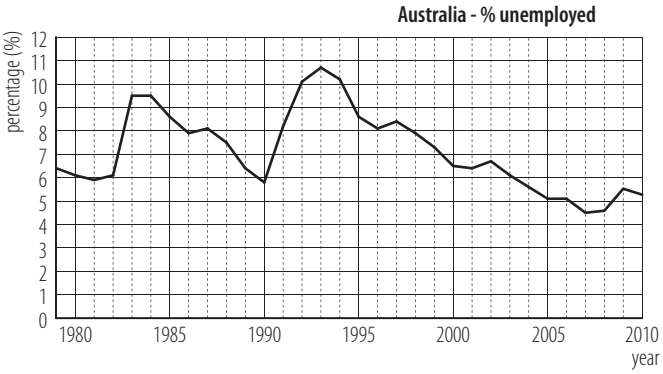


1500 m

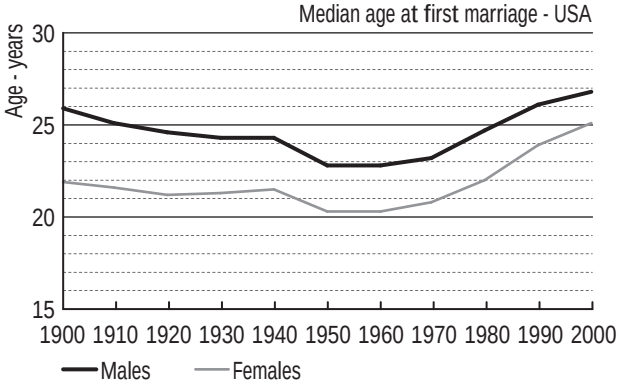
a) In which year between 1979 and 2007 was the highest percentage of Australians unemployed?



b) Using the data below, between which 2 years did the percentage of unemployed Australians increase most?

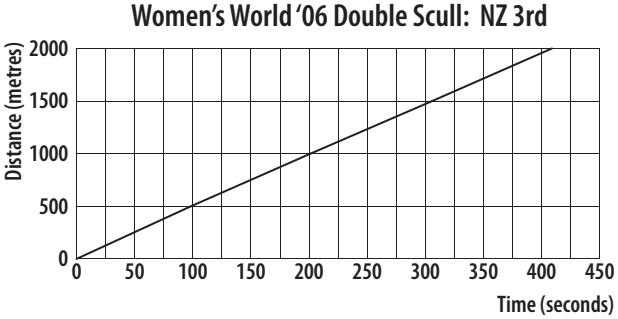


c) In which of the years shown has there been the greatest difference in marrying age of men and women in the USA?



d) At what approximate speed, in m/s, did the New Zealand team row?

A) 0.5 m/s B) 2 m/s C) 5 m/s D) 10 m/s



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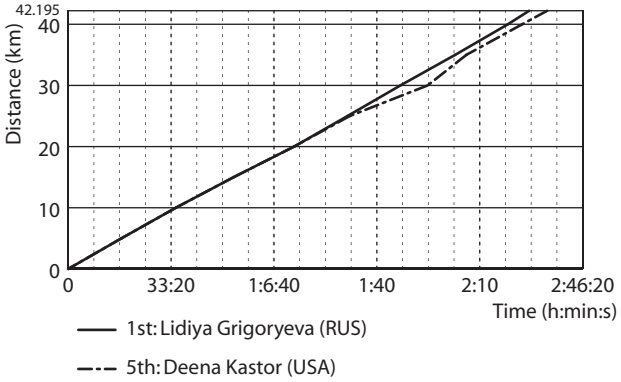
.....

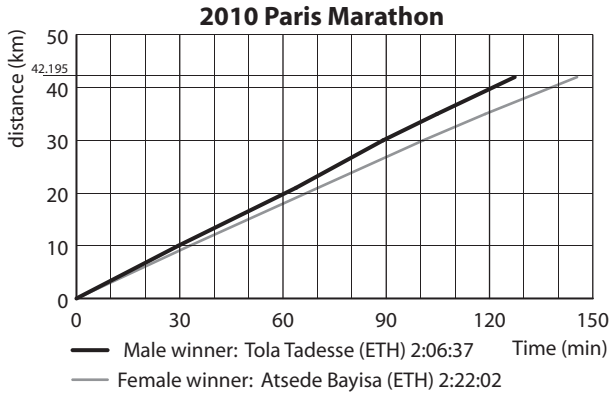
Skill 29.3 Interpreting data in line graphs (2).

e) How far into the marathon was Deena Kastor when she began to recover from stomach cramps?



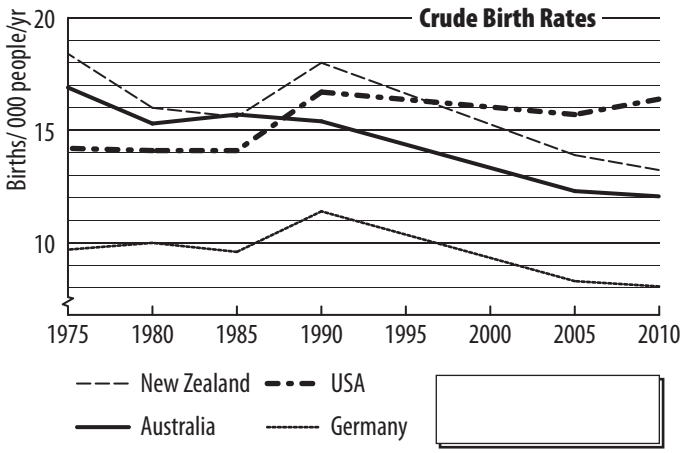
km

f) Approximately how much longer did it take Atsede than Tola to reach the 30 km mark of the 2010 Paris marathon?

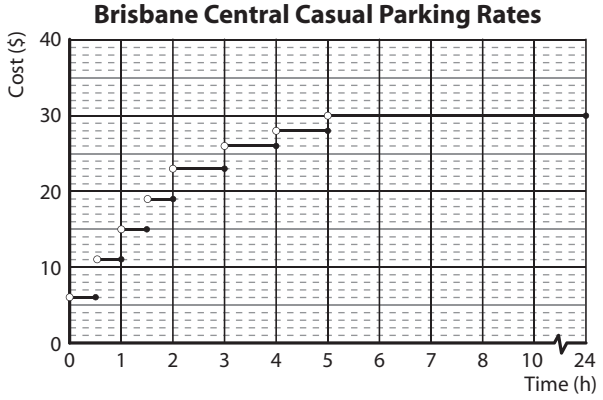


min

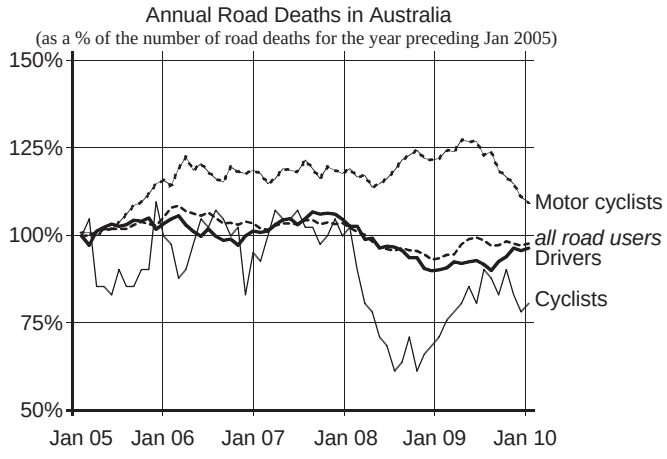
g) During which 5-year interval did Australia's crude birth rate go most against the trend?



