

# Worksheet 10: Algebra Part 2

Give yourself plenty of space to answer these questions, don't scrunch the answers up in the margin of the handout!

## Solving equations

Solve the following equations

1) Solve  $3x = 15$

2) Solve  $y + 7 = 22$

3) Solve  $3a + 7 = 22$

4) Solve  $\frac{x}{4} = 20$

Hint: what is the opposite of dividing?

5) Solve  $4.5a = 18$

6) Solve  $5x - 7 = 3$

7) Solve  $4x - 10 = 2$

8) Solve  $3k + 10 = 4$

Hint: might be a fraction

9) Solve  $\frac{x}{6} + 5 = 8$

10) Solve  $2x - 12 = 2$

11) Solve  $4(3x - 5) = 28$

12) Solve  $6x - 5 = 17$

Hint: might be a mixed number

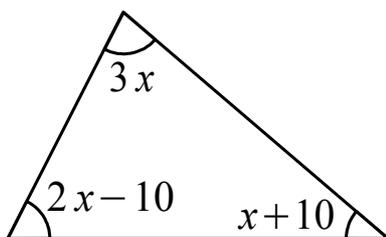
13) Solve  $4x + 3 = 6x - 1$

14) Solve  $7y - 9 = 5y + 1$

15) Solve  $\frac{3}{5}x + \frac{1}{2} = x + 1\frac{1}{2}$

## Making expressions (and equations)

- 1) Pens are sold in packs of 12.  
Write an expression for the total number of pens in  $y$  packs
- 2) Paper clips are sold in boxes of 80.  
Write an expression for the total number of paper clips in  $Q$  boxes.
- 3) Apples cost 12p each. Satsumas cost 15p each.  
Write an expression for the total cost of  $a$  apples and  $s$  satsumas.
- 4) Cabbages cost 70p each and broccoli costs 60p a bulb.  
Write an expression for the cost of  $c$  cabbages and  $b$  broccoli bulbs.
- 5) Nusut thinks of a number  $n$ , doubles it and then adds 3 on.  
Write an expression for his answer in terms of  $n$ .
- 6) Alice is  $n$  years old  
Bob is twice as old as Alice  
Charlie is 10 years older than Alice
  - a) Form an expression for the total age of the three children
  - b) The total age is 38 years. Work out Alice's age.
- 7) Asif is  $N$  years old.  
Bharat is three times as old as Asif is.  
Cyril is four years younger than Bharat.
  - a) Write an expression for the total age of the three people.
  - b) The total age is 66 years. Work out Cyril's age.
- 8) The triangle below has angles  $3x$ ,  $x + 10$  and  $2x - 10$   
Find the value of the largest angle.



## Changing the subject (rearranging the formula)

1)  $A = 4b$ .

Rearrange the formula to make  $b$  the subject.

2)  $f = \frac{h}{2}$

Make  $h$  the subject of the formula

3)  $C = N + 6$

Rearrange the formula to make  $N$  the subject

4)  $Y = X - 7$

Make  $X$  the subject of the formula

5)  $C = 5M + 7$

Rearrange the formula to make  $M$  the subject

6)  $A = \frac{3}{4}b$

Make  $b$  the subject of the formula

7)  $y = 4x - 5$

Rearrange the formula to express  $x$  in terms of  $y$

8)  $a = 4x^2$

Make  $x$  the subject of the formula

Hint: opposite of squaring is taking the square root

9)  $a = \frac{b}{4} - 5$

Rearrange for  $b$

10)  $A = ay - y$

Make  $y$  the subject of the formula

Hint: factorise  $y$  out of the right hand side

11)  $y - 3x = 6$

Make  $y$  the subject of the formula

## Mixed up puzzle problems

These questions are challenging, don't worry about getting 'the answer'. Take a blank sheet of paper and have a bash at each and bring your attempts, doodles and guesses back next week for discussion.

- 1) Find the mean of these three expressions

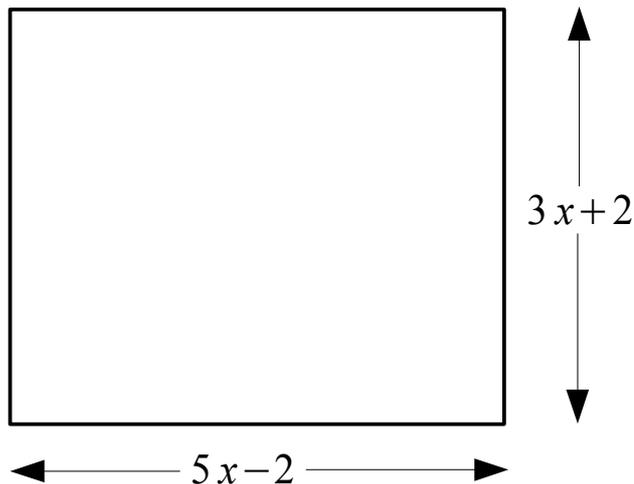
$$x + 10, \quad 3x - 4, \quad 2x + 12$$

Hint: Collect like terms then divide both coefficients by 3

Challenge: is it possible to say which expression is the median?

Challenge 2: can you find a value of  $x$  where there is a mode?

- 2) The rectangle below has a perimeter of 48 cm.



Work out the area of the rectangle.

- 3) Below are four expressions

$$3x - 2, \quad 2x^2, \quad 5x, \quad 2x + 4$$

Suppose all you know is that  $x > 0$ .

Is it possible to put the expressions in order of size?

Hint: try some different values of  $x$  like  $x = 1$  then  $x = 100$

- 4) The sum of two integers is 14 and the product is  $-72$ .  
Find the values of the integers.
- 5) If  $AB = 0$  and  $A \neq B$ , what can you say about  $A$  or  $B$ ?