

Solutions

Accept equivalent correct methods and supported interpretations. The marks check reasoning; they are not an official grade.

2.1 B – Only nonnegative 2 satisfies the original equation. A discards the valid root 2; C has a negative right side and fails the principal root; D retains that extraneous negative candidate.

Correct response linked to the given case.

2.2 C – The denominator is zero at 1. A requires the prohibited input; B forgets the original denominator; D excludes a numerator zero rather than the denominator zero.

Correct response linked to the given case.

2.3 6 – Adding gives $2x=12$; $y=3$.

Correct response linked to the given case.

2.4 False – Every condition must hold simultaneously.

Correct response linked to the given case.

3.1 Substitute to get $x^2 + (x - 1)^2 = 25$, or $x^2 - x - 12 = 0$. Roots are 4, -3 , giving $(4, 3)$ and $(-3, -4)$. Both give squared sum 25 and satisfy $y = x - 1$.

Sound conclusion or proposed method. Relevant supporting steps or textual evidence
. Accurate conditions, checks or qualification.

3.2 Squaring with $x \geq 0$ gives $(x - 4)(x + 1) = 0$; only $x = 4$ works. The region is on/above $y = x + 1$ and below $y = 4 - x$. It exists only when $x + 1 < 4 - x$, so $x < 3/2$; their meeting point is excluded.

Sound conclusion or proposed method. Relevant supporting steps or textual evidence.
Accurate conditions, checks or qualification.

3.3 Factor numerator $x(x - 4)$ and denominator $(x - 4)(x + 4)$. The original domain excludes $x = 4, -4$. Cancellation gives $F(x) = x/(x + 4)$ for $x \neq 4, -4$. The latter formula alone permits 4, where it gives $1/2$, while $F(4)$ is undefined.

Sound conclusion or proposed method. Relevant supporting steps or textual evidence.
Accurate conditions, checks or qualification.