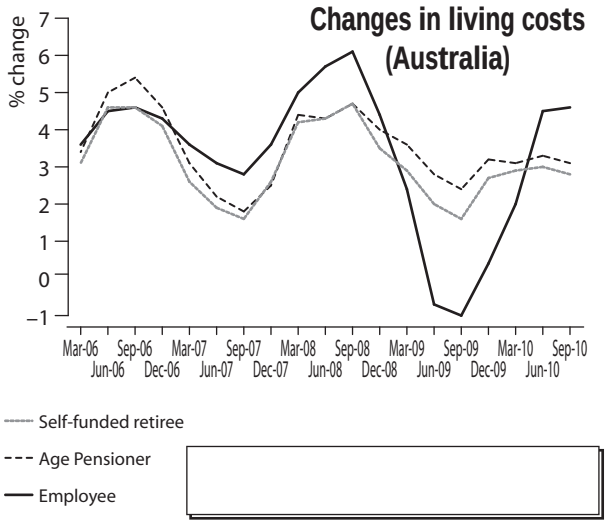
h) What is the cost to park for 3.5 hours?



i) Since 2005, which type of road user has the pecentage change in road deaths most similar to the '*all road users*' average?

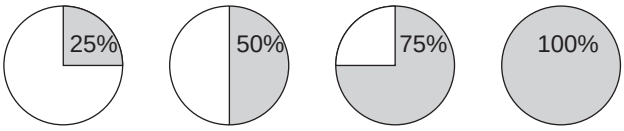


j) Which Australian household type had the greatest % change in living costs for the March 2010 to June 2010 quarter?

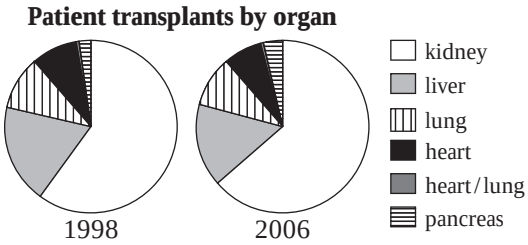


Skill 29.4 Interpreting data in pie charts.

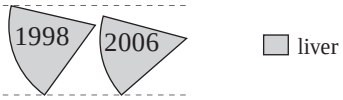
- Pie graphs are circular. Consider each section of the graph as a piece of the pie.
  Hint: Each piece of pie represents a percentage of the total.
  Example:



Q. Which of the years shown had the largest proportion of liver transplants?

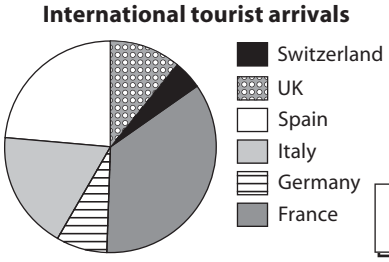


A. Compare the relative sizes of the sectors (pieces of the pie charts) for both years.



1998

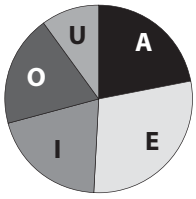
a) Of the European countries listed below which had the third highest number of international tourist arrivals?



Italy

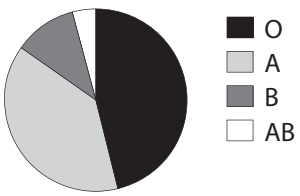
b) In the Concise Oxford Dictionary, the chance of a vowel being a "U" is closest to:

A) 5% B) 10% C) 15% D) 25%

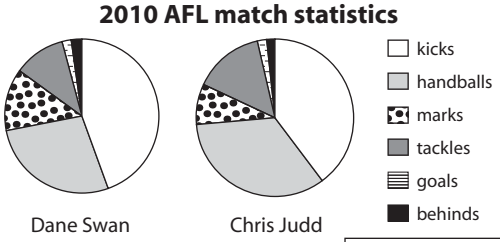


Frequency of vowels -
Concise Oxford Dictionary

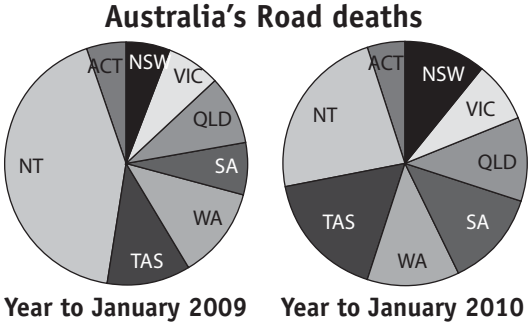
c) Which blood type accounts for closest to 10% of the population?



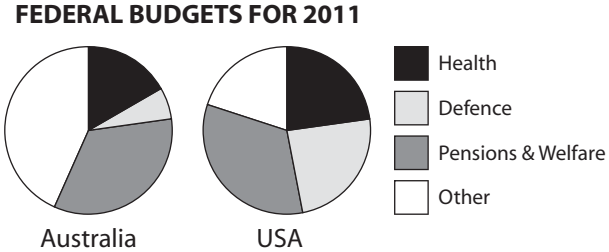
d) Which player shown below had the highest percentage of their match statistics as marks?



e) Which state or territory saw a reduction in the number of deaths in the year to Jan 2010 compared to the previous year?



f) Which country spends approximately 25% of its federal budget on defence?



Skill 29.5 Calculating the median of sets of data.

Median (middle value)

- Write all the values in order.
- Odd numbered set - middle value.
  Even numbered set - average of the 2 middle values.

Set of data (even): 5, 1, 5, 3, 2, 1, 5, 2
Ordered set: 1, 1, 2, 2, | 3, 5, 5, 5
Median $\frac{2+3}{2} = \frac{5}{2} = \mathbf{2.5}$

Q. Calculate the median of this set of data:
3, 3, 4, 2, 3, 2, 4, 6, 1, 9, 8, 8

A. *1, 2, 2, 3, 3, 3, | 4, 4, 6, 8, 8, 9* (order values)
Median: $\frac{3+4}{2} = \frac{7}{2} = \mathbf{3.5}$ (find middle value)

a) Calculate the median of this set of data:
3, 4, 8, 5, 2, 4, 3, 6, 7

(order values) (find middle value)
2, 3, 3, 4, | 4, | 5, 6, 7, 8

9 values so 5th value is the middle 4

b) Calculate the median of this set of data:
1, 3, 4, 4, 5, 2, 6, 1, 7, 9, 4

c) Calculate the median of this set of data:
1.2, 4.1, 3.2, 3, 4.1, 2.3, 2, 3.1, 2

d) Calculate the median of this set of data:
5, 2, 3, 7, 8, 4, 6, 4

e) Calculate the median of this set of data:
12, 12, 11, 10, 11, 13, 12, 15, 12

(order values) (find middle value)
10, 11, 11, 12, | 12, | 12, 12, 13, 15

f) Calculate the median of this set of data:
1, 3, 1, 4, 4, 4, 2, 3, 4, 5, 2, 3

g) Calculate the median of this set of data:
2, 2, 2, 2.5, 3.5, 3.5, 4, 4.5

h) Calculate the median of this set of data:
9, 10, 11, 10, 15, 11

Skill 29.6 Calculating the mode and range of sets of data.

Mode (most common value)

Range

- Write all the values in order.
- Subtract the lowest value from the highest value.

Hint: A set of data can have more than one mode, if two or more values repeat the same number of times.

