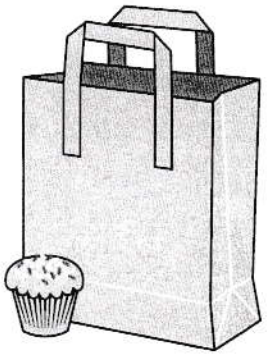
1 [2016S]

Maria bakes cakes and sells them in bags.



She uses this formula to work out how much to charge for one bag of cakes.

Cost = number of cakes × 20p + 15p for the bag

How much will a bag of 12 cakes cost?

$12 \times 20 + 15$

$= 240 + 15$

$= 255$

£2·55

Olivia buys a bag of cakes for £5.15

→ £5 FOR CAKES
→ 15p FOR BAG

Use the formula to calculate how many cakes are in the bag.

Show your method

$\frac{500}{20} = \frac{50}{2}$

$= 25$

25

[3 marks]

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2 [Extra]

Here is the rule that an electrician uses to work out how much to charge a customer.

Cost in pounds = 25 × hours worked + 55

The electrician takes **three hours** to replace some electrical cable and some sockets.

Use the rule to work out how much the electrician should charge the customer.

$25 \times 3 + 55$

$= 75 + 55$

$= 130$

£ 130

[2 marks]

3 [2017]

Here is a rule for the time it takes to cook a chicken.

Cooking time = 20 minutes plus an extra 40 minutes for each kilogram

How many minutes will it take to cook a 3 kg chicken?

$20 + 40 \times 3$

$= 20 + 120$

$= 140$

140 **minutes**

What is the mass of a chicken that takes 100 minutes to cook?

$100 - 20 = 80$

THE 20 MINUTES 'EXTRA'

$\frac{80}{40} = 2$

2 **kg**

[2 marks]

4

[2001]

Boat Hire	
Motor boats	**Rowing boats**
£1.50 for 15 minutes	£2.50 for 1 hour

How much does it cost to hire a **rowing boat** for three hours?

$2 \cdot 50 \times 3$

£7·50

Sasha pays **£3.00** to hire a **motor boat**.

She goes out at **3:20 pm**.

30 MINUTES!

By what time must she **return**?

30 MINUTES AFTER 3·20

3:50pm

[2 marks]

5

[Extra]

Here is a rule to work out the time it takes to cook a piece of meat.

Time in minutes = 35 × weight in kg + 30

A piece of meat has a weight of 4 kg.

Use the rule to work out the time, in minutes, it takes to cook this piece of meat.

$35 \times 4 + 30$

$= 140 + 30$

$= 170$

170 minutes

[2 marks]

6 [Extra]

The cost of food for a wedding is £300 plus £9 per person.

This rule written as a formula is

$$C = 300 + 9 \times n$$

Explain what the letter **n** represents in the formula.

'n' REPRESENTS 'THE NUMBER OF PEOPLE'

A couple want food for **200** guests.

How much will it cost them?

$300 + 9 \times 200$

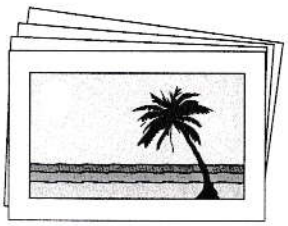
$= 300 + 1800$

£2100

[2 marks]

7 [Extra]

Alfie has some photographs printed.



The cost is £2.50 for postage and 12 pence for each print.

Alfie uses this formula for the total cost (C) in pence.

$$C = 250 + 12n$$

n stands for the number of photographs.

The total cost for Alfie is **£6.70**

How many photographs does he have printed?

Show your method

$670 - 250 = 420$

$\frac{420}{12} = \frac{210}{6} = \frac{105}{3}$

35

[2 marks]

8 [Extra]

The following formula is used to convert a temperature in degrees Celsius (°C) to a temperature in degrees Fahrenheit (°F).

$$F = 1.8 \times C + 32$$

Use the formula to convert a temperature of 20 degrees Celsius to degrees Fahrenheit.

Show your method

$F = 1.8 \times 20 + 32$

$= 36 + 32$

$= 68$

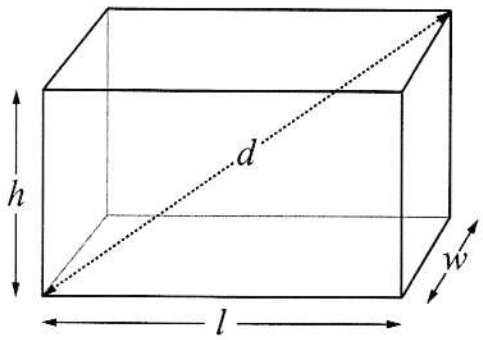
68°F

[2 marks]

9 [Extra]

A cuboid has length, l, width, w, and height, h

The distance between opposite corners is d



Look at the formula.

$$d^2 = l^2 + w^2 + h^2$$

Use the formula to find the value of d when $l = 6$, $w = 2$ and $h = 3$

Show your method

$d^2 = 6^2 + 2^2 + 3^2$

$= 36 + 4 + 9$

$= 49$

$d = \sqrt{49}$

$= 7$

7

[2 marks]

10 [Extra]

The cost to hire a boat on a lake is worked out using the information below.

