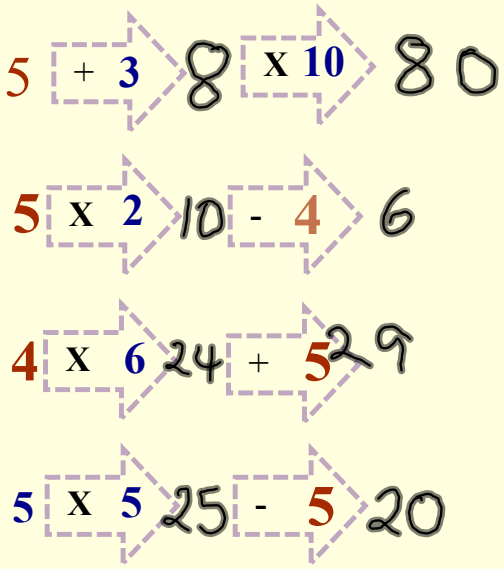
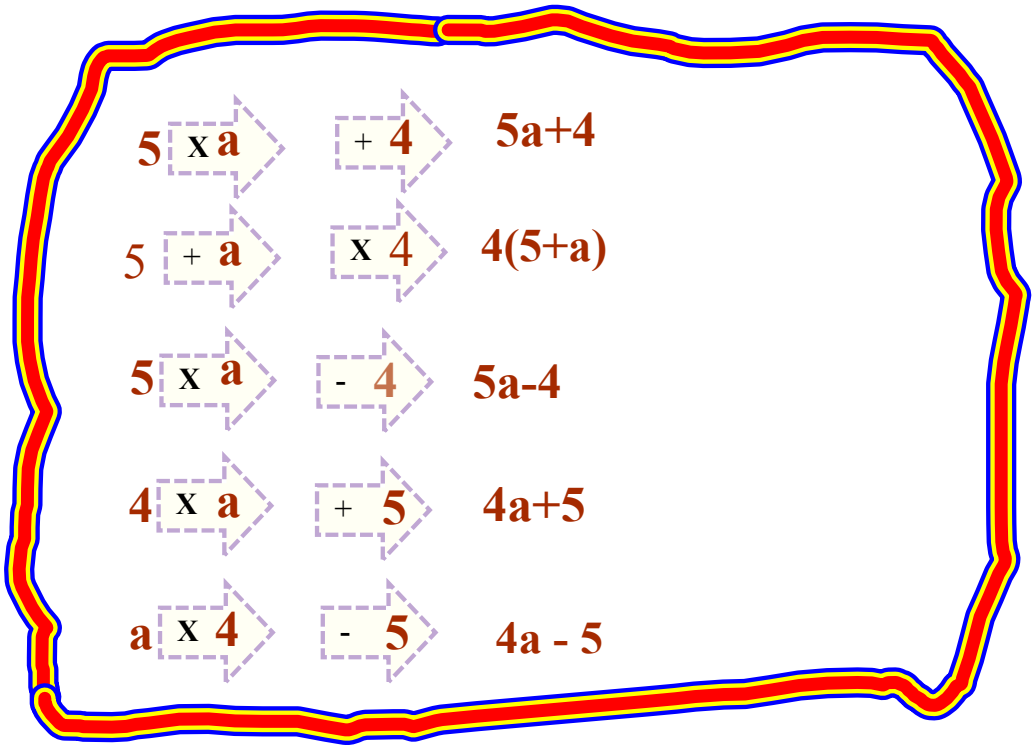
Number Machines



Match the flow diagram to the expression:

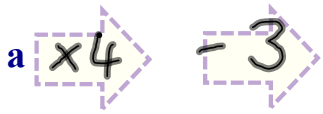


Draw a flow diagram for these expressions:

1) 4a + 3

2) 3 + 2a

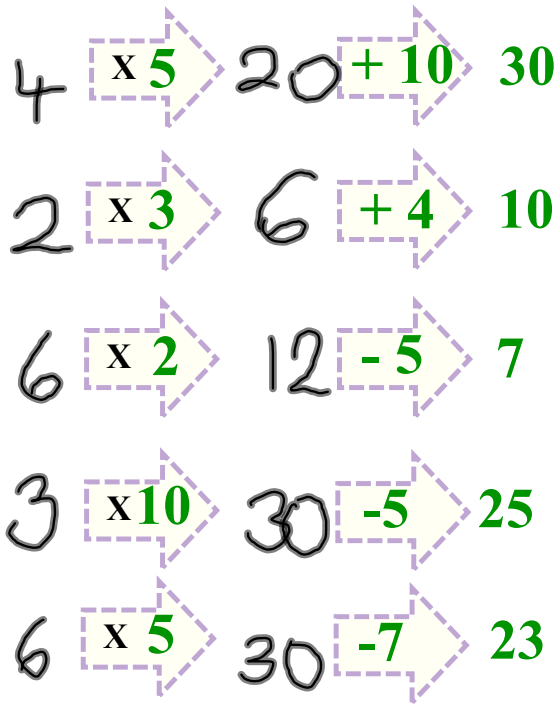
3) 4a - 3



4) 4(3+a)

5) 3(a-5)

Flow diagrams: backwards!