Set of data: 5, 1, 5, 3, 2, 1, 5, 2
Ordered set: 1, 1, 2, 2, 3, 5, 5, 5
Mode 5
Range 5 – 1 = **4**

Q. Calculate the mode and range of this set of data:
1, 2, 3, 3, 4, 5, 2, 6, 8, 5, 3

A. *1, 2, 2, 3, 3, 3, 4, 5, 5, 6, 8* (order values)
Mode: ***3*** (The value 3 is in the set 3 times)
Range: *8 – 1 =* ***7*** (difference between highest and lowest)

a) Calculate the mode of this set of data:
2, (21), (21), 15, 16, 15, (21)
(The value 21 is in the set 3 times)
21

b) Calculate the mode of this set of data:
3, 2, 2, 4, 5, 6, 7, 4, 5, 2, 5, 3, 4, 2

c) Calculate the mode of this set of data:
18, 21, 20, 18, 22, 18, 20, 21, 22

d) Calculate the mode of this set of data:
102, 99, 98, 100, 101, 98, 102, 98

e) Calculate the range of this set of data:
12, 14, 16, 14, 15, 13

16 – 12 = ...

f) Calculate the range of this set of data:
19, 22, 23, 15, 12, 16, 13, 15, 24, 14, 17, 18

.....

g) Calculate the mode and range of this set of data:
3, 5, 4, 8, 5, 6, 8, 6, 4, 7, 4, 7, 8, 4

.....

mode = range =

h) Calculate the mode and range of this set of data:
31, 32, 35, 32, 34, 29, 30, 31, 33, 32

.....

mode = range =

i) Calculate the mode and range of this set of data:
2.8, 3.1, 3.5, 3.6, 3.6, 4, 4.2, 4.5, 4.7, 4.9

.....

mode = range =

j) Calculate the mode and range of this set of data:
14, 18, 19, 19, 24, 23, 29, 18, 28, 19

.....

mode = range =

Skill 29.7 Calculating the mean of sets of data.

Mean (or average)
- Add all the values in the set.
- Divide the total by the number of values in the set.

Set of data: 5, 1, 5, 3, 2, 1, 5, 2
Mean 1 + 1 + 2 + 2 + 3 + 5 + 5 + 5 = 24
8 values so 24 ÷ 8 = **3**

Q. Calculate the mean of this set of data:
10, 10, 16, 14, 15

A. *10 + 10 + 16 + 14 + 15 = 65*
65 ÷ 5
= ***13***
5 values in the set, so divide by 5

a) Calculate the mean of this set of data:
6, 22, 21, 14, 18, 15

6 + 22 + 21 + 14 + 18 + 15 = 96

96 ÷ 6 = 16

b) Calculate the mean of this set of data:
1, 3, 3, 4, 7, 9, 15

1 + 3 + 3 + 4 + 7 + 9 + 15 =

c) Calculate the mean of this set of data:
8, 8, 9, 10, 10, 10, 11, 12, 12

d) Calculate the mean of this set of data:
2.1, 2.2, 2.2, 2.5, 2.5, 2.5, 2.7, 3.3

e) Calculate the mean of this set of data:
1, 3, 3, 4, 4, 4, 6, 7, 7, 7, 9

f) Calculate the mean of this set of data:
8, 8, 9, 10, 11, 11, 13

g) Calculate the mean of this set of data:
2, 2, 5, 6, 8, 10, 14, 17

h) Calculate the mean of this set of data:
0, 0, 2, 1.5, 1.8, 2, 2.2, 3, 3.5, 4

i) Calculate the mean of this set of data:
10, 12, 13, 16, 17, 18, 20, 22

j) Calculate the mean of this set of data:
3, 4, 6, 7, 8, 10, 11, 13, 16, 17

Skill 29.8 Calculating the mean, median and mode of sets of data.

Mean (or average)
- Add all the values in the set.
- Divide the total by the number of values in the set.

Median (middle value)
- Write all the values in order.
- Odd numbered set - middle value.
  Even numbered set - average of the 2 middle values.

Mode (most common value)

Set of data: 5, 1, 5, 3, 2, 1, 5, 2

Mean $1 + 1 + 2 + 2 + 3 + 5 + 5 + 5 = 24$
8 values so $24 \div 8 = \mathbf{3}$

Ordered set: 1, 1, 2, 2, | 3, 5, 5, 5

Median $\frac{2+3}{2} = \frac{5}{2} = \mathbf{2.5}$

Mode **5**

Q. Which set of data has the same mean, median and mode?

A) 1, 2, 4, 4, 4, 6, 7
B) 3, 5, 5, 8, 9
C) 1, 2, 2, 2, 4, 4, 6

A. *A) Mean* $1 + 2 + 4 + 4 + 4 + 6 + 7 = 28$
$28 \div 7 = \mathbf{4}$
Median 1, 2, 4, | 4, | 4, 6, 7 $\Rightarrow \mathbf{4}$
Mode 1, 2, (4), (4), (4), 6, 7 $\Rightarrow \mathbf{4}$

B) Mean $3 + 5 + 5 + 8 + 9 = 30$
$30 \div 5 = \mathbf{6}$
Median 3, 5, | 5, | 8, 9 $\Rightarrow \mathbf{5}$
Mode 3, (5), (5), 8, 9 $\Rightarrow \mathbf{5}$

C) Mean $1 + 2 + 2 + 2 + 4 + 4 + 6 = 21$
$21 \div 7 = \mathbf{3}$
Median 1, 2, 2, | 2, | 4, 4, 6 $\Rightarrow \mathbf{2}$
Mode 1, (2), (2), (2), 4, 4, 6 $\Rightarrow \mathbf{2}$

So ***A)*** *has the same mean, median and mode.*

a) Which set of data has the same mean, median and mode?

A) −2, 0, 0, 1, 2, 2, 2, 3
B) 10, 10, 11, 11, 11, 12, 12

b) Which set of data has the same mean, median and mode?

A) 1, 2, 3, 3, 3, 4, 5
B) 5, 5, 6, 7, 9, 10

c) Which set of data has the same mean, median and mode?

A) 8, 8, 9, 10, 11
B) −1, −1, 1, 1, 1, 3, 3
C) 2, 3, 3, 4, 5, 7

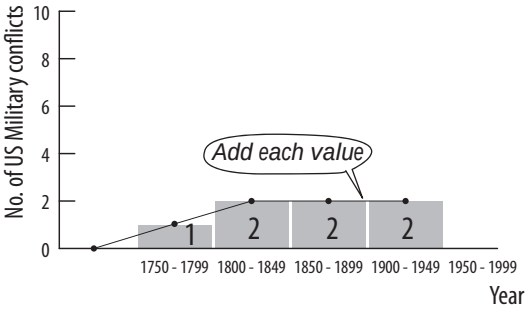
d) Which set of data has the same mean, median and mode?

A) 29, 30, 30, 32, 34
B) 6, 6, 7, 9, 9, 9, 10
C) −2, 2, 3, 3, 3, 5, 7

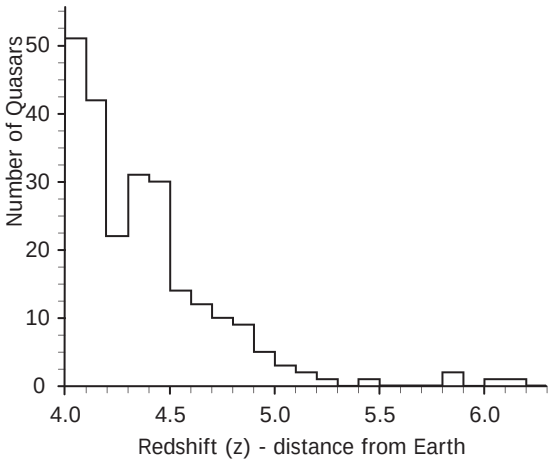
Skill 29.9 Interpreting histograms.

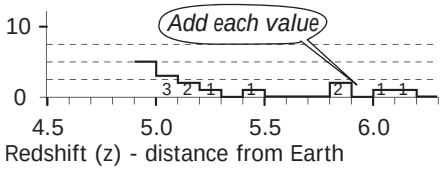
Q. Using this histogram, how many times did the USA engage in military conflict prior to 1950?