Cost to hire a boat:
£4.50 per boat
and then
£3.50 per hour

Four friends hire a boat for five hours.

They share the cost equally.

How much does **each** person pay?

1ST $450 + 350 \times 5$

$= 450 + 1750$

$= 2200$

2ND $2200 \div 4$

350 × 5 = 1750

£ 550

Chen's family hires a boat and pays a total of £15

How many hours did they have the boat for?

1ST £15 − £4.50 = £10.50

2ND $1050 \div 350 = 3$

3 hours

[2 marks]

11 [Extra]

Doctors sometimes use this formula to calculate how much medicine to give a child.

$$c = \frac{ay}{12 + y}$$

c is the correct amount for a child, in ml

a is the amount for an adult, in ml

y is the age of the child, in years

A child who is **4 years old** needs some medicine.

The amount for an adult is **20 ml**.

Use the formula to work out the correct amount for this child.

$c = \frac{20 \times 4}{12 + 4} = \frac{80}{16}$

$= 5$

5 ml

Another child needs some medicine.

The amount for an adult is **30 ml**.

The correct amount for this child is **15 ml**.

How old is this child?

Show your method

$\frac{30 \times y}{12 + y} = 15$

$\Rightarrow \frac{y}{12+y} = \frac{1}{2}$ so $y = 12$

12

[THIS IS PROBABLY TOO DIFFICULT FOR THE CURRENT KS2 SATS!]

[4 marks]

12 [Extra]

Some people use this rule to work out how many hours' sleep each night young children need.

> **Subtract** the child's age in years **from 30**, then **divide** the result by **2**

Sanjay is **8** years old.

Use the rule to work out how many hours' sleep he needs.

$30 - 8 = 22$

$\frac{22}{2} = 11$

11 hours

Lisa is **6** years old.

She wakes up every morning at **7am**.

Use the rule to work out what time she needs to go to sleep.

Show your method

$30 - 6 = 24$, $\frac{24}{2} = 12$ HOURS SLEEP.

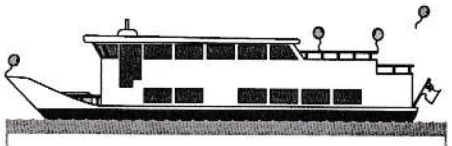
SO SHE GOES TO SLEEP 12 HOURS BEFORE

7 p.m.

[3 marks]

13 [Extra]

A boat can be hired for children's parties.



Have your child's party on our boat

The formula below shows the cost.

Cost = £13.50 × the number of children + £23

What is the cost of a party for **8 children**?

$13.50 \times 8 + 23$

$= 108 + 23$

$= £131$

£ 131

1350
× 8
10800
2 4

A different children's party cost **£225.50**

How many children were at the party?

Show your method

$225.50 - 23.00 = 202.50$

$202.50 \div 13.50 = 15$

15

[3 marks]

14 To find the nth triangular number, you can use this rule.

[Extra]

$$n\text{th triangular number} = \frac{n}{2}(n+1)$$

Example: 3rd triangular number $= \frac{3}{2}(3+1)$

$= 6$

Work out the **10th** triangular number.

$\frac{10}{2} \times (10+1)$

$= 5 \times 11$

$= 55$

55

Now work out the **100th** triangular number.

$\frac{100}{2} \times (100+1)$

$= 50 \times 101$

$= 5 \times 1010$

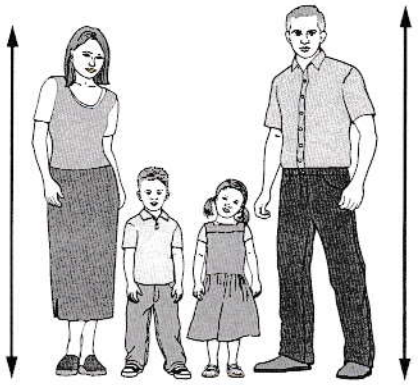
$= 5050$

5050

[2 marks]

15 Here are Alfie and Emma with their parents.

[Extra]



You can use the table below to predict how tall children will be when they are adults.

There is one formula for boys and a different one for girls:

Boy's predicted height	Girl's predicted height
$0.4(x + y) + 42$	$0.4(x + y) + 29$
x is the father's height in cm. y is the mother's height in cm.	

13 cm SHORTER

Calculate the predicted height of Alfie when he is an adult.

$0.4 \times (180 + 160) + 42$

$= 0.4 \times 340 + 42$

$= 4 \times 34 + 42$

$= 136 + 42$

$= 178$

178 cm

When Emma is an adult, she is predicted to be taller than her mother.

How much taller?

EMMA'S PREDICTION IS $178 - 13$

$= 165$

5 cm

THIS IS 5cm TALLER THAN HER MOTHER

[2 marks]