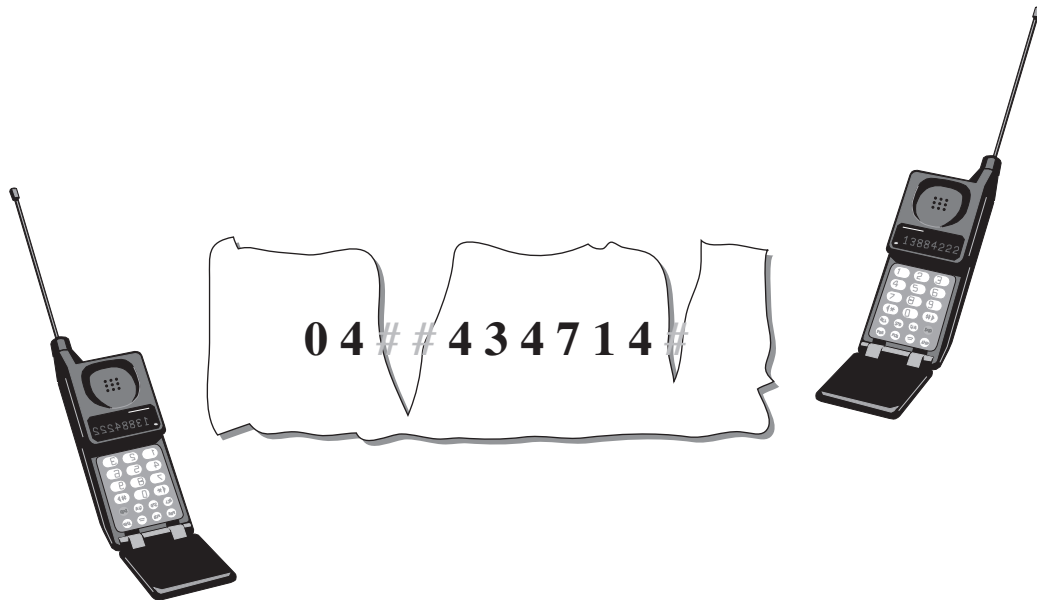# UNIT 19

Questions 48 and 49

Phoebe is given Ben's eleven-digit mobile phone number, but when she looks later she cannot read the third, fourth and last digits because the paper is torn, as indicated here:

Question 48

Phoebe's friend Rosa thinks that Ben's number starts with 0417 and ends in an odd digit.

If this is correct, how many different 11-digit phone numbers would Phoebe have to try to be certain of ringing Ben's number?

A   4
B   5
C   9
D   10

Question 49

Phoebe thinks that Ben's phone number starts with either 0417 or 0419 but cannot remember the last digit.

If this is correct, how many different 11-digit phone numbers would Phoebe have to try to be certain of ringing Ben's number?

**A**   20
B   18
C   10
D   9

UNIT 20

Questions 50 – 54

Figure 1 gives an estimate of the size of the workforce required to build a pyramid that is 150 metres high and has a square base with 300 metre long sides (similar to the Great Pyramid of Giza built for the Egyptian Pharaoh Khufu about 2500 BC). In the figure, the number of workers needed for each 20 metres of building height is given.

For convenience, the building of the first 20 metres is referred to as Stage 1, the building of the next 20 metres is referred to as Stage 2, and so on.

In the figure, the construction is divided into two sets of tasks:

1 *Quarrying* (cutting) the blocks and *other tasks*.
2 *Hauling* the blocks (horizontally) from the quarry and *lifting* them (vertically) into place on the growing pyramid.

