

**MA053G**  
**Discrete Maths for Vocational Studies**  
**Answers Basic Algebra Test**

You have passed the test if you have at least 30 correct answers out of the 35 possible. You passed the test with distinction if you had at least 32 correct answers.

If you had 6 or more errors it indicates that you would benefit from some revision. The course website has links to revision resources. Note also, that if all or most of your errors were in one of Questions 1, 2 or 3, then you should concentrate your revision on the topic tested by that question (algebraic reduction (Q1), multiplying brackets (Q2) and linear equations (Q3)).

[Q1] Simplify the following expressions as much as possible.

(a)  $3x + 7y - 2y = \underline{3x + 5y}$

(b)  $14m - 6k - 5m + 3k + k + m = \underline{10m - 2k}$

(c)  $4x^2 + 2x + 3x^2 + 5 + x + 1 = \underline{7x^2 + 3x + 6}$

(d)  $5 + 3x^2 - 4 + 6x - 3x - 1 = \underline{3x^2 + 3x}$

(e)  $5x^2 \cdot 2x^2 = \underline{10x^4}$

(f)  $4y^2 \cdot 5y^3 = \underline{20y^5}$

(g)  $2(3x + 4) - 3(2 - x) = \underline{9x + 2}$

(h)  $\frac{x(2x)^2 - 2x^2}{2x^2 - x} = \underline{2x}$

(i)  $\frac{3x - 4}{3x} - \frac{2x - 3}{2x} = \underline{\frac{1}{6x}}$

(j)  $\left(\frac{a+2}{a-2} - \frac{a-2}{a+2}\right)^{-1} = \underline{\frac{a^2-4}{8a}}$

[Q2] Expand (sv: utveckla) and simplify the following expressions.

$$(a) (x-y)(x+y) = \underline{x^2 - y^2}$$

$$(b) (2a-3)(2a+3) = \underline{4a^2 - 9}$$

$$(c) (x-3)(x+2) - x^2 + 8 = \underline{2-x}$$

$$(d) (x+1)^2 - (x-1)^2 = \underline{4x}$$

$$(e) (x+1)(x-2)(x+3) = \underline{x^3 + 2x^2 - 5x - 6}$$

$$(f) (x+1)(2x^2 - x + 3) = \underline{2x^3 + x^2 + 2x + 3}$$

$$(g) (x-2x-1)(2x^2 - x + 3) = \underline{-2x^3 - x^2 - 2x - 3}$$

$$(h) (2x+3y-1)^2 = \underline{4x^2 + 9y^2 + 12xy - 4x - 6y + 1}$$

$$(i) (a+b)^2 = \underline{a^2 + 2ab + b^2}$$

$$(j) (a+b)^4 = \underline{a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4}$$

[Q3] Solve the following equations.

$$(a) x + 5 = 11. \text{ Answer: } \underline{x = 6}$$

$$(b) 6a = 20. \text{ Answer: } \underline{a = \frac{10}{3}}$$

$$(c) b/3 = -5. \text{ Answer: } \underline{b = -15}$$

$$(d) 3x + 5 = 10x. \text{ Answer: } \underline{x = \frac{5}{7}}$$

$$(e) 2x - 5 = 7. \text{ Answer: } \underline{x = 6}$$

$$(f) 2x + 2 = x + 4. \text{ Answer: } \underline{x = 2}$$

$$(g) 5x - 2 = 12 - 3x. \text{ Answer: } \underline{x = \frac{7}{4}}$$

$$(h) 2(5x + 1) = 4(3x - 7). \text{ Answer: } \underline{x = 15}$$

(i)  $2(2x + 1) - 3(x - 1) = 8$ . Answer:  $x = \underline{3}$

(j)  $x^2 = 4$ . Answer:  $x = \underline{\pm 2}$

[Q4] (a) Solve the inequality  $5x + 2 > 12$ . Answer:  $\underline{x > 2}$

(b) Solve the inequality  $-2x + 3 > 13$ . Answer:  $\underline{x < -5}$

(c) Simplify the following expression.

$$(\sqrt{12} - \sqrt{3})^2 = \underline{3}$$

(d) Suppose that  $f(x) = 2(3x - 4)$ .  
Then  $f(4) = \underline{16}$

(e) The area of a triangle is

$$\frac{1}{2}bh$$

where  $b$  denotes the length of the base and  $h$  the height of the triangle. The area of a triangle with  $b = 7$  cm and  $h = 4$  cm is  $\underline{14 \text{ cm}^2}$