Planner

Expressions (1)

- Writing and finding the power of a number
- Identifying the correct order for a calculation
- Writing expressions
- Substituting into expressions

Keywords

You should know

explanation 1

1 These diagrams show the square numbers 1, 4 and 9.

$1^2 = 1 \times 1 = 1$ $\quad 2^2 = 2 \times 2 = 4$ $\quad 3^2 = 3 \times 3 = 9$

a Copy and continue the pattern to show the next two square numbers.

b Copy and complete the table to show the first 12 square numbers.

n	1	2	3	4	5	6	7	8	9	10	11	12
n^2	1	4	9					64				

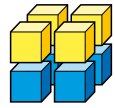
2 Emma and Harry are arguing over the value of 15^2.

Harry is correct. Explain how he worked out his answer.

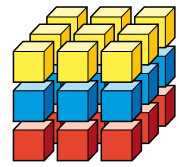
explanation 2

3 The diagram shows the first three **cube numbers**.

$1^3 = 1 \times 1 \times 1$
$= 1$



$2^3 = 2 \times 2 \times 2$
$= 8$



$3^3 =$ _____
$=$ □

a Copy and complete the calculation for 3^3. Find its value.

b **i** Write the calculation for 4^3.

ii What is the value of 4^3?

c Copy and complete the table to show the first 5 cube numbers.

n	1	2	3	4	5
n^3	1	8			

d What is the value of 10^3?

explanation 3

4 Write each calculation using a power.

a 3×3 **b** $5 \times 5 \times 5$ **c** 4×4

d $2 \times 2 \times 2 \times 2$ **e** 6×6 **f** $7 \times 7 \times 7$

5 Write each calculation using a power.

a 8×8 **b** $7 \times 7 \times 7 \times 7$ **c** $2 \times 2 \times 2$

d $6 \times 6 \times 6$ **e** $4 \times 4 \times 4 \times 4 \times 4$ **f** $5 \times 5 \times 5 \times 5$

***g** $2 \times 2 \times 2 \times 3 \times 3$ ***h** $5 \times 5 \times 7 \times 7 \times 7$ ***i** $3 \times 3 \times 5 \times 5 \times 6 \times 6 \times 6$

6 Write the calculation for each of these.

a 4^3 **b** 8^4 **c** 2^5

d 11^2 **e** 6^5 **f** 3^4

***g** $2^3 \times 3^4$ ***h** $5^3 \times 7^2$ ***i** $3^5 \times 5^2$

7 Find the value of each of these.

a 6^2 **b** 3^3 **c** 9^2 **d** 2^4

e 4^3 **f** 2^5 **g** 3^4 **h** 10^4

explanation 4a explanation 4b online

8 Find the value of each expression.

a $3^2 + 4^2$ **b** $2^2 \times 5$ **c** $5^2 - 4^2$ **d** 20^2

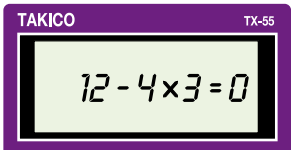
e $6^2 \div 2$ **f** $9^2 + 4^2$ **g** 100^2 **h** $8^2 \div 2^2$

i $8^2 + 7^2$ **j** $2^4 - 4^2$ **k** $4^2 \times 3^2$ **l** $5^2 \times 2^3$

9 Paul says, '$12 - 4 \times 3$ is 24. I did $12 - 4$ which is 8. Then I did 8×3 to get 24.'

However, his calculator shows that the correct answer is 0.

How do you get the correct answer?



10 There is one answer card for each question.

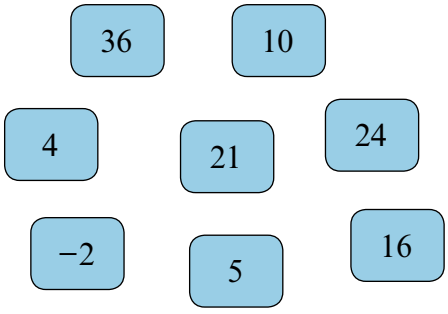
Match the questions and answers. One has been done for you.