workforce needed to build pyramid
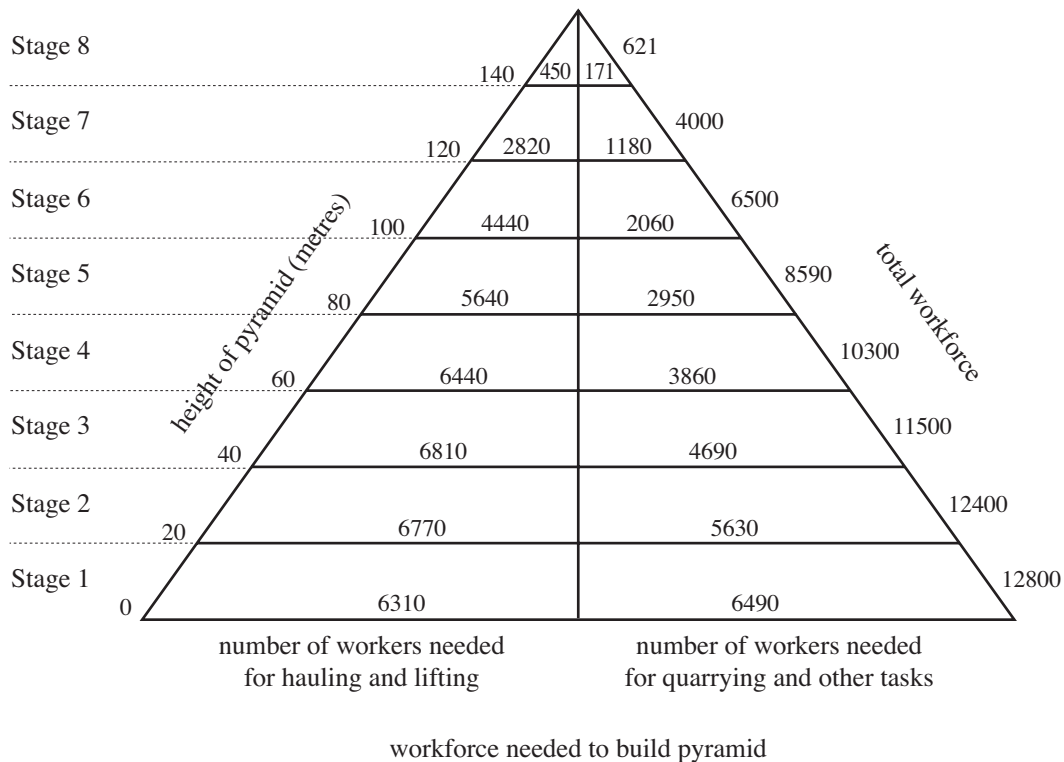
Figure 1

Note:

- Figure 1 is not drawn to scale;
- the pyramid has a square base and a square cross-section at each stage;
- the length of a side of the base of the pyramid is 300 metres and its height is 150 metres.

Question 50

From stage to stage, as the pyramid gets higher from the start to finish, there is always

A   a decrease in the number of people needed for hauling and lifting.
B   an increase in the number of people needed for hauling and lifting.
C   a decrease in the number of people needed for quarrying and other tasks.
D   an increase in the number of people needed for quarrying and other tasks.

Question 51

How many people were needed for hauling and lifting in the stage when the pyramid was increased in height from 40 to 60 metres?

A   12400   **C**   6810
B   11500   **D**   6770

Question 52

Compared with the number of people needed for quarrying and other tasks for Stage 1, the number needed for quarrying and other tasks for Stage 5 was closest to

A   one fifth.   **C**   one third.
B   one quarter.   **D**   one half.

Question 53

Of the following, the greatest difference between the number of people needed for hauling and lifting and the number of people needed for quarrying and other tasks occurs in

A   Stage 4.   **C**   Stage 6.
B   Stage 5.   **D**   Stage 8.

Question 54

For which stage is the value of the fraction below greatest?

$$\frac{\text{number of people needed for hauling and lifting}}{\text{number of people needed for quarrying and other tasks}}$$

A   Stage 1   **C**   Stage 5
**B**   Stage 2   **D**   Stage 8

UNIT 21

Questions 55 – 60

A telephone company, *Phonewise*, offers three different mobile phone plans to customers.

- *Premium* plan customers pay a rental of $10 per month plus 20 cents per call;
- *Timewise* plan customers pay a rental of $20 per month plus 15 cents per call; and
- *Business* plan customers pay a rental of $30 per month plus 10 cents per call.

Abby draws some graphs, including Figure 1, to help her work out the cost for various plans.
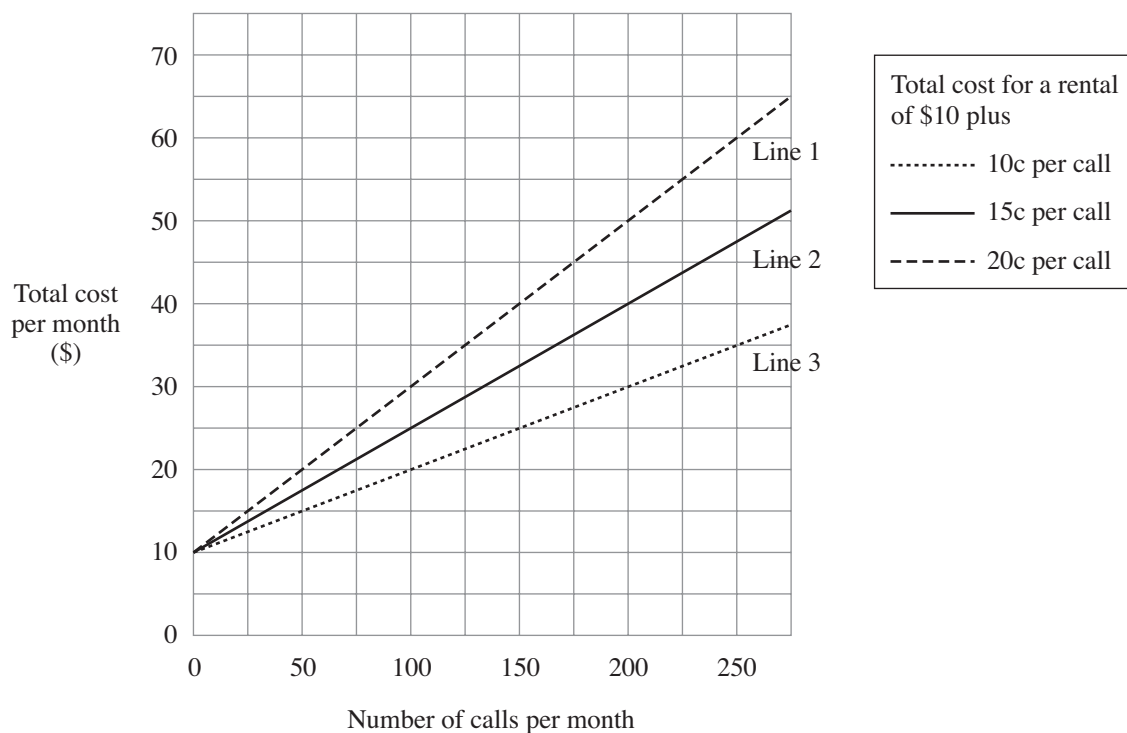
Figure 1