A. *1 + 2 + 2 + 2*
= *7*



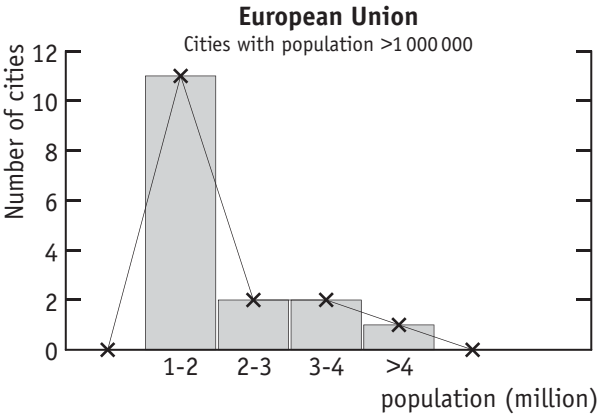
a) How many quasars have been discovered with a redshift of 5 or greater?





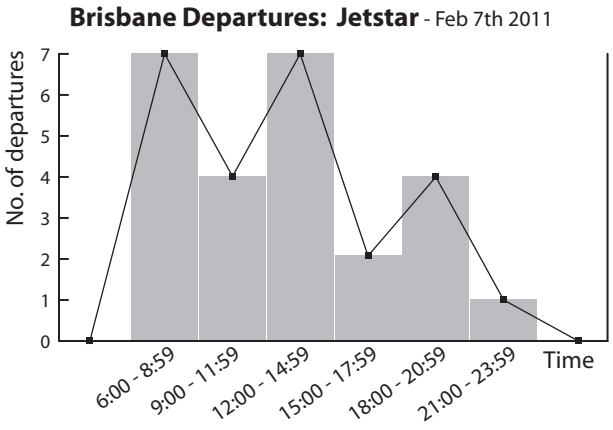
3 + ...

b) How many cities in the European Union have a population greater than 2 million people?



.....

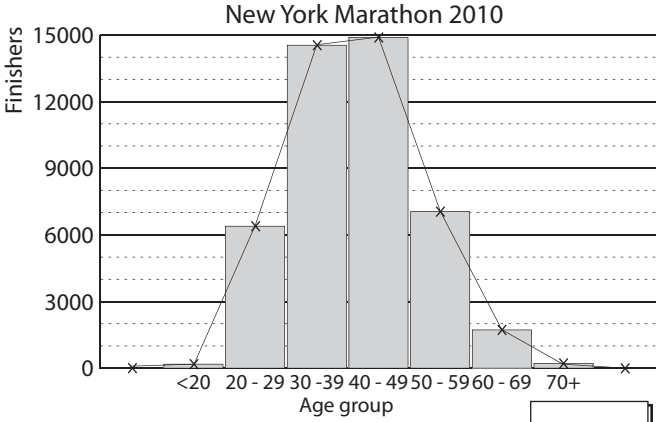
c) On February 7th, 2011 how many departures did Jetstar have out of Brisbane after 6:00 pm?



.....

d) The best approximation for the number of finishers in the 2010 New York Marathon is:

A) 30 000 B) 45 000 C) 60 000



.....

Skill 29.10 Interpreting stem-and-leaf plots (1).

To complete a stem-and-leaf plot from a given set of data:

- Write the values from the data set - each unit digit is a leaf beside its corresponding tens (or hundreds) digit, which is a stem.

Hint:

tens value | units value

STEM	LEAF	
0	2	= 2
1	5 7	= 15 and 17

hundreds & tens values | units value

STEM	LEAF	
23	7	= 237

To calculate values from a stem-and-leaf plot:

Mode (most common value)

- Find the leaf digit that repeats most.
- Read the number resulting from the corresponding stem and leaf.

Median (middle value)

- Count the number of leaves.

If an odd number of leaves:

- Count from the top left leaf until you reach the middle leaf.
- This digit is the unit and must be put with the corresponding stem.

If an even number of leaves:

- Count from the top left leaf until you reach the two middle leaves.
- Read the digits with their corresponding stems.
- Find the average of the 2 middle numbers.

Range

- Subtract the lowest number (top left leaf) from the highest number (bottom right leaf).

Data set of 13 elements:

{13, 18, 18, 19, 20, 21, 21, 22, 22, 22, 29, 30, 31}

mode = 22

median (7th element) = 21

range

stem	leaves
1	3 8 8 9
2	0 1 1 2 2 2 9
3	0 1

lowest value = 13; median = 21; mode = 22; highest value = 31

range = high – low
= 31 – 13
= 18

mean = 286 ÷ 13
= 22

Q. This back-to-back stemplot shows Richmond and North Melbourne scores during the 2010 AFL home and away season. Find the difference between the medians of the two sets of data.

North Melbourne		Richmond
9	3	
	4	5 8
7 5	5	3 3 4 6 9
3 3 0	6	4 7
8 2	7	3 7 8
4 2 2	8	0 6 9
7 1 0	9	4 5
4 3	10	0 0 5
9 6 3 0	11	2
9 3	12	6

middle leaves *middle leaves*

A. *22 scores for each team ⇒*
median = average of 11th and 12th scores

North Melbourne:

$$\text{median} = \frac{84+90}{2} = \frac{174}{2} = 87$$

Richmond:

$$\text{median} = \frac{77+78}{2} = \frac{155}{2} = 77.5$$

difference = 87 – 77.5 = ***9.5***

a) Complete the stem-and-leaf plot for this data:
3, 12, 16, 17, 20, 21, 32, 35, 35, 37, 39, 43, 48

stem	leaves
0	3
1	2 6 7
2	0 1
3	___ ___ ___ ___ ___
4	___ ___

b) Complete the stem-and-leaf plot for this data:
202, 204, 207, 210, 223, 223, 226, 228, 229, 230, 231, 232, 236

stem	leaves
20	___ ___ ___
21	___
22	___ ___ ___ ___ ___
23	___ ___ ___ ___

Skill 29.10 Interpreting stem-and-leaf plots (2).

c) The stem plot shows a set of scores obtained by a year 9 Maths class. Find the median and range of the data.

stem	leaves
2	0 2 3 6
3	2 3 5 6 7
4	6 8 9
5	4 7
6	2
7	3 8 9
8	5

19 scores

46 - middle score

nine leaves + middle leaf + nine leaves

median =

range = 85 – 20 =

median = range =

d) The stem-and-leaf plot shows a set of IQ scores obtained by 30 year 10 students. Find the median and mode of the data.

STEM	LEAF
8	7
9	0 2 3 4 4 5 7 8 9 9
10	1 2 2 2 5 7 9 9
11	4 5 7 9
12	1 1 2 4 6 8
13	
14	1

median =

mode =

median = mode =

e) Complete the back-to-back stem-and-leaf plot for the following two sets of data representing the ages of the teachers at the local high school. Find which set has the greater median.

Male: 27, 28, 33, 36, 39, 40, 47, 47, 48, 49, 50 52, 55

Female: 22, 23, 26, 27, 29, 29, 34, 36, 38, 38, 41 43, 44, 44, 45, 48, 49, 50, 56, 59, 61

male		female
__ __	2	__ __ __ __ __ __
__ __ __	3	__ __ __ __
__ __ __ __ __	4	__ __ __ __ __ __ __
__ __ __	5	__ __ __
	6	__

f) This back-to-back stemplot shows the numbers of sausages and soft drinks sold at the school fundraisers in one year. Find the difference between the medians of the two sets of data.

sausages		soft drinks
	14	3 4
4 3 2	15	2 4 8 8
2 1 1	16	0 2 3
6	17	7
9 9 7 6 5	18	0 2

g) The back-to-back stemplot below shows the English and Maths scores of a year 10 class. Find the difference between the medians of the two sets of scores.

