



# Algebra I

TESTS MASTERY OF PRE-ALGEBRA II • 20 ITEMS • 60-75 MINUTES • CALCULATOR ON SECTION B ONLY

This diagnostic checks readiness for a full Algebra I course: whether equation solving, linear modelling, exponents and data reasoning are reliable under awkward numbers and negative signs. Items favour structural understanding over recall.

## BEFORE YOU BEGIN

No calculator unless a question says otherwise. Show your working - the method tells us more than the answer.  
Leave a question blank rather than guessing. A blank tells us it is unfamiliar; a wrong answer tells us what is believed.  
Work alone. Nobody should explain the mathematics or suggest a method.  
Stop and resume later if you tire. This is a picture of understanding, not a race.

## SECTION A Multiple choice

10 items

Choose one answer. If you are unsure, leave it blank rather than guessing.

**01** Solve:  $(x/3) - 4 = 2$

- A)  $x = 18$
- B)  $x = 6$
- C)  $x = -6$
- D)  $x = 2$

**02** Which line is parallel to  $y = 3x - 4$  ?

- A)  $y = 3x + 1$
- B)  $y = -3x - 4$
- C)  $y = (1/3)x - 4$
- D)  $y = -(1/3)x + 4$

**03** Simplify:  $(x^6)/(x^2)$

- A)  $x^4$
- B)  $x^3$
- C)  $x^8$
- D)  $x^{12}$



- 04 Factorise:  $x^2 - 9$
- A)  $(x-3)(x+3)$
  - B)  $(x-3)^2$
  - C)  $(x-9)(x+1)$
  - D)  $x(x-9)$
- 05 The function  $f(x) = 2x + 1$ . What is  $f(3)$ ?
- A) 7
  - B) 6
  - C)  $2x+1$
  - D) 3
- 06 Which describes the solution to  $2x + 6 = 2(x + 3)$  ?
- A) Infinitely many solutions
  - B)  $x = 0$
  - C) No solution
  - D)  $x = 3$
- 07 A population doubles each year from 50. Which models it after  $t$  years?
- A)  $50 \cdot 2^t$
  - B)  $50t^2$
  - C)  $50 + 2t$
  - D)  $2 \cdot 50^t$
- 08 Solve the inequality:  $-2x > 6$
- A)  $x < -3$
  - B)  $x > -3$
  - C)  $x < 3$
  - D)  $x > 3$
- 09 Which is the y-intercept of  $2x + 4y = 8$  ?
- A) (0, 2)
  - B) (4, 0)
  - C) (0, 8)
  - D) (2, 0)



- 10 A scatter plot shows points falling from upper left to lower right. The correlation is
- A) Negative
  - B) Positive
  - C) Zero
  - D) Impossible to tell

SECTION B Student solving

6 items

Show your working. We are reading the method, not only the answer.

- 11 Solve and check:  $(2x - 1)/3 = (x + 4)/2$

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- 12 Expand and simplify:  $(2x - 3)(x + 5)$

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- 13 A taxi charges \$3 plus \$1.50 per mile. Write a formula for cost  $C$  after  $m$  miles, then find the miles for a \$18 fare.

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- 14 Factorise fully:  $x^2 + 7x + 12$

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- 15 Solve the system by any method:  $y = 2x - 1$  ,  $3x + y = 9$

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- 16 The table shows  $x$ : 1, 2, 3, 4 and  $y$ : 5, 8, 11, 14. Is the relationship linear? Justify, then write the rule.

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**SECTION C Error analysis**

4 items

Each shows work containing a mistake. Find the FIRST incorrect step, say what the student believed, and give the correct answer.

- 17 Find the first incorrect step and correct it.

$$\begin{aligned}-2x &> 6 \\ x &> -3\end{aligned}$$

- 18 Find the first incorrect step and give the correct expansion.

$$\begin{aligned}(2x - 3)(x + 5) \\ = 2x^2 - 15\end{aligned}$$

- 19 Find the error and give the correct simplification.

$$\begin{aligned}(x + 4)/4 \\ = x\end{aligned}$$

- 20 A student says these lines are perpendicular. Explain why not, and give a line that is.

$$\begin{aligned}y &= 2x + 1 \\ y &= -2x + 3\end{aligned}$$

Student: the slopes are opposite,  
so the lines are perpendicular.

**What happens next**

Bring this completed sheet to your consultation. A tutor reads it alongside a short conversation with the student and any school work you choose to share, then recommends a level. No placement is ever decided by a score on its own, and no student is placed without a tutor's approval.