

Functional Skills Maths

Level 2

Understand and use simple formulae and equations involving one- or two-step operations

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Skill Standard:

5

Coverage and Range:

Understand and use simple formulae and equations involving one- or two-step operations.

- Understand that words and symbols in expressions and formulae represent variable quantities (numbers) not things, so $2a + 2b$ cannot be explained as 2 apples and 2 bananas.
- Understand that the contents of brackets must be worked out first.
- Understand that when there is no operator between a number and a variable, two variables, or a bracket, multiplication is implied.
- Make substitutions in given formulae in words and symbols.¹

¹ QCA Functional Skills guidance: amplification of the standards June 2008 QCA/08/3700

Explain the Skill

BIDMAS

Calculations can get very complicated, especially if brackets are included. It is important to do the various stages of the calculation in the correct order.

Order of calculations:

B	I	D	M	A	S
Brackets	Indices	Divide	Multiply	Add	Subtract
Always do brackets first.	Do in order given in the problem.			Do in the order given in the problem.	
First	Next			Last	

To calculate $(7 \times 3) \times 4 - 5$

brackets first $21 \times 4 - 5$
multiplication second $84 - 5$
then subtraction $= 79$

To calculate $4 \times 9 + 16 \div 2$

multiplication and division must be done before addition

$$= 36 + 8$$
$$= 44$$

To calculate $6 \times 30 \div 9 - 8$

Division and multiplication are done in the order given in the calculation so

$$180 \div 9 - 8$$
$$20 - 8$$
$$= 12$$

Practise the Skill

1) Complete the following questions.

$7 + 8 \times 3 = \underline{\hspace{2cm}}$

$3 \times 6 - 9 = \underline{\hspace{2cm}}$

$18 - 5 \times 2 + 3 = \underline{\hspace{2cm}}$

$4 \times 7 - 45 \div 5 = \underline{\hspace{2cm}}$

$(12 - 3) \div 3 + 5 = \underline{\hspace{2cm}}$

$15 \times 2 - (8 + 4) = \underline{\hspace{2cm}}$

$(14 - 6) \times (6 + 2) = \underline{\hspace{2cm}}$

$3 \times 2^2 \times 5 = \underline{\hspace{2cm}}$

$3 + (4^2 - 2^3) = \underline{\hspace{2cm}}$

$8 \times 5 - (5^2 - 9) = \underline{\hspace{2cm}}$

Explain the Skill

Formulae

A formula (plural formulae) is a mathematical relationship expressed in letters or symbols. These letters or symbols represent quantities which can vary and are known as variables.

When you create a formula remember to use the + or – sign to add or subtract letters.

When multiplying the multiplication sign is left out.

If letters or symbols are to be multiplied by numbers, the numbers always come first.

e.g. $2x + 5y$

Here is a reminder of the rules of signs when multiplying or dividing positive or negative numbers.

Rules of Signs				
(-)	x	(-)	=	+
(-)	x	(+)	=	-
(+)	x	(-)	=	-
(+)	x	(+)	=	+
(-)	÷	(-)	=	+
(-)	÷	(+)	=	-
(+)	÷	(-)	=	-
(+)	÷	(+)	=	+

It is also important to do the various stages of the calculation in the correct order (BIDMAS).

A plumber charges £50 call out fee and £35 per hour. Write a formula for the cost (C) of hiring the plumber for 'p' hours.

It costs £50 + £35 for the plumber to work for 1 hour.

To hire the plumber for p hours it will cost £50 + p x £35

The formula is $C = £50 + £35p$

We can leave the £ sign out of the formula so $C = 50 + 35p$

Practise the Skill

- 1) Ryan works 40 hours a week.
How much does he earn in y weeks?

- 2) Laura wants to hire the village hall for a party. It costs £50 per hour and there is an administration charge of £25.

Write a formula for the total cost (T) to hire the hall for h hours.

 $T =$ _____

- 3) A taxi charges £4.00 fixed charge (C) plus £1.25 per mile.

Write a formula for the cost of hiring the taxi to travel m miles.

 $C =$ _____

- 4) An electricity company charges £35 standing charge and £0.04 for each unit of electricity used.