Note:

- Total cost equals the rental cost plus the cost of the calls.

Question 55

The total cost per month for Premium plan customers who make 100 calls is

A	$10.	**C**	$25.
B	$20.	**D**	$30.

Question 56

Which line in Figure 1 represents the Business plan?

A Line 1
B Line 2
C Line 3
D None of these three lines represents the Business plan.

Question 57 refers to the following additional information:

Abby draws the graphs (I, II, III and IV) shown in Figure 2. The graphs in Figure 2 are
drawn in proportion to Figure 1 and have the same axes.
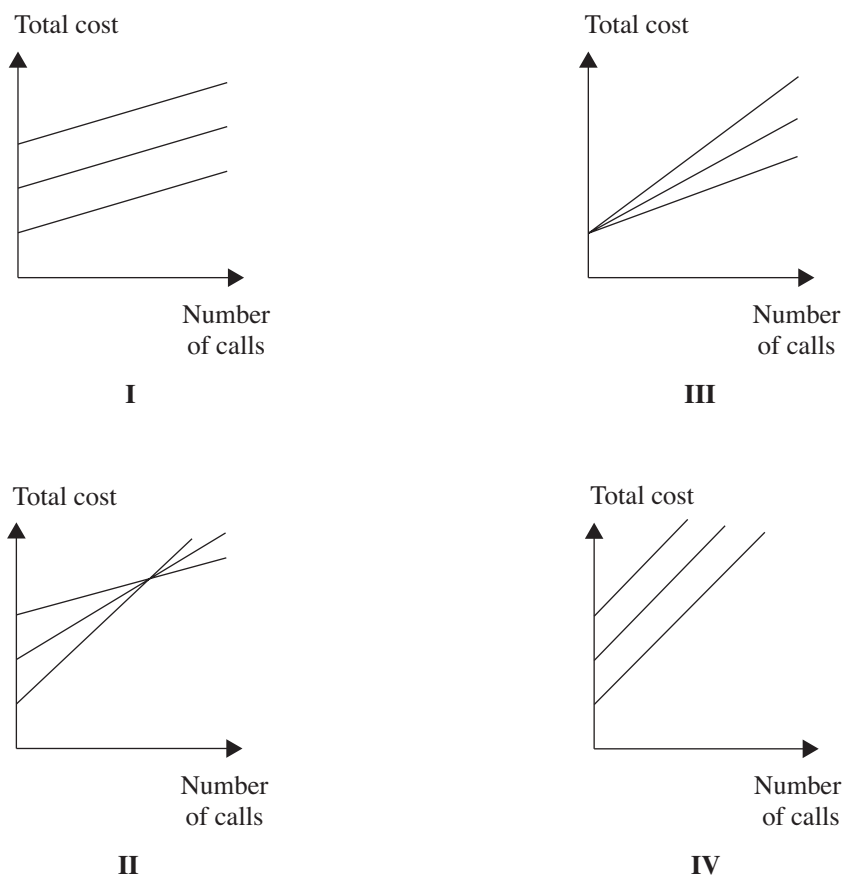
Figure 2

Question 57

Which graph best represents the total cost per month for three different rental costs at a charge of
10 cents a call?

A I   **C** III
B II   **D** IV

Questions 58 and 59 refer to the following additional information:

Abby considers further the Phonewise plans.

Question 58

Phonewise decide to set up spreadsheets on their web site that will allow customers to calculate the cost for each plan. They use T for the total cost per month in dollars and n for the number of calls.

