



### Activity description

In this activity students use an Excel spreadsheet to compare mobile phone tariffs. The main aim is to familiarise students with spreadsheets, and to study how they use relatively straightforward arithmetic (addition, subtraction, multiplication, writing pence in terms of pounds, and working out VAT) to work out the total amount charged.

### Suitability and Time

Level 1 (Foundation)

1–2 hours

### Resources

Student information and worksheet, spreadsheet

### Equipment

Computers and calculators

Optional: internet access

### Key mathematical language

Estimate, VAT, percentage, rate per minute, standing charge

### Notes on the activity

The first sheet in the spreadsheet can be used to introduce the activity.

Comparing mobile phone tariffs is a relatively difficult context for Level 1 learners, but the spreadsheet has been set up to carry out all the necessary calculations.

Students will use two sheets in the spreadsheet to investigate which of two monthly contract tariffs is better for a given customer, and then for their own imaginary customers.

Note that the sheets of the spreadsheet are protected except for the blue cells. (If you want to change the values used, the password is fsma. Take care not to share this information with students as they may then enter data directly into other cells thereby deleting the formulae!)

The sheets include cells where something is added to zero or multiplied by zero; this is referred to in one of the questions in the reflection section at the end of the worksheet and spreadsheet. This section also asks students to try to explain the formulae used in the spreadsheet. It is intended that you discuss the answers to these questions with the whole class, rather than expecting students to answer them individually.

## During the activity

If you have the equipment, you could project the spreadsheet and explore different inputs with the class as a whole. It is best if you start by looking at just one variable – the call time.

Students who find the initial activity easy can introduce texts as well as calls into their investigations. This could lead to discussions about changing one variable at a time.

## Points for discussion

Discuss the answers to the questions posed on the student sheets:

- How do you change pence to pounds?
- How do you work out VAT?
- Do you add or subtract VAT?

The discussion will help students to understand how this is done on the spreadsheet. Discuss each of the formulae used on the spreadsheet, and also what happens when something is added to or multiplied by zero. The reflection worksheet can be used to aid this discussion.

## Extension

The suggested extension uses the Pay & Go sheet on the spreadsheet. Students will need to include the cost of buying a phone as well as the charges for its use. They will need to consider how often students tend to change their phones and whether the frequency is likely to be less for those using Pay & Go. This will give a basis for estimating a monthly cost for the phone similar to calculating the depreciation of a car.

## Answers

- 1 4 minutes for 30 days = 120 minutes.  
 4 A is 120 minutes – 100 free minutes = 20 charged minutes.

Mobile Phone Account				
Tariff	<b>Occasional Caller Plus</b>			
Free calls				
per month (mins)	100			
Free texts per month	500			
Customer	Asma's Mother			
Telephone No:	7468604288			
Invoice Month	September			
				Amount due
Monthly Charge (£)			21.50	21.50
	Minutes		Rate (p. per min.)	
UK Voice Calls	120			
Charged minutes	20	A	35	7.00
Texts				
Charged texts	0		12	0.00
			Subtotal	28.50
			VAT	5.70
			Total	34.20

B  $20 \times 35 / 100 = 7.00$

C  $21.50 + 7.00 = 28.50$

D  $28.50 \div 100 \times 20 = 5.70$

E  $28.50 + 5.70 = 34.20$

A is less than 300 minutes, so they are free.

Mobile Phone Account				
Tariff	<b>Frequent Caller Plus</b>			
Free calls				
per month (mins)	300			
Free texts per month	unlimited			
Customer	Asma's Mother			
Telephone No:	7468604288			
Invoice Month	September			
				Amount due
Monthly Charge (£)			37.00	37.00
	Minutes		Rate (p. per min.)	
UK Voice Calls	120			
Charged minutes	0	A	35	0.00
Texts				
Charged texts	0		0	0.00
			Subtotal	37.00
			VAT	7.40
			Total	44.40

B  $0 \times 35 / 100 = 0$

C  $37.00 + 0 = 37.00$

D  $37.00 \div 100 \times 20 = 7.40$

E  $37.00 + 7.40 = 44.40$

Occasional Caller Plus is cheaper for this customer