



Algebra 1

TESTS MASTERY OF PRE-ALGEBRA 2 • 20 ITEMS • 60-75 MINUTES • CALCULATOR ON SECTION B ONLY

This diagnostic checks whether integer fluency, proportional reasoning and equation solving are reliable enough to carry linear relationships, exponents and systems. Items are chosen to expose fragile procedures that succeed on simple numbers and fail on awkward ones.

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: $-2x = 14$

- A) $x = -7$
- B) $x = 7$
- C) $x = -28$
- D) $x = 12$

02 Simplify: $x^3 \cdot x^4$

- A) x^7
- B) x^{12}
- C) $2x^7$
- D) x^1

03 What is the slope of the line through (1,2) and (3,8)?

- A) 3
- B) $\frac{1}{3}$
- C) -3
- D) 6



- 04 Which is equivalent to $-(x - 5)$?
- A) $-x + 5$
 - B) $-x - 5$
 - C) $x - 5$
 - D) $x + 5$
- 05 If $y = 3x + 2$, what is y when $x = -2$?
- A) -4
 - B) 8
 - C) 4
 - D) -8
- 06 A phone plan charges \$15 plus \$0.10 per minute. Which represents the cost of m minutes?
- A) $15 + 0.10m$
 - B) $15m + 0.10$
 - C) $15.10m$
 - D) $(15 + 0.10)m$
- 07 Which of these is a solution of $2x + y = 10$?
- A) $(3, 4)$
 - B) $(4, 3)$
 - C) $(5, 5)$
 - D) $(1, 4)$
- 08 Expand: $(x + 2)(x + 3)$
- A) $x^2 + 5x + 6$
 - B) $x^2 + 6$
 - C) $x^2 + 5x$
 - D) $2x + 5$
- 09 What is 3^0 ?
- A) 1
 - B) 0
 - C) 3
 - D) undefined



10 The mean of 4, 7, x and 9 is 7. Find x.

- A) 8
- B) 7
- C) 6
- D) 28

SECTION B Student solving

6 items

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

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

12 Write the equation of the line with slope -2 passing through (0, 5). Then find y when $x = 4$.

13 Solve the system and show your method: $x + y = 10$, $x - y = 2$



- 14** Simplify fully: $(2x^2)(3x^5)$

- 15** A rectangle has perimeter 30 cm and length 3 cm greater than width. Find its dimensions.

- 16** Explain in your own words what the slope of a line tells you about a real situation. Give an example.

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.

$$\begin{aligned} x^3 &\cdot x^4 \\ &= x^{12} \end{aligned}$$



- 18** Find the first incorrect step, explain the belief, and correct it.

$$\begin{aligned} & -(x - 5) \\ &= -x - 5 \end{aligned}$$

- 19** Find the first error and give the correct solution.

$$\begin{aligned} 2x + 3 &= 7x - 12 \\ 2x - 7x &= -12 - 3 \\ -5x &= -15 \\ x &= -3 \end{aligned}$$

- 20** Explain why this reasoning fails, and give the correct expansion.

$$\begin{aligned} & (x + 3)^2 \\ &= x^2 + 9 \end{aligned}$$

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.