## Algebra Prior Learning Assessment Questions 7,8,9 &10

**Objective: I can find the value of more than one unknown amount.**

NC A4: find pairs of numbers that satisfy an equation with two unknowns
A5: enumerate possibilities of combinations of two variables.

### Teacher Input Ideas:

- Look at the prior learning assessment for each question. Allow children time to explain how they approached each question and their answers. Children to model strategies and discuss their difficulties.
- Set up a class shop. Give children a total they can spend (like in Question 8 of the prior assessment). Provide the children with time to come up with different combinations of products and to record these algebraically. How many different options did we find as a class? Have we found them all? How do we know?
- Set up a question with 2 missing amounts such as in question 9 and 7. What information can we use to help us? What starting points do we have? What information do I know? Explain how you can find the answer. What other knowledge do you need to use? Which possibilities do not work? Why? Is there more than one possible answer?
- Make a large product pyramid in the classroom. You may want to include all the amounts in the boxes when first introducing product pyramids. Encourage the children to discuss what they notice about the amounts in the boxes. How have they been made? Discuss the meaning of product using the children's discussions. Once the children know the meaning of this word, create large product pyramids with some missing amounts. Encourage the children to explore possible amounts and provide suggestions of how they tackled finding the missing values. Which information is the most useful? Why? Where did you start? Model how algebra is used to find the missing amounts (see mastery 1 sheet).

### Practice Activities

**Purple Practice: Most suited for children who made errors in Question 9 of the prior learning assessment.**

The purple activity provides the children with the opportunity to explore different possibilities of unknown values. The children should apply their knowledge of addition facts, multiples and factors to help them to find a variety of possibilities. It also encourages the children to work systematically to ensure that they have found all possible answers.

The children may need some guidance with starting points for the second and third questions. Prompt the children to suggest that they jot down multiples of 3 and 4 to 60 to help them then find possible values to place into the boxes. Encourage the children to suggest working through the values systematically to ensure that they find all possible options. If modelling this to the children, encourage the children to try section 3 independently.

**Green Practice: Most suited for children who demonstrated errors in question 8 of the prior learning assessment and would benefit from exploring different possibilities to make a total and ways to record this algebraically.**

Practical: set up a shop at a table or in the classroom somewhere. Have objects such as fruit or sweets displayed with different price tags. You could even encourage the children to bring in food items from home to create a real-life shop or make a leaflet for the children with different foods and prices.

Give each child or group of children different amounts they can spend such as 90p, 45p £1.62, etc. The children to select different items that equal to the exact amount. They are then to record these down using symbols on to their shopping list or into their books to show that they can record this algebraically. The children should be able to find more than one combination, so ensure that the prices you provide allow the children to explore different possibilities.

For example: the children may record: $2o + p + 3s = 90$

Differentiate with different amounts and combinations. You could also extend this activity by replacing the amounts with coins such as I need to give the cashier 90p. From the coins I have, which combinations can I use? How can I express this? If I have one 50p already in my hand what other coins can I use? Here this could be restricted so there are only 2 options, encouraging the children to rule out the use of certain coins. How can they record this?

**Yellow Practice: Most suited for children who demonstrated difficulties with answering question 7 of the prior learning assessment.**

This activity requires the children to use 2 different equations to work out the amount of more than one missing value. The children are provided with 2 or 3 equations in each question on the sheet to solve. The children will need to decide which equation to solve first to help them to find the value of a missing amount. This can then be used to find the value of another missing amount.

**Mastery 1:** The children are provided with 4 product pyramids, like the one in Question 10 of the prior learning assessment. The children are encouraged to work out the missing values. In the first 2 questions, the children have some support provided as there are examples as to how to find the missing values of the labelled boxes (a, b, c). The children are to demonstrate their understanding of the word product and to find the value of the missing boxes using the amounts they have been provided with.

**Mastery 2:** This activity is a problem-solving activity which will encourage the children to suggest starting points and to reason using information they have been provided. The children are to find the missing values of the letters of the alphabet. The children have been given some values of the letters, however they are then required to find missing values by using the equations on the yellow blocks provided.