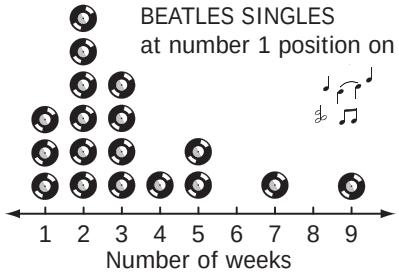
MATHS		ENGLISH
2 1	4	0 5 8
8 8 7 6 5 3 0	5	1 3 0 7
9 9 8 5 5 5 3 2 1	6	4 6 9 9
6 6 5 0	7	2 2 5 5 7 9 9 9
2	8	0 4 6
8	9	4 5

h) This back-to-back stemplot shows Collingwood and Fremantle scores during the 2010 AFL home and away season. Find the difference between the medians of the two sets of data.

Collingwood		Fremantle
	3	9
1	4	
4 0	5	
	6	7 9
6	7	6
6 0	8	1 2 2 7
6 5	9	3 3 6 7
7 5 5 0	10	0
3	11	1 2 3 4 5 8
9 7 3 0	12	5
5 3	13	9
	14	
7 5	15	
2	16	0

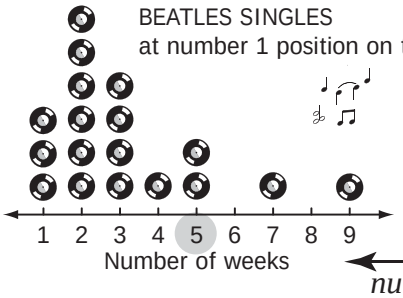
Skill 29.11 Interpreting dot plots.

Q. What is the median number of weeks in which The Beatles songs were at number one on the US Billboard charts?



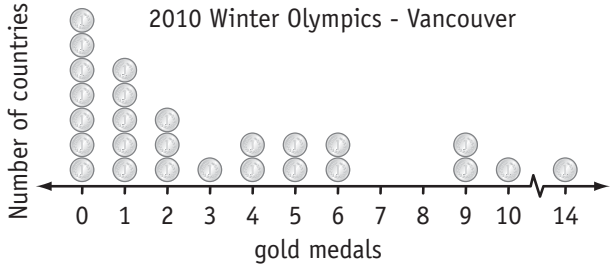
A. *5*

Check the data for the number of weeks.
It is displayed on the bottom axis.
Find the median of this data.

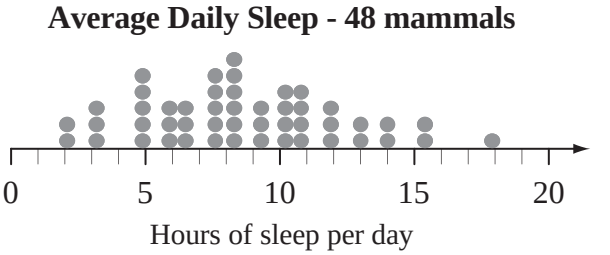


data is number of weeks

a) How many countries won more than 7 medals at the 2010 Winter Olympics?



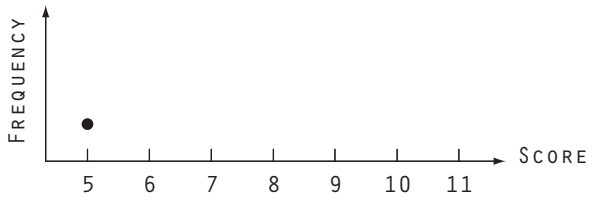
b) Estimate to the nearest hour, the most common number of hours of sleep required by a mammal.



h

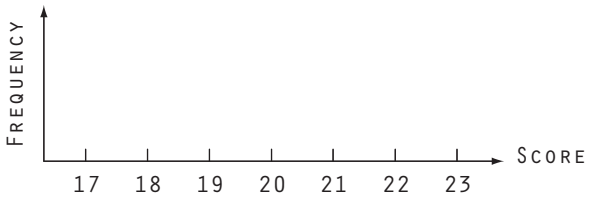
c) Complete the dot plot and find the median of the following data:

~~5~~, 9, 7, 6, 9, 8, 8, 8, 7, 6, 10, 11

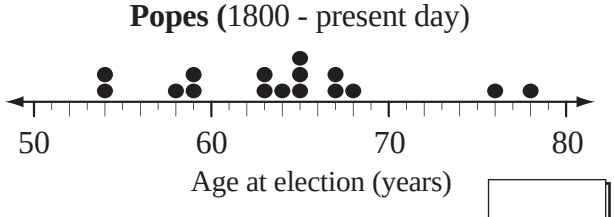


d) Complete the dot plot and find the median of the following data:

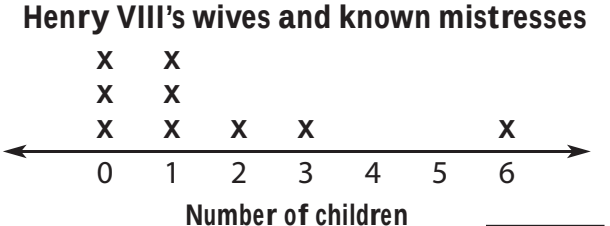
21, 18, 21, 23, 22, 19, 17, 22, 20, 17, 19, 21



e) This dot plot shows the age of a Pope at his election to office. What is the median number of the distribution?



f) This dot plot shows the number children Henry VIII had with his 6 wives and 3 mistresses. What is the median number of the distribution?



Skill 29.12 Interpreting frequency tables.

Mode (most common value)
- Find the highest number in the frequency row.

Median (middle value)
- Add all the frequencies to know how many scores are in total.

If an odd numbered total:
- Add from the left on the frequency line till you reach the middle score.

If an even numbered total:
- Add from the left on the frequency line till you reach the two middle scores.
- Find the average of the 2 middle scores.

Mean (or average)
- Multiply each score by its frequency.
- Add the results.
- Divide by the total number of frequencies (scores).

Range
- Subtract the lowest score from the highest score.

Q. How many scores are there of 6 or less in the following distribution?

Score	5	6	7	8	9
Frequency	3	2	4	3	1

How many times the score occurs

A. *There are 2 lots of 6 and 3 lots of 5 scored.*
2 + 3
= ***5***

a) How many scores are there of more than 13 in the following distribution?

Score	10	11	12	13	14
Frequency	4	8	3	6	5

14 > 13

b) How many scores are there of 8 or more in the following distribution?

Score	4	6	8	10	12
Frequency	3	7	1	4	5

c) Find the median and range of the following distribution.

Score	15	16	17	18	19
Frequency	3	5	2	7	3

20 scores

$median = \frac{17+18}{2} = \frac{35}{2} = 17.5$

range = 19 – 15 = 4

median = range =

d) Find the mean and mode of the following distribution.

Score	2	3	4	5	6
Frequency	4	2	1	1	2

10 scores

$mean = \frac{2\times4+3\times2+4\times1+5\times1+6\times2}{10} = \frac{35}{10}$

mode =

mean = mode =

e) Find the median and range of the following distribution.

Score	0	1	2	3	4
Frequency	5	11	6	14	5

median =

range =

median = range =

f) Find the mean and mode of the following distribution.

