

SMILE WORKCARDS

Percentages Pack Two

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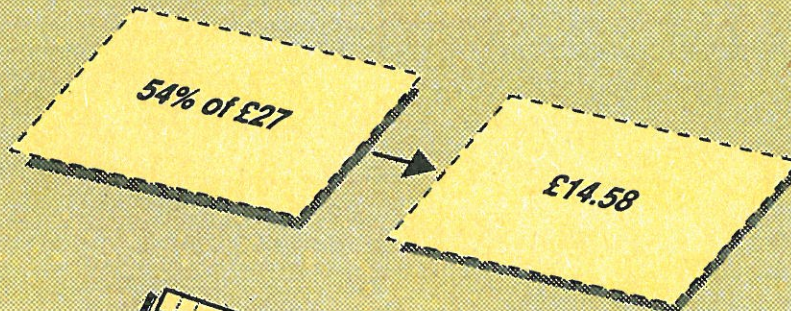
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Smile 2004

"54% is a little more than half marks"

This envelope should contain
ten YELLOW and ten BLUE cards.

Use sensible guesswork to match
the cards in pairs.



2004
"54% is a little more than half marks"
50% of £27 is £13.50
so 54% is

Then check your answers with a
calculator.

These cards and those from 2004b should be cut out and put in envelope 2004.



64% of £320

72% of £250

94% of £165

68% of £210

47% of £245

11% of £900

103% of £78

70% of £80

19% of £200

56% of £42

These cards and those from 2004a should be cut out and put in envelope 2004.



£204.80

£180

£155.10

£142.80

£115.15

£99

£80.34

£56

£38

£23.52

Percentage Puzzle

You will need: scissors, glue

- Cut out the numbers at the bottom of this sheet.
- Place them on the sheet to make four true statements.
- Do not stick them down until you are sure that all four statements are true.

% of =

10	15	20	25	35	45
50	65	70	75	80	150

Marks to percentages

Which is the best mark

$$\frac{17}{20} \text{ or } \frac{21}{25} \text{ or } \frac{32}{40} \text{ ?}$$

Converting the marks to percentages is one way to compare them.

$$\frac{17}{20} \xrightarrow{\times 2} \frac{34}{40} \xrightarrow{\times 3} \frac{51}{60} \xrightarrow{\times 2} \frac{68}{80} \xrightarrow{\times 2} \frac{85}{100} = 85\%$$

$$\frac{21}{25} \xrightarrow{\times 4} \frac{\square}{100} = \square\%$$

$$\frac{32}{40} \xrightarrow{\div 4} \frac{\square}{10} \xrightarrow{\times \square} \frac{\square}{100} = \square\%$$

So $\frac{17}{20}$ is the best mark.

Here are Nazma's marks for the Autumn and Summer terms.
Convert them to percentages.

AUTUMN TERM

Subject	Mark	Working	%
Physical Education	$\frac{19}{25}$		
English	$\frac{34}{50}$		
French	$\frac{14}{20}$		
History	$\frac{17}{25}$		
Geography	$\frac{15}{30}$		
Mathematics	$\frac{41}{50}$		
Science	$\frac{21}{30}$		
Art	$\frac{28}{40}$		
Music	$\frac{12}{24}$		
Technology	$\frac{36}{40}$		

SUMMER TERM

Subject	Mark	Working	%
Physical Education	$\frac{17}{20}$		
English	$\frac{32}{40}$		
French	$\frac{21}{25}$		
History	$\frac{8}{10}$		
Geography	$\frac{13}{20}$		
Mathematics	$\frac{36}{40}$		
Science	$\frac{14}{20}$		
Art	$\frac{17}{25}$		
Music	$\frac{11}{20}$		
Technology	$\frac{27}{30}$		

Use the two tables to answer the following questions.

1. In which term was Nazma's English mark better?

2. What did you notice about her marks for technology?

3. For which subject in the Autumn term did she get a better mark than in the Summer term?

4. In which subjects did she improve her marks from the Autumn term to the Summer term?

5. In which subject did she make the most improvement?

Fractions to Percentages

A

$$\frac{9}{20} \xrightarrow[\left(\frac{9}{20} \times 5 = \frac{45}{100}\right)]{\text{As an equivalent fraction with 100 as the denominator.}} \frac{45}{100} \xrightarrow{\text{As a decimal.}} 0.45 \xrightarrow{\text{As a percentage.}} 45\%$$