Write a formula for the total cost (T) of using e units of electricity.

 $T =$ _____

- 5) Sandeep has £270 in his bank account. Each month he saves £50.

Write a formula to show the total amount (T) he will have in his account after y months.

 $T =$ _____

Explain the Skill**Substitution**

Substitution is where a variable in a formula is replaced with a numerical value.

The perimeter of a rectangle can be found using the formula

$$P = 2l + 2w$$

Find the perimeter (P) when $l = 12$ and $w = 6$

Replace the letters (variables) l and w with the numbers 12 and 6 .

$$P = 2 \times 12 + 2 \times 6$$

$$P = 24 + 12$$

$$P = 36$$

Practise the Skill

- 1) Calculate the value when $a = 5$, $b = 3$ and $c = 9$

$$3a + b = \underline{\hspace{2cm}}$$

$$4a + 2b = \underline{\hspace{2cm}}$$

$$5a + 3b - c = \underline{\hspace{2cm}}$$

$$6(a + b) = \underline{\hspace{2cm}}$$

$$\frac{5(b + c)}{a} = \underline{\hspace{2cm}}$$

- 2) The volume of a box can be found using the formula $V = lwh$

Find the volume (V) when $l = 8$ cm, $w = 5$ cm and $h = 4$ cm

$$V = \underline{\hspace{2cm}} \text{ cm}^3$$

- 3) A mobile phone company uses the formula $C = 10t + 20m$ to calculate the total cost of a bill.

C is the total cost of the bill in pence
 t is the number of text messages
 m is the number of minutes of call time

Calculate the total cost for 150 texts and 50 minutes of call time.

$$\underline{\hspace{2cm}} \text{ p}$$

- 4) A gas company uses the formula $C = 26 + 0.05p$ to work out the charge to a customer each month where p units of gas were used.

How much is a customer charged if 700 units of gas have been used?

£ _____

- 5) Use the formula $C = \frac{5(F - 32)}{9}$ where:

C = temperature in °Celsius

F = temperature in °Fahrenheit

Calculate C when $F = 86^\circ$

$C =$ _____ °

Apply the Skill

- 1) Anna and Peter are going on a city break to Budapest.

The travel agent calculates the cost of the break using this formula $C = p(t + 30)$.

C is the total cost in pounds.

p is the number of people

t is the cost of the trip per person

Use this formula to calculate the total cost if $p = 2$ and $t = 245$.

£ _____

- 2) Anna and Peter buy travel insurance for the trip.

The insurance company uses the formula

$T = 3.5n + 5$ to work out the cost, T pounds, for insuring a customer for n days.

Work out the cost for travel insurance for 4 days.

£ _____

- 3) Anna checks the temperature in Budapest and it is going to be 68°F when they are there. She wants to convert the temperature to degrees Celsius.

Use the formula $C = \frac{5(F - 32)}{9}$

Where C = temperature in $^{\circ}\text{Celsius}$

F = temperature in $^{\circ}\text{Fahrenheit}$

Find C when $F = 68^{\circ}$

$68^{\circ}\text{F} = \text{_____}^{\circ}\text{C}$

- 4) Anna and Peter stay in a hotel and their bedroom is 8 metres long and 5.5 metres wide.

Peter works out the area of the room using the formula: $A = LW$ where L is the length of the room and W is the width.

What is the area of their room?

_____ m^2

- 5) They decide to hire a car for a day to do some sightseeing. The car hire costs €28 per day plus 35 cents for each kilometre travelled.

The company use the formula $T = €28 + 0.35m$ to work out the cost where T is the total cost in euros and m is the number of kilometres travelled.

How much will it cost to hire the car for 1 day and travel 120 km?

€ _____

- 6) The time a journey takes can be calculated using the formula:

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

Peter travels 60 kilometres and drives at 40 kilometres per hour.

How long does the journey take?

_____ hours

- 7) Anna uses her mobile phone on the trip.

The mobile phone company uses the formula $C = 15 + 0.12m$ to calculate the total cost, C pounds, for a customer who makes m minutes of phone calls in a month.

Work out the total cost if Anna makes 200 minutes of phone calls.

£ _____