Some children may find it hard to suggest a starting point. The children have been given the value of some letters so encourage the children to suggest a starting point from there. Then encourage the children to look at the equations to see which block would be the best place to start with. If the children are finding it difficult, encourage the children to use the information that 0 = zero, then to look for blocks where this would be the most useful (g + o, n-o, p x o x p). Also encourage the children to check they have used the signs accurately too. Children may want to cross off blocks once they have solved them to help.

**Answers:**

**Purple:**

1) 1 and 5 2 and 4 4 and 2 5 and 1
2) possible options together:

| m | n |
|---|---|
| 12 | 48 |
| 24 | 36 |
| 36 | 24 |
| 48 | 12 |

encourage children to explain what they notice and any patterns they see.

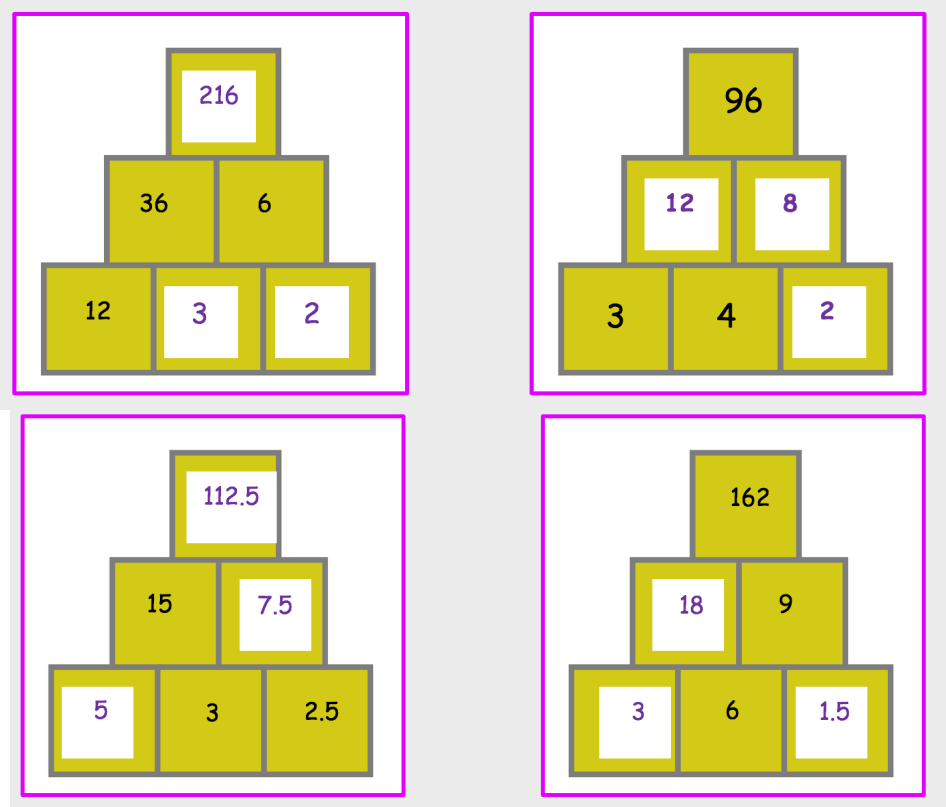
3)possible options together:

| f | a |
|---|---|
| 3 | 1 |
| 6 | 2 |
| 12 | 4 |
| 24 | 8 |

**Yellow:**

1) a = 12 b = 3
2) c= 30 d = 2
3) e = 4 f= 9
4) g = 5 h= 0
5) i= 7 j = 42
6) l= 14 k = 6
7)

**Mastery 1: product pyramids**




Mastery 2:

a = 3 b = 2 c = 9 d=30 e = 6 f = 33 g= 10 h = 5 i= 36

j = 1 k = 35 l = 96 m = 20 n= 12 o = 0 p= 4 q=11 r= 7

s=8 t= 15 u = 17 v =16 w = 90 x =13 y = 14 z= 50

BRICKWORK Mathematics

Purple Practice:

LO I explore possible options of missing values when 2 amounts are unknown.

Explore different possibilities for the answers of the missing values in each question.

Hint: There is more than one correct answer for each question.
Can you find all the possibilities?

Pick 2 digits between 1 and 9 to make this sum correct.