Score	0	1	2	3	4
Frequency	4	6	5	3	2

mean =

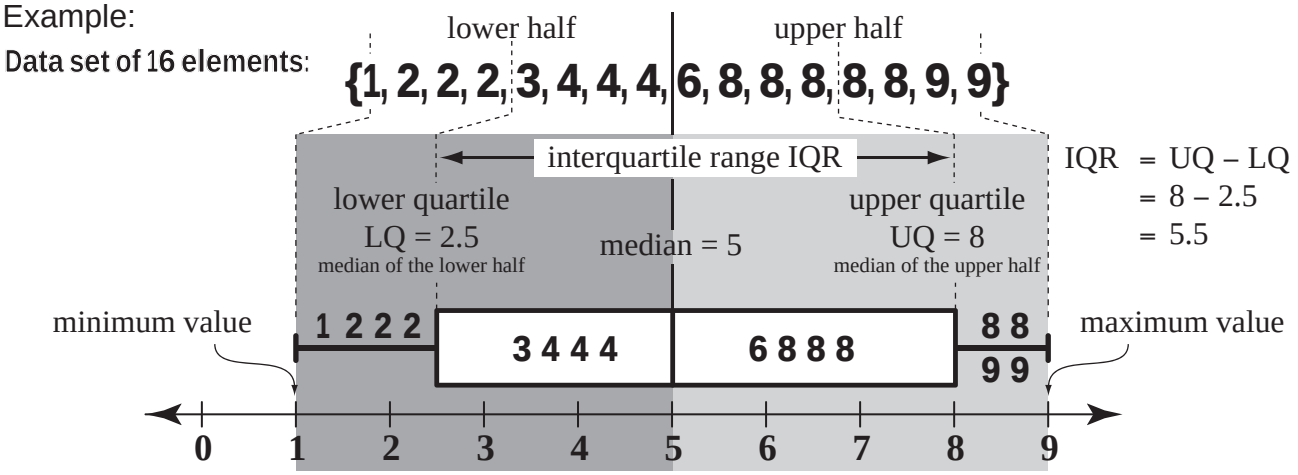
mode =

mean = mode =

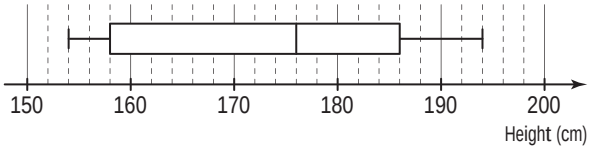
Skill 29.13 Calculating the median, range, upper quartile (UQ), lower quartile (LQ) and interquartile range (IQR) for box-and-whisker plots.

- Find the median or middle value of the set of data.
- Divide the data into an upper half and a lower half.
- Find the median of the upper values of the set of data, or the upper quartile (UQ).
- Find the median of the lower values of the set of data, or the lower quartile (LQ).
- Find the interquartile range (IQR) of the set of data by subtracting the LQ from the UQ.

Example:



Q. For this box-and-whisker plot, find the median and upper quartile (UQ).

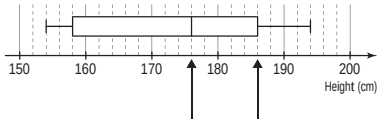


A. *median = middle value*

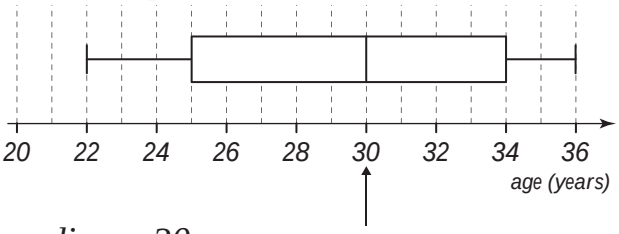
median = ***176***

UQ is the median of the upper scores ⇒

UQ = ***186***



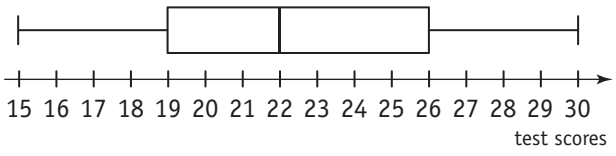
a) For this box-and-whisker plot, find the median and lower quartile (LQ).



median = 30

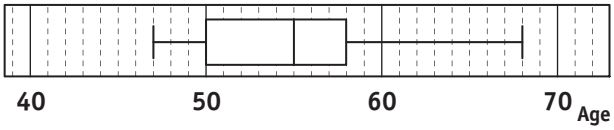
median = 30 LQ =

b) For this box-and-whisker plot, find the lower quartile (LQ) and upper quartile (UQ).



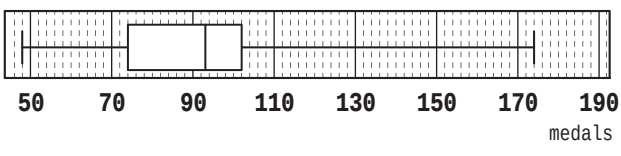
LQ = UQ =

c) What is the median and upper quartile (UQ) of the set of ages of the 19th century American presidents when they were first elected?



median = UQ =

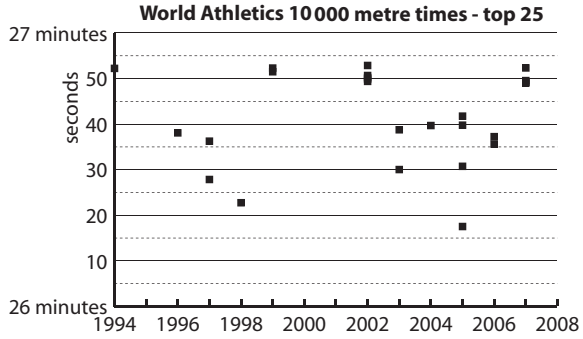
d) What is the median and interquartile range (IQR) of the number of medals won by the USA at each of the Olympics between 1908 and 2004, as shown on this boxplot?



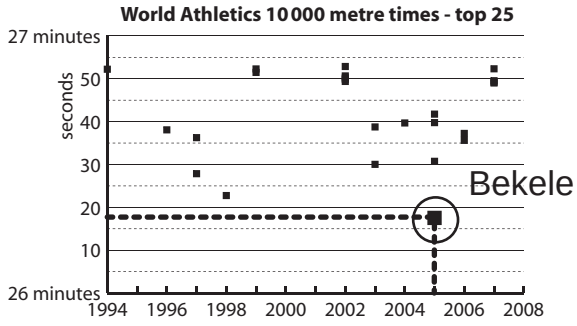
median = IQR =

Skill 29.14 Interpreting scatter plots.

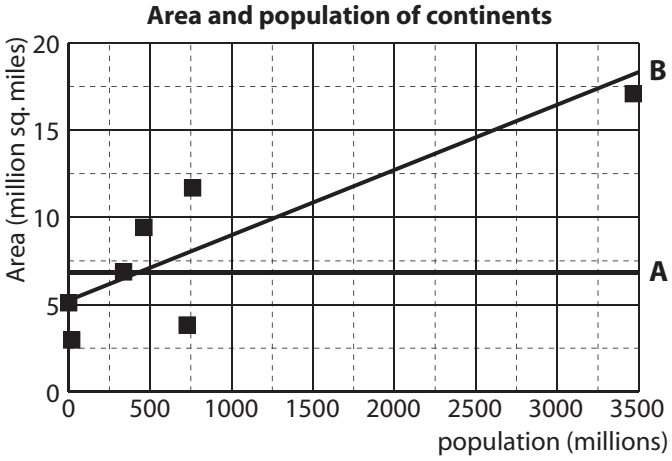
Q. In what year did Bekele (Ethiopia) set the world record time of 26:17.53 for the 10 000 m event?



