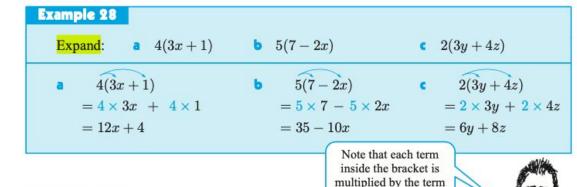
Do now on expanding single brackets

Expand and simplify: 3(3v + 4) + 5(3v + 4)			Expand and simplify: 3(3q + 3) + 5(2q + 2)
Expand and simplify: 2(t + 2) + 2(t - 6)	Expand and simplify: 7(m + 4n) + 3(m - 2n)	Expand and simplify: 6(e + 6f) + 3(e - 3f)	
		372	
Expand and simplify: 7(x - 5) + 4(x - 7)		Expand and simplify: 7(7x + 4) - 3(3x + 8)	

Walt Practice Expanding Brackets

Success Criteria I know how to apply the distributive rule and add like terms



EXERCISE 4J

- 1 Complete the following expansions:
 - $2(x+5) = 2x + \dots$
- $5(y+3) = \dots + 15$

outside the bracket.

- $6(3+a) = \dots + 6a$
- d $7(4+b) = 28 + \dots$
- 3(z-4)=3z-...
- $8(a-3) = \dots 24$
- 2 Expand the following expressions:
 - a 3(a+2)
- **b** 2(x+5)
- 5(a-4)

- d 7(2x-3)
- 4(4c-7)

- 3(10-y)
- h 5(2-x)
- 2(2+b)

- 4(m+n)
- $k \quad 4(2a-b)$
- 3(2x+3y)

Entenden

Extension:

Example 29

Expand:

- 2x(3x-2)
- **b** 3x(2y+4)
- (2a-1)b

2x(3x-2)

$$=2x\times 3x - 2x\times 2$$

$$=6x^2-4x$$

3x(2y+4)

$$= 3x \times 2y + 3x \times 4$$

$$=6xy+12x$$

$$(2a-1)b$$

$$=\widehat{b(2a-1)}$$

$$=b\times 2a - b\times 1$$

$$=2ab-b$$

3 Expand the following expressions:

a(a+4)

b 2a(a+3)

a(a+6)

d y(4y+10)

2p(2p+6)

f r(r+2)

z(5+z)

h k(k+1)

i y(1+y)

5x(3x-2)

k 7p(2p-4)

I q(q-1)

4 Expand:

k(l+3)

b k(l-1)

k(l+5)

d x(y+2)

€ (a+2)b

(x+6)y

(k+7)l

h (z-1)p

i 5x(2y+3)

a(a+c)

k 4k(k-2l)

2x(3x-4y)

5 Use the distributive law to expand:

3(z+2)

b 3(3z-2)

10(2z-3y)

d 7(x+3z+1)

e 6(2-3a-5b)

4(5z-2x+3y)

2a(3x-4y+7)

h x(5-2x+3y)

2p(3+x-2q)

EXPANDING AND SIMPLIFYING

Now that our use of variables has extended to multiplication of variables, our definitions of like terms must be extended.

Terms which contain all the same variables, to the same index, are called like terms.

 $2z^2y$ and $10yz^2$ are like terms, For example, xy and 3xy are like terms, 5x and $3x^2$ are not like terms, 5xy and 7yz are not like terms.

Example 30

Remove the brackets and then collect like terms for the following expressions:

a
$$6y + 2(y - 4)$$

b
$$2(2x+1)+3(x-2)$$

$$6y + 2(y - 4)$$

$$= 6y + 2y - 8$$

$$= 8y - 8$$

$$\begin{array}{ll}
 & 2(2x+1) + 3(x-2) \\
 & = 4x + 2 + 3x - 6 \\
 & = 7x - 4
\end{array}$$

A bracket may be removed by multiplying the number outside the bracket by each term inside the bracket.

Expand and then simplify by collecting like terms:

$$2+3(x+2)$$

b
$$2+5(a+7)$$

$$3(n+1)+2(n+3)$$

$$3n+2(n+3)$$

$$2(x-6)+5(x-1)$$

c
$$3(n+1)+2(n+3)$$
 d $3n+2(n+3)$
c $2(x-6)+5(x-1)$ f $8(y-2)+3(y+6)$

Example 31

Expand and then simplify by collecting like terms:

$$2a(a+5) + 3(a+4)$$

$$2a(a+5) + 3(a+4)$$

$$=2a \times a + 2a \times 5 + 3 \times a + 3 \times 4$$

$$=2a^2+10a+3a+12$$
 {10a and 3a are like terms}

$$=2a^2+13a+12$$

Like terms have identical variable(s).

