Simplify algebraic expressions by collecting like terms, using the ≡ symbol

1 Match each expression to its simplified form.

$2b + 5b$	$5b$
$7b - 2b$	$6b$
$3b \times 2$	$7b$
$2b - 7b$	$-5b$

2 Mo and Eva are simplifying expressions.

Tick the correct answers.

Expression	Mo's answer	Eva's answer
$9a - a$	$9a - a \equiv 9$	$9a - a \equiv 8a$ ✓
$b + b$	$b + b \equiv b^2$	$b + b \equiv 2b$ ✓
$3h^3 + 2h^2$	$3h^3 + 2h^2 \equiv 5h^2$	$3h^3 + 2h^2 \equiv 5h^5$
$3a + 3b$	$3a + 3b \equiv 6ab$	$3a + 3b \equiv 3a + 3b$ ✓
$5g + 2$	$5g + 2 \equiv 5g + 2$ ✓	$5g + 2 \equiv 7g$
$6 \times 2y$	$6 \times 2y \equiv 12y$ ✓	$6 \times 2y \equiv 8y$

3 **a)** Simplify the expressions.

$h + h + h + h + h \equiv$ 5h

$3h + 2h \equiv$ 5h

$4h + h \equiv$ 5h

$9h - 4h \equiv$ 5h

b) What do you notice about your answers?

c) Write five expressions that are equivalent to $3g$.

E.g. $g + g + g \equiv 3g$ $10g - 7g \equiv 3g$

$2g + g \equiv 3g$ $99g - 96g \equiv 3g$

$4g - g \equiv 3g$

4 Simplify the expressions by collecting like terms.

a) $p + p + p + p \equiv$ 4p

b) $7f + 5f \equiv$ 12f

c) $11g - 8g \equiv$ 3g

d) $5h + 6h + 7h \equiv$ 18h

e) $4n + 6n - 2n \equiv$ 8n

f) $15y - y \equiv$ 14y

g) $3u - 7u \equiv$ -4u

h) $18y^2 + 3y^2 \equiv$ $21y^2$

i) $8ef - 7ef + ef \equiv$ 2ef

j) $0.8m - 0.35m + 0.7m \equiv$ 1·15m

k) $-5p + 7p \equiv$ 2p

5 **a)** Explain why you cannot simplify $3a + 2m$.

3a and 2m are not like terms.

b) Explain why $2b + 3$ is not equivalent to $5b$.

2b and 3 are not like terms so you can't collect them.

c) Explain why you can simplify $7k - 3k + 2k + 3a$.

You can simplify the like terms (7k, -3k and 2k) so $7k - 3k + 2k + 3a \equiv 6k + 3a$

6 Correct Dexter's mistakes.

Dexter's working	Correct working
$7c + 6c \equiv 13c^2$	$7c + 6c \equiv 13c$
$2a + 3a + 2b \equiv 7ab$	$2a + 3a + 2b \equiv 5a + 2b$
$3y + 2y^2 \equiv 5y^3$	$3y + 2y^2 \equiv 3y + 2y^2$
$y + y + y + x + x + x + x \equiv 3x + 4y$	$y+y+y+x+x+x+x \equiv 3y+4x$
$2g - 10g \equiv 8g$	$2g - 10g \equiv -8g$

7 Is it possible to simplify $3pq + 5qp$?

Explain your answer to a partner.

8 Simplify these expressions.

Set 1		Set 2	
$3a + 2a + 4b + 3b \equiv$	$5a + 7b$	$4p + 3q + 2p + 7q \equiv$	$6p + 10q$
$3a + 4b + 2a + 3b \equiv$	$5a + 7b$	$5p + p + 5q + 5q \equiv$	$6p + 10q$
$4b + 2a + 3b + 3a \equiv$	$5a + 7b$	$8p - 2p + 8q + 2q \equiv$	$6p + 10q$
$3b + 2a + 3a + 4b \equiv$	$5a + 7b$	$12q + 3p + 3p - 2q \equiv$	$6p + 10q$

Write one more expression that would go in each set.

9 Simplify the expressions by collecting like terms.

a) $7a + 3b + 4a + 5b$ — $11a + 8b$

b) $6g + 3h + 4h + g$ — $7g + 7h$

c) $8y + 4p - 3y + 7p - y$ — $4y + 11p$

d) $8b + 11a - 8b + a$ — $12a$

e) $9.4k + 7.8m - 5.2m - 4.9k$ — $4.5k + 2.6m$

f) $4g^3 + 3g^2 - 3g^3 + 8g^2 + g^3$ — $2g^3 + 11g^2$

g) $3.9t + 39t - 3t^2 + 9$ — $42.9t - 3t^2 + 9$

h) $5np + 4n + 3p + 2pn$ — $7np + 4n + 3p$

i) $4.3g^6 - 6g + 4g^2 + 8.6g + 2.7g^2$ — $4.3g^6 + 6.7g^2 + 2.6g$