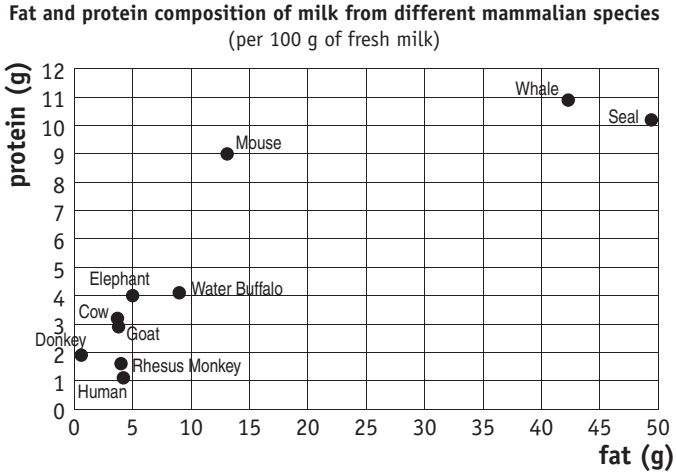
A. *2005*



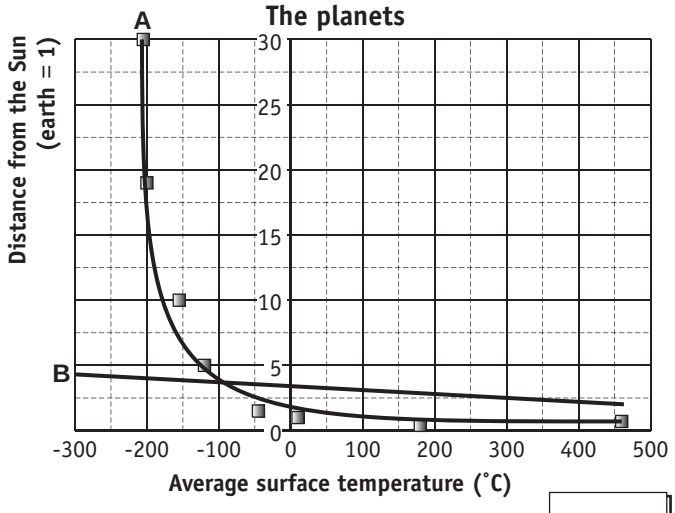
a) Select the most appropriate trend line for this scatter plot. [Hint: The sums of the distances from the points above and below the line, to the line, are approximately equal.]



b) How many of the mammals tested have less than 5 g of fat and less than 2 g of protein in any 100 g of their milk?

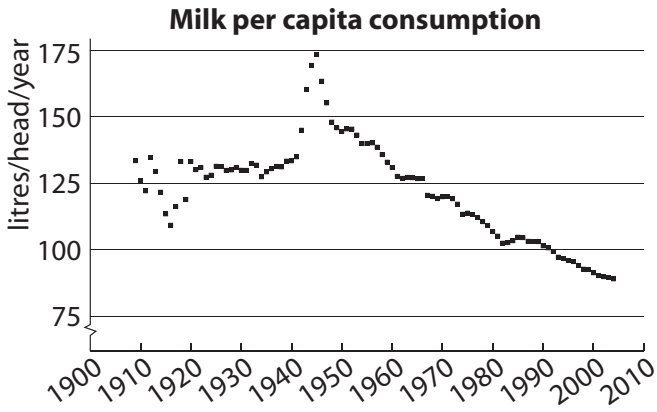


c) Select the most appropriate trend line for this scatter plot. [Hint: The sums of the distances from the points above and below the line, to the line, are approximately equal.]



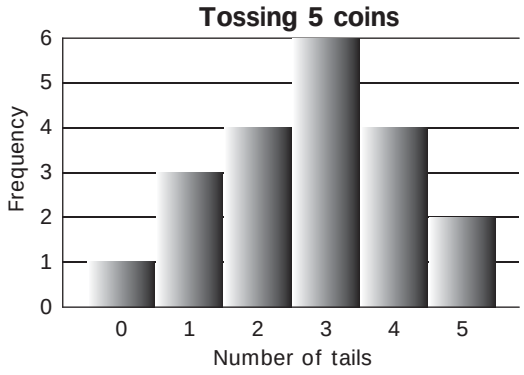
d) The difference in milk consumption between 1960 and 1990 is:

A) < 25 litres/head/year
B) = 25 litres/head/year
C) > 25 litres/head/year



Skill 29.15 Interpreting frequency histograms.

Q. Find the range, median and mean of the distribution.



A. *The data for the number of tails is:*

0, 1, 1, 1, 2, 2, 2, 2, 3, 3, | 3, 3, 3, 3, 4, 4, 4, 4, 5, 5

first 10 terms *last 10 terms*

range = last term – first term = 5 – 0 = ***5***

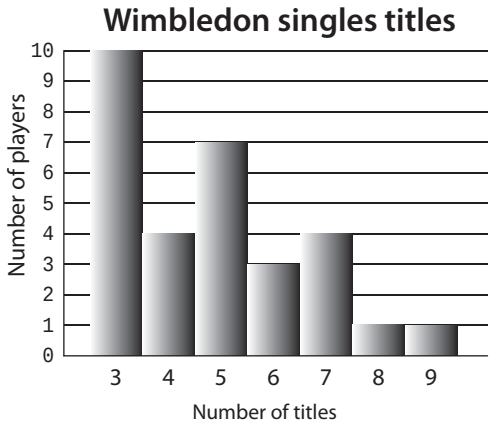
median = average of 10th and 11th term = ***3***

mean = sum of all numbers ÷ number of terms

= 65 ÷ 20

= ***3.25***

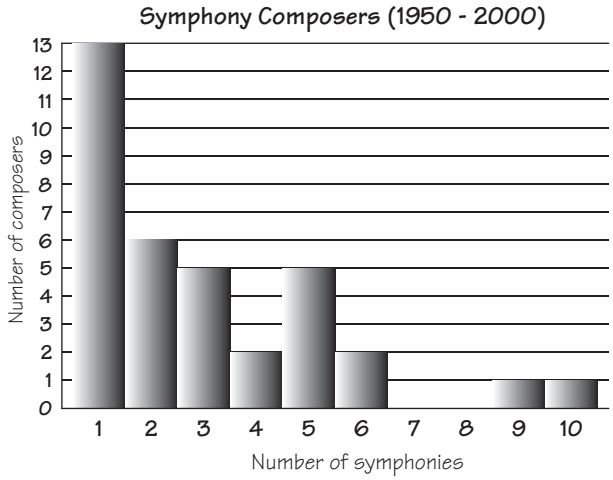
a) Find the range and median of the distribution.



.....

range = median =

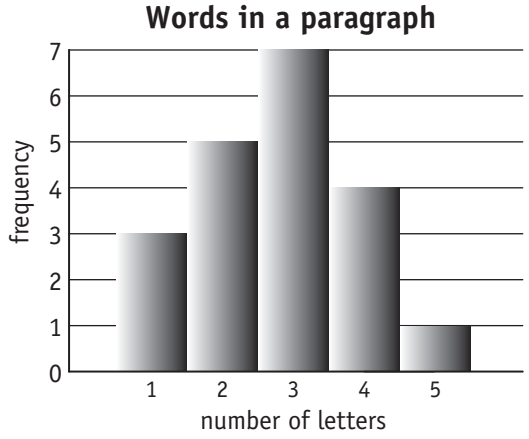
b) Find the range and median of the distribution.



.....

range = median =

c) Find the range and mean of the distribution.

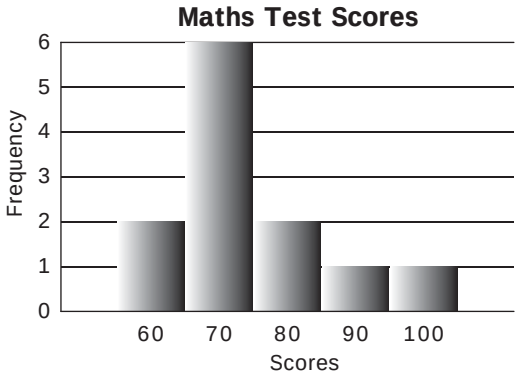


.....

.....

range = mean =

d) Find the median and mean of the distribution.
[Round the mean to the nearest whole number.]