7 Expand and then simplify by collecting like terms:

a
$$m(m+2) + m(2m+1)$$
 b $x(x+2) - x^2$

$$x(x+2)-x^2$$

$$3a(a+2)-2a^2$$

$$5x(x+2)-2$$

$$a(a+2) + 5a(a+1)$$

$$\begin{array}{lll} \textbf{3} a(a+2) - 2a^2 & \textbf{d} & 5x(x+2) - 2 \\ \textbf{2} & 3a(a+2) + 5a(a+1) & \textbf{f} & 4(p+3q) + 2(p+2q) \end{array}$$

$$x(x+3y) + 2x(x+y)$$

h
$$4(3+2x)+4x(x+1)$$

MULTIPLYING BRACKETED QUANTITIES BY NEGATIVES (EXTENSION)

Example 32

$$-3(x+4)$$

Expand: $^{-}3(x+4)$ $^{-}(5-x)$

$$\begin{array}{ll}
 & \overline{-3(x+4)} \\
 & = (-3) \times x + (-3) \times 4 \\
 & = -3x + (-12) \\
 & = -3x - 12
\end{array}$$

b
$$-(5-x)$$

= $-1(5-x)$
= $(-1) \times 5 - (-1) \times x$
= $-5 - (-x)$
= $-5 + x$

8 Complete the following expansions:

$$-2(x+5) = -2x - \dots$$

$$-2(x-5) = -2x + \dots$$

$$-3(y+2) = -3y - \dots$$

$$-3(y-2) = -3y + \dots$$

$$(b+3) = -b - \dots$$

$$(b-3) = b + \dots$$

= x - 5

$$-4(2m+3) = \dots -12$$

$$-4(2m-3) = \dots + 12$$

Expand:

$$-2(x+5)$$

$$-3(2x+1)$$

$$-3(4-x)$$

$$-6(a+b)$$

$$-(x+6)$$
h $-(5-x)$

f
$$-(x-3)$$

i $-5(x+1)$

$$-(5+x)$$

$$-(5-x)$$

$$-5(x+1)$$

$$-4(3+x)$$

$$(3b-2)$$

$$(3b-2)$$
 $-2(5-c)$

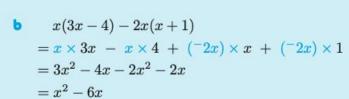
Example 33

Expand and simplify: **a** 3(x+2) - 5(3-x) **b** x(3x-4) - 2x(x+1)

a
$$3(x+2) - 5(3-x)$$

= $3 \times x + 3 \times 2 + (-5) \times 3 - (-5) \times x$
= $3x + 6 - 15 - (-5x)$
= $3x + 6 - 15 + 5x$
= $8x - 9$

In practice you may not include all of these steps.





10 Expand and simplify:

- 3(x+2)-2(x+1)
- 3(x-2)-2(x+2)
- 5(y+2)-2(y-3)

- **b** 4(x-7)-2(3-x)
- d 3(y-4)-2(y+3)
- 6(b-3)-3(b-1)

11 Expand and simplify:

- x(x+4) x(x+2)
- (x+6)-2(x+1)
- **b** x(2x-1)-x(7-x)-2(x-1)-3(5-x)
- a(a+2)-2a(1-a)
- (11-a)-2(a+6)

Answers

1.6	24v + 32	39w + 32	24y + 32	19q + 19
5.ა	4t - 8	^{6.} 10m + 22n	^{7.} 9e + 27f	^{8.ь} 7y - 5
9.υ	11x - 63	11x² - 33y	40x + 4	2j² - 38
13.υ	10g² - 32h²	14.ս 1p - 8q	30f + 30	25v + 83w²

```
10 b
                c 18
                       d 7b e 12 f 8a
            5y
               2x+10 c 5a-20 d 14x-21
     3a + 6
            b
     6y + 3
            f 16c-28 g 30-3y h 10-5x
     4+2b j 4m+4n k 8a-4b l 6x+9y
     a^2 + 4a b 2a^2 + 6a c a^2 + 6a
     4y^{2} + 10y e 6p^{2} + 18p f r^{2} + 2r

5z + z^{2} h k^{2} + k i y + y^{2} j 15x^{2} - 10x
      14p^2 - 28p l q^2 - q
     kl + 3k b
                kl-k c kl+5k d xy+2x
     ab+2b f xy+6y g kl+7l h pz-p
     10xy + 15x j 2a^2 + 2ac k 4k^2 - 8kl
     6x^{2} - 8xy
     3z + 6 b 9z - 6 c 20z - 30y
     7x + 21z + 7 e 12 - 18a - 30b
     20z - 8x + 12y g 6ax - 8ay + 14a
     5x - 2x^2 + 3xy i 6p + 2px - 4pq
     3x + 8 b 5a + 37 c 5n + 9 d 5n + 6
     7x - 17 f 11y + 2
     3m^2 + 3m b 2x c a^2 + 6a
5x^2 + 10x - 2 e 8a^2 + 11a f 6p + 16q
     3x^2 + 5xy h 4x^2 + 12x + 12
     10 b 10 c 6 d 6 e 3 f 3 g
   h
      -8m
      -2x - 10 b -6x - 3 c -12 + 3x
     ^{-}6a - 6b e ^{-}x - 6 f ^{-}x + 3
     -5 - x h -5 + x i -5x - 5
     -12-4x k -3b+2 l -10+2c
      x+4 b 6x-34 c x-10 d y-18
      3y + 16 f 3b - 15
      2x b 3x^2 - 8x c -3x - 8 d
11
   a
      a^2 - 4a f -a - 23
    e
```