Expressions, Equations and Inequalities (Foundation)

THIRD SPACE LEARNING

Expanding single brackets

Remove the brackets by multiplying:

a) $3(x + 2) = 3x + 6$

b) $5(4 - x) = 20 - 5x$

c) $-2(3x - 5) = -6x + 10$

d) $x(x - 4) = x^2 - 4x$

Linear equations one unknown

Solve for x:

a) $17 - x = 9$
$= x = 8$

b) $4x = 24$
$= x = 6$

c) $3x + 7 = 22$
$= x = 5$

d) $19 - 2x = 26$
$= x = -\frac{7}{2}$

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

f) $5x + 2 = 16 - x$
$= x = \frac{7}{2}$

g) $18 - 7x = 31 - 9x$
$= x = \frac{13}{2}$

Simultaneous equations

Find values for x and y that satisfy:

a) $x + y = 21$
$x - y = 9$
$x = 15, y = 6$

b) $2x + y = 14$
$x - y = -5$
$x = 3, y = 8$

c) $4x + 3y = 23$
$3x - 2y = -4$
$x = 2, y = 5$

Substitution

Let $a = 4$, $b = -1$, $c = 5$, $d = -2$

Evaluate:

a) $a + b + c = 8$

b) $d - 3b = 1$

c) $b^2 = 4$

d) $ad - bc = -3$

e) $\frac{abc}{d} = 10$

Product of binomials

Expand and simplify:

a) $(x + 3)(x + 5) = x^2 + 8x + 15$

b) $(x - 4)(x - 1) = x^2 - 5x + 4$

c) $(2x + 1)(3x - 1) = 6x^2 + x - 1$

d) $(3x - 2)^2 = 9x^2 - 12x + 4$

e) $(x + 3)(x - 1)(x + 2) = x^3 + 4x^2 + x - 6$

Simplifying expressions

Simplify:

a) $x + x + x + x = 4x$

b) $5y - 8y + 4y = y$

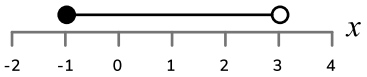
c) $2a \times 3b \times 4c = 24abc$

d) $28xy \div 4y = 7x$

e) $4a + 3b - 5a = 3b - a$

Inequalities

a) Write the inequality that is described by the number line:



$-1 \leq x < 3$

b) Find the set of integers satisfying the inequality:

$-3 \leq n < 2$

$n = -3, -2, -1, 0, 1$

c) Solve the inequality:

$3x - 4 > 11$ $\quad x > 5$

d) Solve the inequality:

$1 < 2x - 5 < 11$

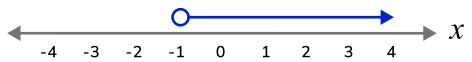
$3 < x < 8$

e) Solve the inequality:

$2x + 7 > 5$

$x > -1$

Now represent your solution on the number line:



Changing the subject

a) Given $v = u + at$ make a the subject

$a = \frac{v - u}{t}$

b) Given $E = mgh$ make h the subject.

$h = \frac{E}{mg}$

c) Given $P = I^2R$ make I the subject.

$h = \sqrt{\frac{P}{R}}$

Factorising quadratics

Factorise as a product of binomials:

a) $x^2 - 4x - 5 = (x + 1)(x - 5)$

b) $x^2 - 7x + 12 = (x - 3)(x - 4)$

c) $x^2 - 25 = (x + 5)(x - 5)$

Solving quadratic equations

Solve for x:

a) $x^2 - 8x + 7 = 0$ $\quad x = 1, x = 7$

b) $x^2 + x - 6 = 0$ $\quad x = -3, x = 2$

Factorising

Fully factorise:

a) $4x + 20$
$= 4(x + 5)$

b) $6x - 9$
$= 3(2x - 3)$

c) $24 - 14y$
$= 2(12 - 7y)$

d) $4ab + 6ac$
$= 2a(2b + 3c)$