Solutions

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

2.1 A – Either factor may be zero. B loses the allowed zero root; C loses the other factor's root; D changes the sign when solving x−5=0.

Correct response linked to the given case.

2.2 B – The factors have opposite signs strictly between the roots. A gives zeros excluded by the strict sign; C gives positive products; D includes intervals of both signs.

Correct response linked to the given case.

2.3 7 – The squared term is nonnegative and can equal zero.

Correct response linked to the given case.

2.4 False – A negative multiplier reverses order.

Correct response linked to the given case.

3.1 Factor $x(x-3)(x+3)=0$, giving $-3, 0, 3$. Dividing by x improperly removes the allowed zero root. For the inequality, roots are $-2, 5$; the product is nonnegative outside the roots, including endpoints, so $x \leq -2$ or $x \geq 5$.

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

3.2 Completing the square gives $2(x-3)^2+5$, with minimum 5 at $x=3$. Expansion of the product is $2x^2+5x-12$, so the coefficient is 5.

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

3.3 $C = f + pn = 25\,\text{yuan} + (0.40\,\text{yuan/page})(n\,\text{pages})$. Budget $25 + 0.40n \leq 65$ gives $0 \leq n \leq 100$, with integer n. The charge is affine linear in n. The rectangle has $A = x(x+3) = x^2+3x$ square metres for numerical lengths in metres and $x > 0$; multiplication of two variable lengths creates a quadratic, rather than a fixed fee plus a rate .

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