$54 + \square = 60 - \square$

m is a multiple of 3 and n is a multiple of 4. What can the value of m and n be to make this sum correct?

$$m + n = 60$$

f and a are both factors of 24. What can the value of f and a be to make the sum correct?

$$f \div a = 3$$

BRICKWORK Mathematics

Yellow Practice

LO: I can find the value of 2 unknown values.

Look at the equation blocks and work out the missing values:

1.

$a + b = 15$ $b^2 = 9$

a = b =

2.

$c \div d = 15$ $c + d = 32$

c = d =

3.

$e \times f = 36$ $e + f = 13$

e = f =

4.

$g \times h = 0$ $5g + h = 25$

g = h =

5.

$i^2 + j = 91$ $j \div i = 6$

i= j =

6.

$35 + k + l = 55$ $l - k = 8$

k = l =

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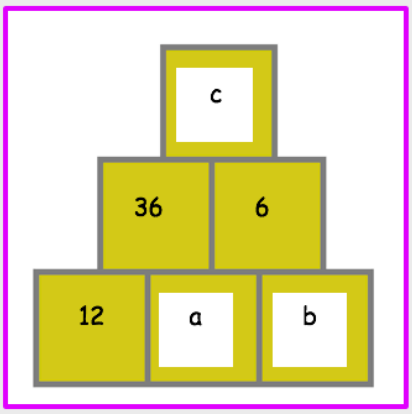
Mastery

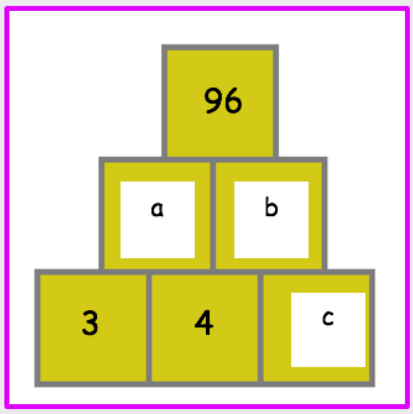
Problem Solving: Product Pyramids

Look at each of the **product** pyramids and find the missing values.



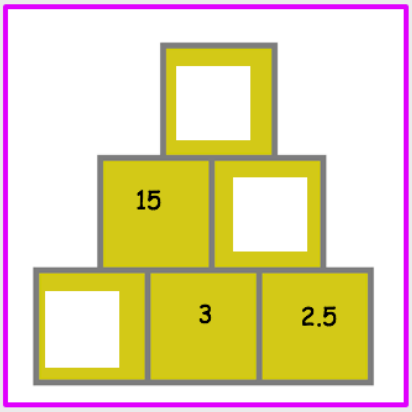

12 x a = 36
a x b = 6
c = 36 x 6

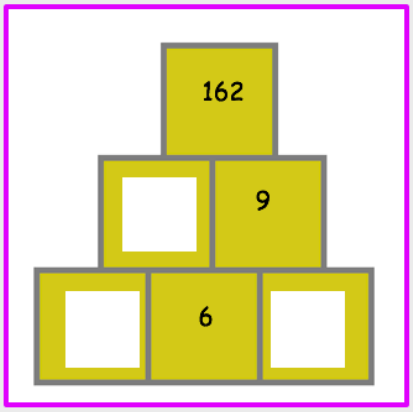
a = b = c =




a x b = 96
3 x 4 = a
b ÷ 4 = c

a = b = c =



BRICKWORK Mathematics

**Mastery 2**

Problem Solving

Work out the value of each letter. (Tip: x has been found already and does not appear on any block. X is used as the multiply sign)

a = b = c = d=30 e = f = 33 g= h = i=

j = k = l = m = n= o = 0 p= q=11 r=7

s=8 t= u =17 v = w = x =13 y = z=

E + g + g = 26

a X n = 36

n - o = 12

c + a + t = 27

m + a + n =35

a X s = 24

3h = 15

h + a + m = 28

g + o = 10

s + u + n = 37

h + a + t = 23

m + u+ m = 57

$c^2 = 81$

i ÷n = 3

p X o X p = 16

j+u+m+p = 42

z - o- o = 50

r = a + p

b + e + d =38

l + o - w = 6

w = e X t

b X y = 28

k - e - y=15

V+ e - t =7