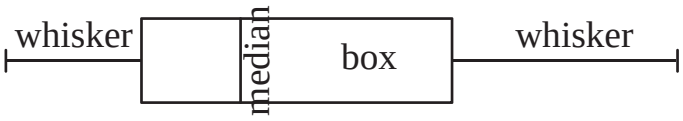
.....

.....

median = mean =

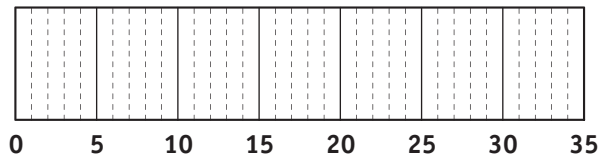
Skill 29.16 Drawing box-and-whisker plots.

- Order the given data set.
- Find the median, lowest and greatest values, lower quartile and upper quartile.
- Mark the maximum and minimum values with whiskers.
- Mark the median of all values with a vertical line.
- Mark the upper quartile and lower quartile with the box edges as shown below.



Q. Draw a box-and-whisker plot for this set of data:

7, 8, 13, 15, 20, 22, 24, 27, 30, 32



A. (7), 8, (13), 15, 20, 22, 24, (27), 30, (32)

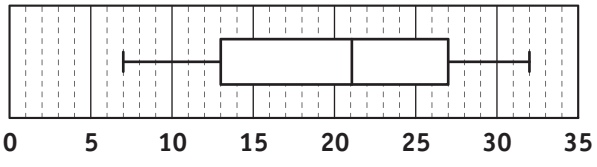
maximum value = 32

minimum value = 7

median $= \frac{22 + 20}{2} = 21$

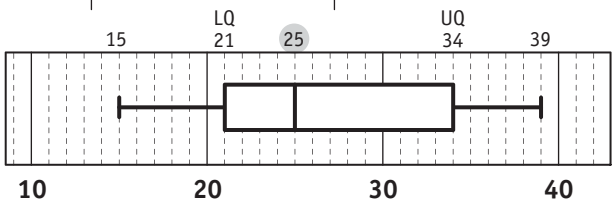
upper quartile = 27 (median of upper half)

lower quartile = 13 (median of lower half)



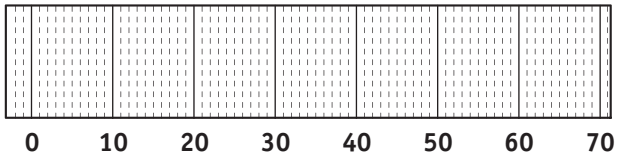
a) Draw a box-and-whisker plot for this set of data:

15, 21, 21, 23, (25), 27, 32, 36, 39



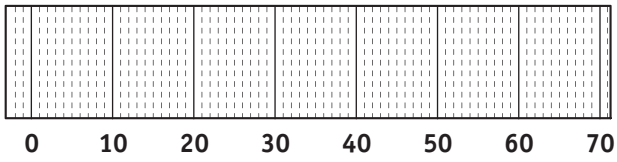
b) Draw a box-and-whisker plot for this set of data:

34, 47, 11, 15, 57, 24, 20, 11, 19, 50, 28, 37

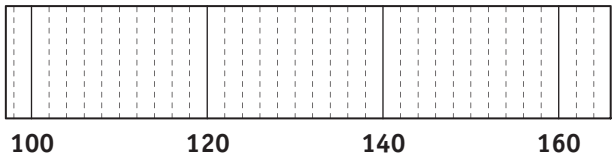


c) Draw a box-and-whisker plot for this set of data:

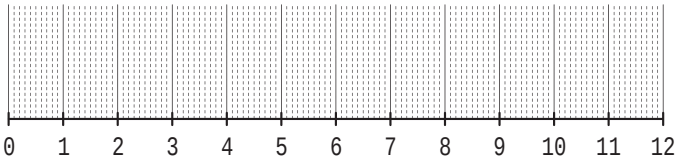
51, 17, 25, 39, 7, 49, 62, 41, 20, 6, 43, 13



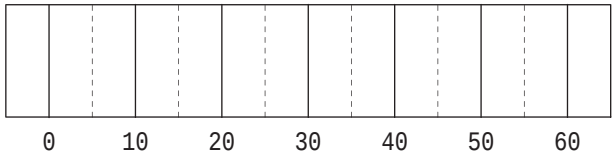
d) Draw a box-and-whisker plot for the set of data whose lowest value is 104, greatest value is 158, median is 136, lower quartile is 116 and upper quartile is 142.



e) Draw a box-and-whisker plot for the set of data whose lowest value is 0, greatest value is 11.8, median is 4.1, lower quartile is 1.2 and upper quartile is 8.5



f) Draw a box-and-whisker plot for the set of data whose lowest value is 15, greatest value is 60, median is 35, lower quartile is 25 and upper quartile is 40.



Skill 29.17 Calculating the median, upper quartile (UQ), lower quartile (LQ) and interquartile range (IQR) for frequency tables and stem-and-leaf plots.

- Find the median or middle value of the set of data.
- Divide the data into an upper half and a lower half.
- Find the median of the upper values of the set of data, or the upper quartile (UQ).
- Find the median of the lower values of the set of data, or the lower quartile (LQ).
- Find the interquartile range (IQR) of the set of data by subtracting the LQ from the UQ.

(see skill 29.13, page 346)

Q. Calculate the median and upper quartile (UQ) for the data displayed in this frequency table.

Athens, 2004 - bronze medal winning countries

Number of medals	1	2	3	4	5	6	7	8	9	10
Frequency	15	13	7	6	2	2	1	0	4	0

scores 1 to 15 are all 1 *scores 16 to 28 are all 2*

A. *50 scores altogether ⇒*
median = average of 25th and 26th scores
25th and 26th scores are 2 ⇒
median = ***2***
UQ is the median of the 25 upper scores ⇒
UQ = 13th score counting from the top score:
9, 9, 9, 9, 7, 6, 6, 5, 5, 4, 4, 4, 4 ⇒
13th score from the top
UQ = ***4***

a) For this stem-and-leaf plot, find the median and the lower quartile (LQ).

stem	leaves
1	3 8 8 9
2	0 1 1 2 2 2 9
3	0 1

13 scores ⇒ median = 7th term

$LQ = \frac{18+19}{2} = \frac{37}{2} =$

median = 21 LQ = 18.5

b) Calculate the median and lower quartile (LQ) for the data displayed in this frequency table.

Athens, 2004 - silver medal winning countries

Number of medals	1	2	3	4	5	6	7	8	9	10
Frequency	15	11	6	5	2	4	1	0	4	0

median = LQ =

c) Calculate the median and upper quartile (UQ) for the data displayed in this frequency table.

Adam Scott - PGA, 2006 **rounds 72 or less**

Score	63	64	65	66	67	68	69	70	71	72
Frequency	1	1	4	4	5	5	11	7	11	9

median = UQ =

d) Calculate the median and lower quartile (LQ) for the data displayed in this frequency table.

Score	5	6	7	8	9	10	11	12	13	14
Frequency	2	3	1	4	0	10	5	0	12	3

median = LQ =

e) Find the interquartile range (IQR) for the set of data shown in this stem-and-leaf plot.

STEM	LEAF
1	1 1 2 3 4 4
1	7 8 9
2	0 2 2 4
2	5 5 6 8 9
3	0 1 2 2 3 4
3	6 6 7 8 9
4	1 1 2 3 3 4

IQR =

f) This stem-and-leaf plot shows the ages of the 19th century American presidents when they were first elected. Find the interquartile range (IQR) for the set of data.

STEM	LEAF
4	7 8 9
5	0 0 0 1 2 2 4
5	5 5 6 7 8 8 8 9
6	2
6	5 6 8

IQR =