For each of these fractions find

- an equivalent fraction with 100 as the denominator
- a decimal
- a percentage

1) $\frac{19}{20}$ 2) $\frac{13}{20}$ 3) $\frac{3}{5}$ 4) $\frac{18}{25}$ 5) $\frac{23}{25}$

$$\frac{42}{60} \xrightarrow[\left(\frac{42 \div 6}{60 \div 6} = \frac{7 \times 10}{10 \times 10} = \frac{70}{100}\right)]{\text{As an equivalent fraction with 100 as the denominator.}} \frac{70}{100} \xrightarrow{\text{As a decimal.}} 0.7 \xrightarrow{\text{As a percentage.}} 70\%$$

For each of these fractions find

- an equivalent fraction with 100 as the denominator
- a decimal
- a percentage

6) $\frac{36}{60}$ 7) $\frac{69}{75}$ 8) $\frac{26}{40}$ 9) $\frac{102}{120}$ 10) $\frac{117}{180}$

B

Write these fractions as

- a decimal
- a percentage

1) $\frac{3}{4}$ 2) $\frac{3}{8}$ 3) $\frac{5}{8}$ 4) $\frac{7}{8}$ 5) $\frac{1}{16}$

C

A number of 4 year old cars had their MOT test. Some failed.

At garage A, 150 cars were tested and 42 cars failed.
42 out of 150 cars failed.

$$\frac{42}{150} = 0.28 = 28\%$$

The percentage of cars failing the MOT at garage A was 28%.

This table shows the number of failures at each garage.

Garage	Number tested	Number failed
A	150	42
B	320	128
C	180	54
D	480	84
E	72	27
F	256	64

- Find the percentage of cars failing their MOT at each garage.
- Which garage would you go to? *Give your reasons why.*

D

A number of households in six towns were asked if they owned a video.

Town	Number of households	Number owning a video
Gloucester	8000	6400
Harrogate	6000	2220
Jarrow	7500	2100
Keswick	15000	2550
Leicester	21000	11970
Margate	3800	1140

- Find the percentage of households questioned which owned a video in each town.

Excess Luggage



Airline passengers may take a certain amount of luggage free of charge. Extra luggage has to be paid for.

Why do airlines charge for excess luggage?

Free luggage

First Class up to 30kg
Economy Class . . . up to 20kg



Air fares from London

Destination	First Class £	Economy Class £
Addis Ababa	1089	529
Brussels	95	95
Cairo	862	339
Nairobi	1346	629
New York	1571	510
Paris	111	90
Rio de Janeiro	1720	801
Rome	406	171
San Francisco	1774	481
Tokyo	2284	1125

Excess luggage charge

Every extra kilogram (kg) costs
1% of the First Class fare.

Ngozi is travelling Economy Class
to New York.

She has 26kg of luggage.
20kg will go free.
6kg has to be paid for.

Each kg costs 1% of £1571

1% of £1571 = £15.71

6 x £15.71 = £94.26

So Ngozi's excess luggage charge
is £94.26

Copy this table and fill it in.

Passenger	Destination	Class	Weight of luggage	Excess Luggage	Charge
Ngozi	New York	Economy	26kg	6kg	£94.26
Pritesh	Rome	First	26kg		
Paul	Rio de Janeiro	Economy	27kg		
Yuen Ling	Brussels	First	41kg		
Chris	Tokyo	Economy	28kg		
Maria	Addis Ababa	Economy	19kg		

Turn over

Luggage charges to Rome.

Copy this table and fill it in.

Weight of luggage kg	Luggage Charge	
	First Class	Economy Class
15		
17		
19		
21		
23		
25		
27		
29		
31		
33		
35		
37		

Is 20kg of luggage enough for most
journeys?

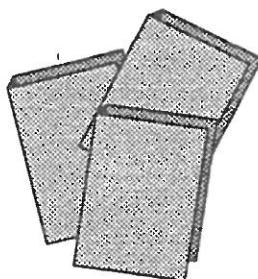
Is it worth going over the limit?

Do airlines use a fair way of
charging for excess luggage?

Can you think of a fairer way?

PERCENTAGE SALES

A shopkeeper
buys ringbinders
at £2.20 each.



25% of the cost is added to the price before they
are sold. 25% of £2.20

$$= 0.25 \times £2.20$$

$$= £0.55 \text{ This is the shopkeeper's profit.}$$

The ringbinders are sold for
£2.20 + £0.55
= £2.75.



Calculate the shopkeeper's profit and the selling
price for the following articles.

	Buying price	Percentage profit
1.	80p	25%
2.	£1.70	10%
3.	£5.40	30%
4.	£5.00	15%
5.	£9.70	20%

In a sale the original selling price of some articles
were reduced.

Calculate the reduction and the sale price of these
articles.