A mathematical formula that could be used to calculate the total cost per month in dollars for the Premium plan is

A $T = 0.20n + 10$ **C** $T = 10n + 30$

B $T = 5n + 10$ **D** $T = 20n + 10$

Question 59

Premium, Timewise and Business plans would all result in the same total monthly cost for customers

A with 150 calls per month.
B with 200 calls per month.
C with 250 calls per month.
D in none of the above situations.

Question 60 refers to the following additional information:

A second telephone company, *Connect*, has recently been formed. They offer the *Superconnect* plan. Superconnect customers pay a monthly rental of $20 plus 10 cents per call.

Question 60

One customer thought about changing from Timewise to Superconnect but decided not to do this because the Phonewise company had been very reliable.

After 6 months at 200 calls per month, how much would the customer have saved if she had changed?

A $ 0   **C** $30

B $10   **D** $60

UNIT 22

Questions 61 and 62

A shop that sells canned foods to customers (who will store the cans in different conditions) uses the following table (Table 1) to advise them. The table provides information about the percentage of vitamin activity that remains in some canned foods under different conditions of temperature and different storage times. The table gives information for vitamin C and another vitamin, thiamine.

Table 1

Storage time	Temperature ^{o}C	Percentage of vitamin activity remaining in canned food					
		Peas		Orange juice		Tomatoes	
		Vitamin C	Thiamine	Vitamin C	Thiamine	Vitamin C	Thiamine
12 months	10	93	92	97	100	95	94
	18	91	87	92	98	94	93
	27	86	74	77	89	82	82
24 months	10	91	90	95	100	89	91
	18	89	85	80	89	87	87
	27	81	70	50	83	70	70

Question 61

According to the table, in which one of the following situations is the smallest percentage of thiamine activity lost from the canned foods?

A tomatoes kept at 27 ^{o}C for 12 months   **C** peas kept at 27 ^{o}C for 12 months

B orange juice kept at 27 ^{o}C for 24 months   **D** peas kept at 18 ^{o}C for 24 months

Question 62

According to the table, in which one of the following situations is the greatest percentage of vitamin activity lost from the canned foods?

A thiamine in peas kept at 27 ^{o}C for 12 months
B thiamine in tomatoes kept at 18 ^{o}C for 24 months
C vitamin C in orange juice kept at 27 ^{o}C for 12 months
D vitamin C in orange juice kept at 18 ^{o}C for 24 months

UNIT 23

Questions 63 – 67

*Each of the questions in this unit contains a statement relating to Etruscan civilisation. You need to evaluate each statement according to the following key, **using only the information provided in the map on the opposite page.***

Key:

Choose

A if the map provides evidence only in support of the statement

B if the map provides evidence only against the statement

C if the map provides neither evidence in support of nor against the statement

D if the map provides both evidence in support of and against the statement

Note:

- the term 'map' refers to both the drawing and accompanying text;
- Punic/Carthaginian, Greeks, Corsica and Phoenician all refer to neighbouring lands or peoples.

Question 63

The Etruscans could read and write.

Question 64

Etruscan power was always centred on Clusium *(middle section of the map)*.

Question 65

The Etruscans were militarily strong.

Question 66

Etruscan civilisation was more peaceful than Roman civilisation.

Question 67

The Italian coastline has remained unchanged over time.

The map below outlines certain aspects of Etruscan civilisation. Etruscan civilisation flourished and was at its height in central Italy during the period 800–600 BC.

THE ETRUSCANS

The Etruscans were the creators of the first Italian civilisation. They inhabited a group of loosely associated city-states, which were gradually conquered by Rome from the latter part of the 6th century BC onwards.
The Etruscans also displayed the strong influence of Greek art.

Arno

Arretium

Bronze and iron work

Volaterrae

Cortona

Metal workings from 8th century BC

Chiana

Lake Trasimene

Perusia

Used Ilva iron, perhaps originally an island

Ombrone

Clusium

Populonia

Dominant by 500 BC

Vetulonia

Rusellae

Ilva

Volsinii

Tiber

Iron mines

Fiora

Bolsena

Lake Bolsena

Albegna

Originally on or near sea

Vulci

Italian towns under temporary Etruscan domination

Bronzework and many imported vases

Tuscania

Falerii

Capena

Tarquinii

Lake Bracciano

Bronze industry supreme until c.650 BC

Mt. Tolfa *Mignone*

Metals

Punicum
Pyrgi
Caere
S.Marinella
Alsium

Veii

Name recalls joint Etruscan-Punic efforts which kept Greeks out of Corsica

Rome

Carthaginian (Punic) colony

Fregenae

Bilingual Etruscan-Phoenician inscriptions

0   30

Kilometres

By 600 BC leading city

Greatest days from 550 BC
Fell to Rome 399 BC

37