Reversing the flow!

6 x 5 30 + 10 40

5 x 3 15 + 4 19

12 x 2 24 - 5 19

5 x10 50 -5 45

10 x 5 50 -7 43

x 3 + 10 25

x 7 + 4 18

x 2 -15 7

x10 -5 65

x 9 -7 11

x 5 + 10 30

x 3 + 4 10

x 2 - 5 7

x10 -5 25

x 5 -7 23

x 5 + 10 55

x 3 + 1 22

x 2 - 5 15

x10 -5 45

x 5 +5 40

One step Equations

1. $2x = 10$

   $x = 5$

2. $x+8=10$

   $x = 2$

3. $5-x = 2$ (think carefully)

   $x = 3$

4. $5x= 45$

   $x = 9$

6. $20x = 100$

   $x = 5$

7. $x + 11 = 30$

   $x = 19$

8. $7x = 84$

   $x = 12$

9. $x - 12 = 5$

   $x = 17$

10. $15 - x = 10$

    $x = 5$

Check your solutions work!

Solving two step Equations

1. $2x + 4 = 10$

$x = 3$

$x \rightarrow \times 2 \rightarrow +4 \rightarrow 10$

$3 \leftarrow 6 \leftarrow 10$

2. $3x + 1 = 19$

$x = 6$

$x \rightarrow \times 3 \rightarrow +1 \rightarrow 19$

$6 \leftarrow 18 \leftarrow 19$

3. $5x - 1 = 24$

$x = 5$

$x \rightarrow \times 5 \rightarrow -1 = 24$

$5 \leftarrow 25$

4. $10x - 4 = 16$

$x = 2$

$x \rightarrow \times 10 \rightarrow -4 \rightarrow 16$

$2 \leftarrow 20$

5. $12 + 2x = 14$

$x = 1$ ✓

$x \rightarrow \times 2 \rightarrow +12 \rightarrow 14$

$\leftarrow 2$

$3x + 1 = 10$

$3x = 10 - 1$

$3x = 9$

$x = 9 \div 3$

$x = 3$

$5x - 4 = 21$

$5x = 21 + 4$

$5x = 25$

$x = 25 \div 5$

$x = 5$

$10x - 3 = 27$

$10x = 27 + 3$

$10x = 30$

$x = 30 \div 10$

$x = 3$

$8x + 6 = 22$

$8x = 22 - 6$

$8x = 16$

$x = 16 \div 8 = 2$

$3x + 1 = 10$

$3x = 10 - 1$

$3x = 9$

$x = 9 \div 3$

$x = 3$

$4x - 1 = 15$

$4x = 15 + 1$

$4x = 16$

$x = 16 \div 4$

$x = 4$

$10x - 1 = 99$

$10x = 99 + 1$

$10x = 100$

$x = 100 \div 10$

$x = 10$

$5x + 3 = 18$

$5x = 18 - 3$

$5x = 15$

$x = 15 \div 5$

$x = 3$

$2x + 5 = 27$

$2x = 27 - 5$

$2x = 22$

$x = 22 \div 2$

$x = 11$

$10 + 3x = 25$

$3x = 25 - 10$

$3x = 15$

$x = 15 \div 3$

$x = 5$

Solving two - step equations

Have a go at solving these:

1. 4x + 1 = 9

$4x = 9-1$

$4x = 8$

$x = 8 \div 4$ $\quad x = 2$ ✓

2. 5x + 3 = 8

$5x = 8-3$

$5x = 5$

$x = 5 \div 5$ ✓

$x = 1$

3. 6x - 1= 29

$6x = 29+1$

$6x = 30$

$x = 30 \div 6$

$x = 5$

$2 = 5$

4. 10x + 3 = 103

$10x = 10x - 3 = 100$

$10x = 100$

$x = 100 \div 10$

$x = 10$

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5. 4x - 5 = 11

$4x = 11+5$

$4x = 16$

$x = 16 \div 4$

$x = 4$

See attachme

Think of a value of x, make up a 2 stage equation, give it to your partner to solve.

