Appendix B. Test Questions (for online publication)

Question 1

Mark (from Sydney, Australia) and Hans (from Berlin, Germany) often communicate with each other using "chat" on the Internet. They have to log on to the Internet at the same time to be able to chat.

To find a suitable time to chat, Mark looked up a chart of world times and found the following:

- Greenwich: 12 Midnight
- Berlin: 1:00 AM
- Sydney: 10:00 AM

At 7:00 PM in Sydney, what time is it in Berlin?

NOTE: In your answer, please specify the hour, minutes, and whether it is AM or PM. For example, if your answer is 3 PM, write your answer as 3:00 PM.

[Input field for answer]
Question 2

To complete one set of bookshelves a carpenter needs the following components:

- 4 long wooden panels,
- 6 short wooden panels,
- 12 small clips,
- 2 large clips and
- 14 screws.

The carpenter has in stock 26 long wooden panels, 33 short wooden panels, 200 small clips, 20 large clips and 510 screws.

How many sets of bookshelves can the carpenter make? (units not required)
Question 3

A documentary was broadcast about earthquakes and how often earthquakes occur. It included a discussion about the predictability of earthquakes.

A geologist stated: "In the next twenty years, the chance that an earthquake will occur in Zed City is two out of three".

Which of the following best reflects the meaning of the geologist's statement?

- $\frac{2}{3} \times 20 = 13.3$, so between 13 and 14 years from now there will be an earthquake in Zed City.
- $\frac{2}{3}$ is more than $\frac{1}{2}$, so you can be sure there will be an earthquake in Zed City at some time during the next 20 years.
- The likelihood that there will be an earthquake in Zed City at some time during the next 20 years is higher than the likelihood of no earthquake.
- You cannot tell what will happen, because nobody can be sure when an earthquake will occur.
Question 4

Infusions (or intravenous drips) are used to deliver fluids and drugs to patients.

Nurses need to calculate the drip rate, $D$, in drops per minute for infusions.

They use the formula:

$$D = \frac{d \cdot v}{60 \cdot n},$$

where

$d$ is the drop factor measured in drops per millilitre (mL)

$v$ is the volume in mL of the infusion

$n$ is the number of hours the infusion is required to run

Nurses need to calculate the volume of the infusion, $v$, from the drip rate, $D$.

An infusion with a drip rate of 50 drops per minute has to be given to a patient for 3 hours. For this infusion, the drop factor is 25 drops per milliliter.

What is the volume in mL of the infusion? (units not required)
Question 5

You are making your own dressing for a salad.

Here is a recipe for 100 milliliters (mL) of dressing.

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity (mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salad Oil</td>
<td>60</td>
</tr>
<tr>
<td>Vinegar</td>
<td>30</td>
</tr>
<tr>
<td>Soy Sauce</td>
<td>10</td>
</tr>
</tbody>
</table>

How many milliliters (mL) of salad oil do you need to make 150 mL of this dressing? (units not required)
Question 6

A car magazine uses a rating system to evaluate new cars, and gives the award of “The Car of the Year” to the car with the highest total score. Five new cars are being evaluated, and their ratings are shown in the table.

<table>
<thead>
<tr>
<th>Car</th>
<th>Safety Features</th>
<th>Fuel Efficiency</th>
<th>External Appearance</th>
<th>Internal Fittings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(S)</td>
<td>(F)</td>
<td>(E)</td>
<td>(T)</td>
</tr>
<tr>
<td>Ca</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>M2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Sp</td>
<td>3</td>
<td>1</td>
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<tr>
<td>N1</td>
<td>1</td>
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<td>3</td>
<td>3</td>
</tr>
<tr>
<td>KK</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

The ratings are interpreted as follows:

- 3 points = Excellent
- 2 points = Good
- 1 point = Fair

To calculate the total score for a car, the car magazine uses the following rule, which is a weighted sum of the individual score points:

\[
\text{Total Score} = (3 \times S) + F + E + T
\]

Calculate the total score for Car “Ca”. Write your answer in the space below. (units not required)
Question 7

The graphics below show information about exports from Zedland, a country that uses zeds as its currency.

What was the total value (in millions of zeds) of exports from Zedland in 1998? (units not required)
Question 8

A revolving door includes three wings which rotate within a circular-shaped space. The inside diameter of this space is 2 meters (200 centimeters). The three door wings divide the space into three equal sectors. The plan below shows the door wings in three different positions viewed from the top.