	Original price	Percentage reduction
1.	70p	10%
2.	£18.00	25%
3.	£15.50	20%
4.	£8.70	$33\frac{1}{3}\%$
5.	£4.40	15%

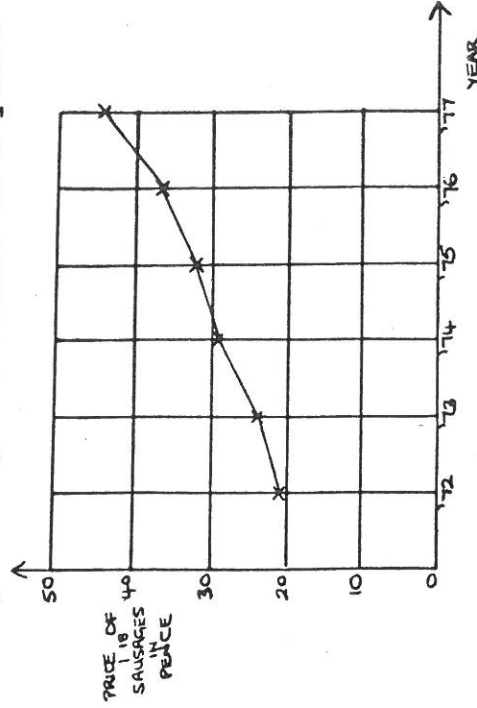
Materials: graph paper, calculator

INFLATION

The prices of 1 lb sausages are graphed below. The points have been joined by straight lines because there is no information about how the prices vary during the course of a year.

Food	1972	1973	1974	1975	1976	1977
1 lb sausages	21p	24p	29p	32p	37p	44p
4ozs coffee	29p	30p	32p	40p	41p	72p
1 lb potatoes	2p	2p	2p	3p	7p	12p
12 eggs	20p	20p	47p	31p	39p	48p
2lbs sugar	10p	9p	10p	29p	23p	21p
1 pt milk	6p	6p	6p	5p	9p	10p
1 lb carrots	3p	4p	5p	7p	7p	14p

The table below gives the prices of seven foods in six successive years.



(1) Draw graphs to illustrate the annual changes in price of the six other foods listed.

(2) a) Which foods did not increase in price between 1975 and 1976?

b) Which products did not record their highest prices in 1977? Which products did not record their lowest prices in 1972? Suggest reasons for your answers.

(3) a) The price increase for 1 lb of sausages between 1972 and 1977 is 23p; for 2 lbs sugar it is only 11p. Any comment?

b) Find the price increases for the other foods.

(4) Which food do you think increased most in price between 1972 and 1977? Which food price do you think increased least?



Sausages and sugar increased by different amounts but in each case the price increase is approximately the same as the original 1972 price.

(5) Copy and complete this table which compares the increase with the original 1972 price.

Food	1972 Price	1977 Price	Price Increase	Price Increase \div 1972 Price	Percentage Increase
1 lb sausages	21p	44p	23p	$\frac{23}{21} = 1.095$	$1.095 \times 100\% = 109.5\%$
4oz coffee	29p	72p			
1 lb potatoes	2p	12p			
12 eggs	20p	48p			
2 lb sugar	10p	21p	11p	$\frac{11}{10} = 1.1$	$1.1 \times 100\% = 110\%$
1 pt milk	6p	10p			
1 lb carrots	3p	14p			

(6) Which food do you now think has increased most in price? Which food price has increased least?

(7) Compare your answers to questions (4) and (6). Comment.

- (8)
- 1 lb sausages
 - 8oz coffee
 - 5 lbs potatoes
 - 6 eggs
 - 3 pts milk
 - 1 lb carrots

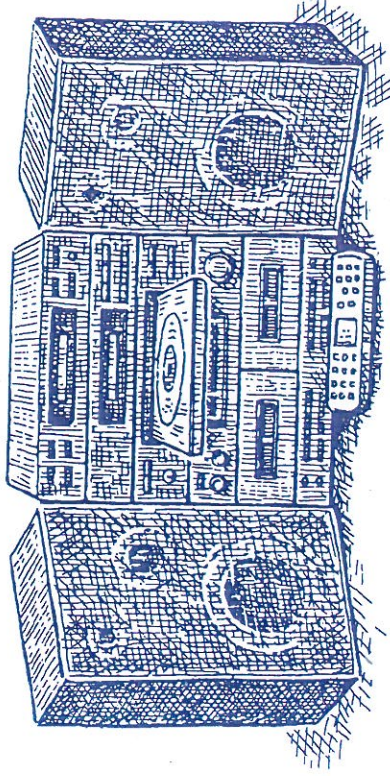
Mrs. Brown's shopping list is the same, year after year.