For example:

$x = 2$

$5x = 10$

$5x + 10 = 20$

$x = 6$

$3x = 18$

$3x - 2 = 16$

Solving problems using equations

Maria has n smarties and Emily has 4 more than Maria.
Altogether they have 10 smarties.
Make and solve an equation to find out how many smarties they each had.

M : n 3
E : n+4 (7)

$n + n + 4 = 10$
$2n + 4 = 10$

$2n + 4 = 10$
$2n = 10 - 4$
$2n = 6$
$n = 6 \div 2$
$n = 3$

Ben has n CDs. Daniel has twice as many as Ben.
Altogether they have 99.
Make and solve an equation to find out how many CDs they each have.

Ben n
Daniel 2n

$n + 2n = 99$

$3n = 99$
$n = 99 \div 3$
$n = 33$

There are n slices of pizza on a plate.
Gio eats 3. There are 12 left.
Make and solve an equation to find out how many pieces of pizza there were at the start.

$n - 3 = 12$
$n = 12 + 3$
$n = 15$

Back of sheet.

Solving equations that have negative x

Work out the solutions to :

1. 4 - x = 3

$x = 1$

2. 10- x = 6

$x = 4$

3. 15 - x = 7

$x = 8$

A step more difficult is, for example:

4. 10 - 2x = 6

$2x = 4$
$x = 4 \div 2$
$x = 2$

5. 25 - 5x = 10

$5x = 15$
$x = 3$

6. 100 - 11x = 78

$11x = 22$
$x = 2$

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(ext qu 2: make sure you write the equation, even if you know the answer).

1) $30 - x = 20$
$x = 10$

2) $12 - 2x = 6$
$2x = 6$
$x = 3$

3) $14 - 3x = 5$
$3x = 9$
$x = 3$

4) $21 - 5x = 11$
$5x = 10$
$x = 2$

5) $12 - 3x = 0$

$3x = 12$

$\underline{x = 4}$

6) $25 - 4x = 5$

$4x = 20$

$\underline{x = 5}$

waldos

group solving 4 equations

Solving Equations with x on both sides

These are like balances.

$2x + 10 = 3x + 5$ $(-2x)$

$10 = x + 5$

$x = 5$

$6x + 4 = 7x + 1$ $(-6x)$

$4 = x + 1$

$x = 3$

$7x - 5 = 6x - 1$ $(-6x)$

$x - 5 = -1$

$x = 4$

$12x + 1 = 20x - 15$ $(-12x)$

$+1 = 8x - 15$

$1 + 15 = 8x$

$16 = 8x$ $x = 2$

p311 E2-E4

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

$5 = x$

2) $3x + 1 = x + 5$ $(-x)$

$2x + 1 = 5$

$2x = 4$

$x = 2$

3) $5x - 5 = 3x + 10$ $(-3x)$

$2x - 5 = 10$

$2x = 10 + 5$

$2x = 15$

$x = 7.5$

4) $10x + 3 = 5x + 13$ $(-5x)$

$5x + 3 = 13$ $5x = 10$

$5x = 13 - 3$ $x = 2$

Make up an equation for your neighbour to solve:

eg

x = 7

$x = 7$

$5x = 35$

$5x + 2 = 37$

$6x + 2 = 20$

$6x = 20 - 2$

$6x = 18$

$x = 18 \div 6$

$x = 3$

$5x + 7 = 61$

$5x = 61 - 7$

$5x = 54$

$x = 54 \div 5$

$x = 10.8$

$x = 9$

$6x = 54$

$6x + 7 = 61$

$6x = 61 - 7$

$6x = 54$

$x = 54 \div 6$

$x = 9$

Solving equations with x on both sides

1) $4x + 1 = 3x + 11$ $(-3x)$

$x + 1 = 11$

$x = 10$

2) $12x - 6 = 9x + 3$ $(-9x)$

$3x - 6 = 3$

$3x = 3 + 6$

$3x = 9$

$x = 3$

3) $15x + 3 = 20x - 2$

4) $2x + 1 = x + 5$

Multiplying out Brackets

$2(n+1)=$

$3(n+1)=$

$5(n-1)=$

$10(n+2)=$

$12(n-3)=$

$2(3n+1)=$

$4(5n-2)=$

Solving Equations with brackets

$2(n+1) = 12$

$3(n-1) = 12$

$5(n+2)= 20$

$10(2n -1) = 30$

Attachments

group solving equations.doc

I'm thinking of a number.doc