The door makes 4 complete rotations in a minute. There is room for a maximum of two people in each of the three door sectors.

What is the maximum number of people that can enter the building through the door in 30 minutes?

- 60
- 180
- 240
- 720
Question 9

What is the size in degrees of the angle formed by two door wings? (units not required)
Question 10

The diagram below illustrates a staircase with 14 steps and a total height of 252 cm:

What is the height of each of the 14 steps (in cm)? (units not required)
Question 11

Robert's mother lets him pick one candy from a bag. He can't see the candies. The number of candies of each color in the bag is shown in the following graph.

What is the probability that Robert will pick a red candy?

- 10%
- 20%
- 25%
- 50%
Question 12

Ninety-five percent of world trade is moved by sea, by roughly 50,000 tankers, bulk carriers and container ships. Most of those ships use diesel fuel.

Engineers are planning to develop wind power support for ships. Their proposal is to attach kite sails to ships and use the wind's power to help reduce diesel consumption and the fuel's impact on the environment.

One advantage of using a kite sail is that it flies at a height of 150 m. There, the wind speed is approximately 25% higher than down on the deck of the ship.

At what approximate speed does the wind blow into a kite sail when a wind speed of 24 km/h is measured on the deck of the ship?

- 6 km/h
- 10 km/h
- 25 km/h
- 30 km/h
- 49 km/h
Question 13

Approximately what is the length of the rope for the kite sail, in order to pull the ship at an angle of 45 degrees and be at a vertical height of 150 m, as shown in the diagram above?

- 173 m
- 212 m
- 285 m
- 300 m
Question 14

In January, the new CDs of the bands 4U2Rock and The Kicking Kangaroos were released. In February, the CDs of the bands No One’s Darling and The Metalfolkies followed. The following graph shows the sales of the bands’ CDs from January to June.

How many CDs did the band The Metalfolkies sell in April?

- 250
- 500
- 1000
- 1270
Question 15

In which month did the band No One’s Darling sell more CDs than the band The Kicking Kangaroos for the first time?

- No Month
- March
- April
- May
The manager of The Kicking Kangaroos is worried because the number of their CDs that sold decreased from February to June.

What is the estimate of their sales volume for July if the same negative trend continues?

- 70 CDs
- 370 CDs
- 670 CDs
- 1340 CDs
Question 17

Robert builds a step pattern using squares. Here are the stages he follows.

Stage 1  Stage 2  Stage 3

As you can see, he uses one square for Stage 1, three squares for Stage 2 and six for Stage 3.

How many squares should he use for the fourth stage? (units not required)

Question 18

On returning to Singapore after 3 months, Mei-Ling had 3,900 ZAR left. She changed this back to Singapore dollars, noting that the exchange rate had changed to:

1 SGD = 4.0 ZAR

How much money in Singapore dollars did Mei-Ling get? (units not required)
Question 19

Choose the one figure below that fits the following description.

Triangle PQR is a right triangle with right angle at R. The line RQ is less than the line PR. M is the midpoint of the line PQ and N is the midpoint of the line QR. S is a point inside the triangle. The line MN is greater than the line MS.

Question 20

In a pizza restaurant, you can get a basic pizza with two toppings: cheese and tomato. You can also make up your own pizza with extra toppings. You can choose from four different extra toppings: olives, ham, mushrooms and salami.

Ross wants to order a pizza with two different extra toppings.

How many different combinations can Ross choose from? (units not required)
Question 21

In Mei Lin’s school, her science teacher gives tests that are marked out of 100. Mei Lin has an average of 60 marks on her first four Science tests. On the fifth test she got 80 marks.

What is the average of Mei Lin's marks in Science after all five tests? (units not required)
Question 22

This graph shows how the speed of a racing car varies along a flat 3 kilometre track during its second lap.

What is the approximate distance from the starting line to the beginning of the longest straight section of the track?

○ 0.5 km
○ 1.5 km
○ 2.3 km
○ 2.8 km
Where was the lowest speed recorded during the second lap?

- at the starting line.
- at about 0.8 km.
- at about 1.3 km.
- halfway around the track.
Question 24

What can you say about the speed of the car between the 2.6 km and 2.8 km marks?

- The speed of the car remains constant.
- The speed of the car is increasing.
- The speed of the car is decreasing.
- The speed of the car cannot be determined from the graph.
Question 25

Here are pictures of five tracks:

Along which one of these tracks was the car driven to produce the speed graph shown earlier?

- A
- B
- C
- D
- E