Linear Equations with Brackets

Starter

1. **(Review of last lesson)**

Expand: (a) $2(5x-7)$ (b) $-8(3x-5)$ (c) $8(3x-4)-6(2x-5)$

Working: (a) $2(5x-7)=10x-7$

(b) $-8(3x-5)=40-24x$

(c) $8(3x-4)-6(2x-5)=24x-32-12x+20=12x-2$

2. **(Review of Y7 material)**

Solve: (a) $4x=28$ (b) $9x-5=49$ (c) $3-8x=35$

Working: (a)
$$4x=28$$
Divide by 4: $$x=\frac{28}{4}=7$$

(b)
$$9x-5=49$$
Add 5: $$9x=54$$
Divide by 9: $$x=\frac{54}{9}=6$$

(c)
$$3-8x=35$$
Subtract 3: $$-8x=32$$
Divide by (−8): $$x=\frac{32}{-8}=-4$$

If in doubt, expand the brackets.

E.g. 1 Solve: (a) $3(x-8)=15$ (b) $4(x+7)=17$

Working: (a)
$$3(x-8)=15$$
Divide by 3: $$x-8=5$$
Add 8: $$x=13$$

(b)
$$4(x+7)=17$$
Expand the brackets: $$4x+28=17$$
Subtract 28: $$4x=-11$$
Divide by 4: $$x=\frac{-11}{4}=-2\frac{3}{4}$$

E.g. 2 Solve (a) $5(q-3)=29$ (b) $-(x-7)=23$

Working: (a) ***29 is not divisible by 5 so expand the brackets***
$$5(q-3)=29$$
Expand the brackets: $$5q-15=29$$
Add 15: $$5q=44$$
Divide by 4: $$q=\frac{44}{5}=8\frac{4}{5}$$

(b) The number in front of the brackets is -1

$$-(x-7)=23$$

Expand the brackets: $-x+7=23$

Subtract 7: $-x=16$

Divide by (−1): $x=\dfrac{16}{-1}=-16$

E.g. 3 Solve: (a) $3(m+1)+2(m-3)=36$ (b) $2(y-3)-4(y-1)=-6$

Working: (a)

$$3(m+1)+2(m-3)=36$$

Expand the brackets: $3m+3+2m-6=36$

Collect like terms: $5m-3=36$

Add 3: $5m=39$

Divide by 5: $m=\dfrac{39}{5}=7\dfrac{4}{5}$

(b)

$$2(y-3)-4(y-1)=-6$$

Expand the brackets: $2y-6-4y+4=-6$

Collect like terms: $-2y-2=-6$

Add 2: $-2y=-4$

Divide by (−2): $y=\dfrac{-4}{-2}=2$

E.g. 4 Solve: (a) $5(x-3)=7(2x+9)$ (b) $4(3x-8)=9(5-6x)$

Working: (a)

$$5(x-3)=7(2x+9)$$

Expand the brackets: $5x-15=14x+63$

Collect like terms: $5x-14x=63+15$

$-9x=78$

Divide by 5: $x=\dfrac{78}{-9}=-\dfrac{26}{3}=-8\dfrac{2}{3}$

(b)

$$4(3x-8)=9(5-6x)$$

Expand the brackets: $12x-32=45-54x$

Collect like terms: $12x+54x=45+32$

$66x=77$

Divide by 11: $x=\dfrac{77}{66}=\dfrac{7}{6}=1\dfrac{1}{6}$

Video: Solving linear equations

Video: Solving linear equations with brackets

Solutions to Starter and E.g.s

Exercise

p133 Ex 8.2 Qu 1aceg, 2ac, 3-5, 6ace, 7-9 (Qu 8 has unknown on both sides)

Textbook answers (only available during a lockdown)