Understand the meaning of equivalence

1 **a)** Complete the table.

Expression	Value when $y = 5$	Value when $y = 9$
$7y$	35	63
$3y$	15	27
$4y + 3y$	35	63
$10 - 3y$	-5	-17
$7y - 4y$	15	27
$y + y + y$	15	27
$3y + 4$	19	31
$4y - y$	15	27

b) Look at each column.
Which expressions give the same answers?

$7y$, $4y + 3y$

$3y$, $7y - 4y$, $y + y + y$, $4y - y$

c) Why do you think this is the case?

$7y \equiv 4y + 3y$

$3y \equiv 7y - 4y \equiv y + y + y \equiv 4y - y$

2 Tick the expressions that are equal to $8p$.

$p + 7p$ ✓	$\frac{p}{8}$	$8p - p - 7p$
$11p - 3$	$4p \times 2$ ✓	$11p - 3p$ ✓
$2p \times 4p$	$4 \times 2p$ ✓	$3p - 11p$

Check your answers by substituting several values of p.

3 **a)** Each of these expressions should be equal to $10m$.
Complete the expressions.

$3m +$ 7m	$5m +$ 5m	$5m \times$ 2
4m $+ 6m$	$10m$	$3m + 3m +$ 4m
$50m \div$ 5	16m $- 6m$	$12m -$ 2m

b) Write five expressions that are equivalent to $24ab$.
One has been done for you.

$6a \times 4b$

Eg. $24a \times b$ $20ab + 4ab$

$8a \times 3b$ $30ab - 6ab$

$6ab \times 4$

4 Work out the expressions below for several values of g.

$4g + 20$ $4(g + 5)$ $4g + 5$

What do you notice? Will this always be the case?

4g + 20 = 4(g + 5)

5 **a)** Circle the two expressions that are equivalent to $3x + 6$

6 + 3x **3(x + 2)** **3(x + 6)**

b) Circle the two expressions that are equivalent to $8y - 20$

20 – 8y **4y + 4y – 20** **2(4y – 10)**

How did you work this out? Talk about it with a partner.

6 Are these statements true or false? Tick your answer.

	True	False
$2x + 3x$ is equivalent to $5x$	☑	☐
$2x \times 3x$ is equivalent to $5x$	☐	☑
$7x - 2x$ is equivalent to $5x$	☑	☐
$7x - 2x$ is equivalent to 5	☐	☑

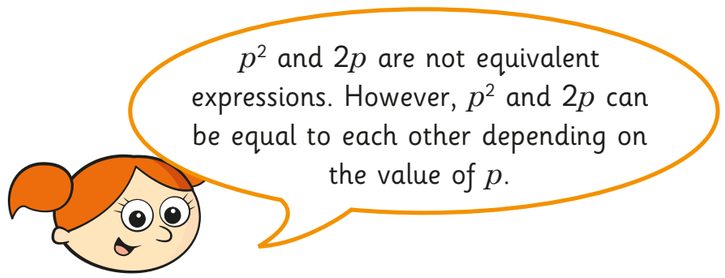
Compare answers with a partner.

7 Are the expressions $3a$ and a^3 equivalent? No

Explain your answer.

They have different powers.

8 Alex is looking at expressions.



Alex is correct. What does the value of p need to be to make the expressions equal?

2

9 Tick the pairs of expressions that are equivalent.

$5ab$ and $5ba$ ✓ $5(a + b)$ and $5a + b$

$3a + 2b$ and $5ab$ $\frac{m}{2}$ and $\frac{2}{m}$

Explain your reasoning.

Are any of these expressions equal to each other for particular values?