a $10 - 2 \times 3 =$ 4 **b** $9 - 7 + 3$

c $32 \div (8 - 6)$ **d** $24 - 9 \div 3$

e $4 \times (7 + 2)$ **f** $1 + 3^2$

g 3×2^3 **h** $10 - (8 + 4)$



11 Work out these calculations.

a $6 + 2 \times 3$ **b** $10 - (4 + 5)$ **c** $12 - 8 \div 4$

d $(1 + 3)^2$ **e** $18 \div (2 + 4)$ **f** $(12 + 3) \times 2$

g $1 + 2 \times 3^2$ **h** $5 \times (2^2 + 1)$ **i** $6 \times 10 \div 4$

12 Work out these calculations.

a $5 + 4 \times 3$ **b** $3 \times (4 + 5)$ **c** $18 - 6 + 4$

d $5 + 3^2$ **e** $12 - (7 + 2)$ **f** $24 \div 3 \times 2$

g $(4 + 3)^2$ **h** $25 - 2^3$ **i** $18 \div (10 - 4)$

***j** $4 \times 3 + 2 \times 5$ ***k** $4 \times (3 + 2) \times 5$ ***l** $4 + 5 \times 2 + 3$

***m** $\frac{6 + 8}{2}$ ***n** $\frac{20}{7 + 3}$ ***o** $\frac{20 - 8}{7 - 4}$

explanation 5 online

13 Which calculations don't need brackets?

a $(2 + 3) \times 5 = 25$ **b** $18 - (4^2) = 2$ **c** $8 - (2 \times 4) = 0$

d $15 - (3 + 8) = 4$ **e** $(7 + 3) - 4 = 6$ **f** $(2 + 4)^2 = 36$

14 Some of these calculations need brackets to make them correct.
Copy the calculations and put the brackets in the right places.

a $16 - 4 \times 3 = 36$ **b** $8 \times 3 + 6 = 72$ **c** $9 + 5 \times 4 = 29$

d $3 \times 5^2 = 75$ **e** $10 - 6 + 8 = 12$ **f** $24 \div 4 \times 2 = 3$

g $2 + 3^2 = 25$ **h** $6 + 8 \div 2 = 7$ **i** $18 - 4^2 = 2$

***15** Work out this challenging calculation. Use the correct order of operations.

$4 \times (12 - 3) + 2^3 - 5 \times 7 + 18 \div 9 + 3^2 - 20$

explanation 6 online

16 Match each expression to a set of instructions. The first has been done for you.

a	I think of a number, x, and double it.	$x + 2$
b	I think of a number, x, and multiply it by 3.	$3 - x$
c	I think of a number, x, and add 1 to it.	$3x$
d	I think of a number, x, and add 2 to it.	$2x$
e	I think of a number, x, and divide it by 2.	$x + 1$
f	I think of a number, x, and subtract 3.	$\frac{x}{2}$
g	I think of a number, x, and subtract it from 3.	$x - 3$

17 Write an expression for each set of instructions. Start with y.

a add 6 to it **b** multiply it by 3 **c** subtract 10 from it

d square it **e** divide it by 3 **f** subtract it from 8

***18** Match each expression to a set of instructions. The first has been done for you.

a	I think of a number, x, and multiply it by 5.	$5(x + 2)$
b	I think of a number x, multiply it by 2 and subtract 5.	$2x - 5$
c	I think of a number, x, multiply it by 5 and then add 2.	$5x + 2$
d	I think of a number, x, add 2 and then multiply by 5.	$5x$
e	I think of a number, x, subtract 5 from it and then multiply by 2.	$2(x - 5)$

***19** Write a set of instructions for each expression. Start with x.

a $3x + 2$ **b** $4x - 1$ **c** $5x - 3$

d $3(x + 2)$ **e** $4(x - 1)$ **f** $5(x - 3)$

explanation 7 online

20 Match each expression to its value when $x = 8$.

One has been done for you.

a $3(x - 2) =$ 18 **b** $4x - 7$

c $(3x + 1) \div 5$ **d** $24 \div x$

e $x^2 \div 2$ **f** $(x - 6)^3$

g $2(x + 4)$ **h** $26 - 2x$

5 3 25 24 32 10 8 18

21 Find the value of each expression when $x = 5$.

a $x + 3$ **b** $2x$ **c** $3x$

d $3x - 2$ **e** $3(x - 2)$ **f** $4x - 3$

g $4(x - 3)$ **h** $12 - x$ **i** x^2

j $\frac{x}{2}$ **k** $\frac{(x + 7)}{2}$ **l** $18 - 2x$

22 Find the value of each expression when $x = 4$.

a $5(x + 2)$ **b** $5x + 2$ **c** $6x - 3$

d $6(x - 3)$ **e** $2(3x - 7)$ ***f** $7 - 3x$

***23** Find the value of each expression when $x = 9$ and $y = 4$.

a $x + y$ **b** $x - y$ **c** $2x + y$

d $x + 3y$ **e** $3x + 2y$ **f** $20 - x - y$

g $5 - (x - y)$ **h** $x^2 + y$ **i** $2x - 3y$