7:05 | Equations with Grouping Symbols

prep quiz 7:05

Rewrite these expressions without grouping symbols.

1 $7(x+4)$ **2** $2(a-3)$ **3** $5(4a+9)$ **4** $6(2p-7)$ **5** $-3(x-4)$

Solve these one-step equations.

6 $x+9=4$ **7** $x-8=-2$ **8** $3p=-27$ **9** $10p=5$ **10** $6+x=-1$

If you remember how to 'expand' grouping symbols, these equations are no harder than the ones you have already seen. Look at these worked examples.

worked examples

1 Expand the grouping symbols and then solve the equation.

a
$$2(x+3)=8$$
$$2x+6=8$$
$$-6 \quad -6$$
$$2x=2$$
$$\div 2 \quad \div 2$$
$$\therefore x=1$$

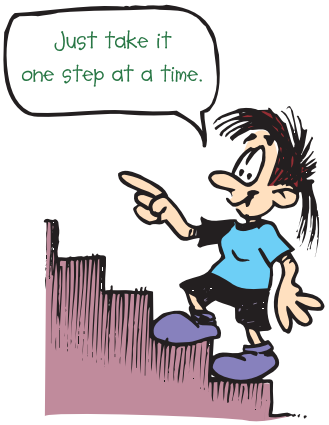
b
$$5(a-3)=3$$
$$5a-15=3$$
$$+15 \quad +15$$
$$5a=18$$
$$\div 5 \quad \div 5$$
$$\therefore a=\frac{18}{5} \text{ or } 3\frac{3}{5}$$

c
$$3(2m-4)=4m-6$$
$$6m-12=4m-6$$
$$-4m \quad -4m$$
$$2m-12=-6$$
$$+12 \quad +12$$
$$2m=6$$
$$\div 2 \quad \div 2$$
$$\therefore m=3$$

2 Expand each set of grouping symbols and then solve the equations.

a
$$3(a+7)=4(a-2)$$
$$3a+21=4a-8$$
$$-3a \quad -3a$$
$$21=a-8$$
$$+8 \quad +8$$
$$29=a$$
$$\therefore a=29$$

b
$$3(x+4)+2(x+5)=4$$
$$3x+12+2x+10=4$$
Collect like terms.
$$5x+22=4$$
$$-22 \quad -22$$
$$5x=-18$$
$$\div 5 \quad \div 5$$
$$\therefore x=-3\frac{3}{5}$$



Exercise 7:05

Foundation Worksheet 7:05

Equations with grouping symbols

1 Expand these grouping symbols.
a $5(x+3)$ **b** $7(a-4)$ **c** $9(2y+3)$

2 Solve these equations.
a $2(a+3)=8$ **b** $5(m-1)=10$ **c** $7(2n+1)=21$

1 Expand the grouping symbols and then solve each equation. (Answers are all integers.)

a $3(a+2)=18$ **b** $2(x+4)=10$
c $5(6+m)=45$ **d** $6(x-4)=6$ **e** $4(x-1)=20$ **f** $7(x-3)=70$
g $5(2y+1)=25$ **h** $3(2p-7)=9$ **i** $10(6+5x)=10$ **j** $8(1+x)=9x+4$
k $2(5a+3)=8a+10$ **l** $7(2a+3)=10a+33$ **m** $9(2x-1)=x+42$
n $6(m-4)=2m+8$ **o** $2(7y-5)=15y-16$ **p** $2a+5=3(a-1)$
q $12x+6=6(x+2)$ **r** $8-2x=3(x-4)$

2 Solve each equation.

a $5(a+1)=8$ **b** $2(m-3)=-3$ **c** $4(x-7)=3$
d $3(3-x)=12$ **e** $5(7-n)=15$ **f** $3(7-y)=9$
g $5(2a+3)=20$ **h** $2(5x-1)=15$ **i** $3(4x-5)=1$
j $4(x-2)=x-2$ **k** $5(n+3)=3n+11$ **l** $3(x-10)=x+20$
m $2-x=3(2x-1)$ **n** $8+7x=3(3x-1)$ **o** $8n-16=4(3n-7)$
p $7a=6(2a-1)$ **q** $2n=3(4n-10)$ **r** $5x=4(2x+9)$

3 Find the solution to each equation by expanding all grouping symbols first.

a $3(a+2)=2(a+1)$ **b** $5(x-1)=4(x+2)$
c $5(p-2)=4(p+2)$ **d** $3(q+2)=2(q+5)$
e $3(m+1)=5(m-1)$ **f** $6(x+2)=4(x+6)$
g $2(a-7)=5(a-4)$ **h** $7(t+2)=4(t+5)$
i $3(2a+1)=5(a+2)$ **j** $4(3p-1)=5(2p+1)$
k $6(t+7)=4(t+10)+8$ **l** $5(2a-1)=3(a+6)-7$
m $3(2+m)=5(2-m)+6m$ **n** $6(p+3)=5(2-p)+7p-12$

4 Solve each equation. Use Worked Example 2(b) as a guide.

a $3(a+2)+a+5=15$ **b** $5(m-1)+2m=2$
c $2(m+3)+5(m+2)=23$ **d** $3(x+2)+2(x-3)=10$
e $5(p+1)+2(p+4)=20$ **f** $4(t-2)+2(t+5)=14$
g $4(2a+3)+2(a-5)=22$ **h** $2(2m+3)+3(m-5)=5$
i $5(a-3)+3(2+3a)=19$ **j** $7(a+5)+2(6-3a)=1$

5 Try solving these equations, but first read the warning sign!

a $3(a+2)-2(a+1)=6$
b $5(m+3)-4(m+2)=10$
c $5(n+4)-3(n-2)=30$
d $6(a+2)-4(a-1)=20$
e $4(a+3)-(a+2)=13$
f $4(p+5)-(p+3)=23$
g $5(2a+1)-2(a-4)=2$
h $6(2x+5)-5(3x+2)=10$

Warning!
Remember how to expand with a negative term:
$-2(x+4)=-2x-8$
or
$-3(a-1)=-3a+3$

fun spot
7:05

Fun Spot 7:05 | If I have 7 apples in one hand and 4 in the other, what have I got?

Solve each equation and put the letter for that part in the box above the correct answer.

I $x+12=7$ **A** $5x=2$ **H** $x-7=-2$

D $\frac{x}{10}=5$ **N** $5x+30=15$ **G** $15-3x=2x+5$

B $\frac{5x+21}{8}=3$ **S** $5(3x+8)+6(10-2x)=109$

$x=\frac{3}{5}$	$x=-5$	$x=2$	$x=5$	$x=\frac{2}{5}$	$x=-3$	$x=50$	$x=3$