- (a) What was the bill for this list in 1972?
- (b) What was the bill in 1977?
- (c) What is the percentage increase in the cost of the shopping?
- (d) Does your answer to (c) give an accurate value for the rate of inflation between 1972 and 1977? Give a reason.



1.

The price of a CD player in November was £400.
On December 1st the price was increased by 15%.

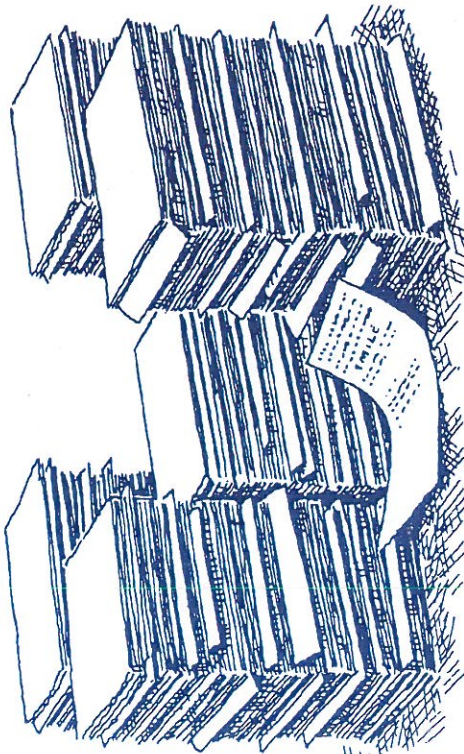


In the January sales the price of the CD player was reduced by 15%.

The sale price was not £400.
Why not?

2.

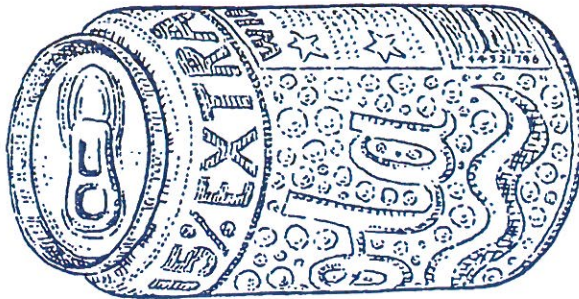
"10% of the wood consumed each year is used as paper, 87.5% of which is used by rich countries."



What percentage of the wood is used by rich countries for paper?

Source: Norman Myers (ed) The Gaia Atlas of Planet Management.

3.



Not to scale.

The height of this can is 126.5mm.

If the diameter remains constant what would be the height of a normal size can?

Turn over

4.

"The world is now losing its tropical forest at the rate of 7% per year."

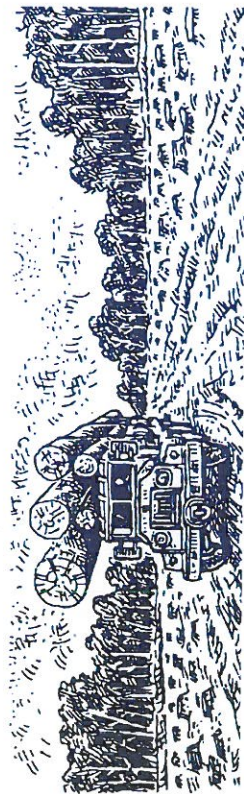
If this trend continues, what percentage of the existing forest will be left in 5 years time?

Show that, 10 years from now, just under half of the tropical forest will have disappeared.

How much will remain after . . . 50 years

. . . 100 years?

You may find a spreadsheet useful.



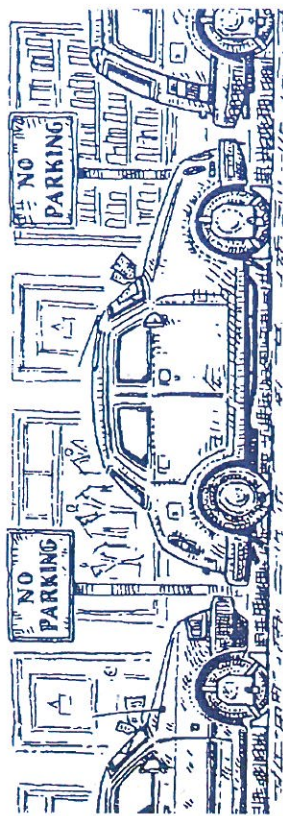
Source: Forest Resources, Food and Agriculture Organisation 1985.

5.

Parking Penalties

"350 000 cars are parked illegally in London every day of the week. Despite this, police claim that wheel clamping is reducing illegal parking by as much as 30%."

Use this information to calculate the maximum number of cars that could have been illegally parked in London in one day, before wheel clamping was used as a deterrent.



Source: Telegraph Weekend Magazine, Sept 24th 1988.