# Rearranging and Grade 9 Algebra — Practice

## A · The subject appears twice

**YOU DO**

1 Make $x$ the subject of $3x + a = bx - 4$

2 Make $x$ the subject of $k(x - 2) = x + 5$

3 Make $x$ the subject of $y = \frac{4x+1}{x-3}$

4 Make $x$ the subject of $y = \frac{x-a}{x+b}$

**FLUENCY · MAKE X THE SUBJECT**

Make $x$ the subject.

**a** $ax + b = cx$

**b** $px - 3 = 2x + q$

**c** $y = \frac{x+2}{x-1}$

**d** $a(x + 1) = b(x - 1)$

**e** $y = \frac{2x-5}{3-x}$

**f** $t = \frac{x+k}{kx}$

## B · Roots, powers and reciprocals

**YOU DO**

1 Make $r$ the subject of $V = \frac{4}{3}\pi r^3$

2 Make $v$ the subject of $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$

3 Make $x$ the subject of $y = 2 + \frac{5}{x+1}$

4 Make $x$ the subject of $p = \sqrt{\frac{x+q}{2x}}$

**FLUENCY · MAKE THE SUBJECT**

**a** Make $h$ the subject of $V = \pi r^2 h$

**b** Make $v$ the subject of $E = \frac{1}{2}mv^2$

**c** Make $x$ the subject of $y = \sqrt{\frac{x}{a}} + b$

## C · Putting it together: grade 9 problems

YOU DO

**1** Solve $\frac{4}{x-1} - \frac{3}{x+2} = 1$

Give your answers as surds.

**2** $f(x) = \frac{x+5}{2x-1}$

(a) Find $f^{-1}(x)$.

(b) What do you notice?

**3** A bag has $n$ counters. 4 are red and the rest are blue. Two counters are taken at random without replacement.

The probability that both are red is $\frac{1}{11}$.

(a) Show that $n^2 - n - 132 = 0$

(b) Find $n$.

(c) Find the probability that both counters are blue.

**4** The line $y = 2x - 5$ meets the circle $x^2 + y^2 = 10$ at $A$ and $B$.

(a) Find the coordinates of $A$ and $B$.

(b) Show that $AB = 2\sqrt{5}$.

## Grade 9 challenge

**1** Solve $\frac{x}{x+2} + \frac{2}{x-1} = \frac{6}{(x+2)(x-1)}$

**2** A bag has $n$ sweets. 6 are orange and the rest are yellow. Two sweets are taken at random without replacement.

The probability that they are the same colour is $\frac{1}{2}$.

Find the possible values of $n$.

**3** $f(x) = \frac{ax+1}{x-3}$, where $a$ is a constant.

$f$ is its own inverse. Find $a$.