

Algebra 2 · Structure of Expressions and Modeling with Equations · Test Answer Key

Common Core A-SSE.A.1, A-SSE.A.2, A-CED.A.1, A-CED.A.2, A-CED.A.3, A-CED.A.4, A-REI.D.11, A-APR.C.5, N-CN.C.8, N-CN.C.9 · mathovore.fr

This algebra 2 expressions test answer key gives the full solution and the scoring guide for each of the 8 test questions on structure of expressions and modeling with equations.

Worked solutions and a scoring guide for the 20-point test on expressions and modeling. Award partial credit exactly as described in each scoring note, and give full credit for any equivalent correct form of an answer.

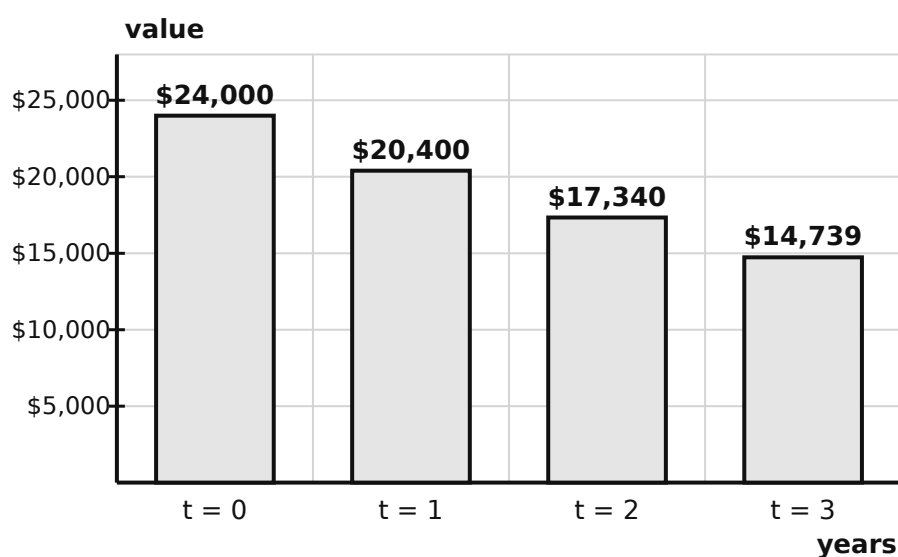
Algebra 2 Common Core: A-SSE.A.1 · A-SSE.A.2 · A-CED.A.1 · A-CED.A.2 · A-CED.A.3 · A-CED.A.4 · A-REI.D.11 · A-APR.C.5 · N-CN.C.8 · N-CN.C.9

Algebra 2 Expressions Test Answer Key: questions 1-5

Question 1: Interpret a model (2 points)

- a. The factor 24000 is the starting value, **\$24,000**. The factor 0.85 means the car keeps 85% of its value each year, a **15% yearly decrease**.
- b. $V(3) = 24000(0.85)^3 = 24000(0.614125) = 14739$, so the value is **\$14,739**.

Scoring: 1 point for both meanings (starting value and 15% decrease); 1 point for the correct value.



Each bar is 85% of the one before it.

Question 2: Factor completely (2 points)

- a. $x^4 - 16y^4 = (x^2 + 4y^2)(x^2 - 4y^2)$, so $(x^2 + 4y^2)(x + 2y)(x - 2y)$.
b. $x^2 + 49 = x^2 - (7i)^2$, so $(x + 7i)(x - 7i)$.

Scoring: 1 point for each correct factorization; part (a) must be factored completely.

Question 3: Binomial Theorem (3 points)

- a. Row 4 is 1, 4, 6, 4, 1: $x^4 + 4x^3(3) + 6x^2(9) + 4x(27) + 81 = x^4 + 12x^3 + 54x^2 + 108x + 81$.
b. The x^2 term uses the third power of -2 and coefficient 10: $10x^2(-2)^3 = -80x^2$. The coefficient is **-80**.

Scoring: (a) 1 point for the Pascal coefficients, 1 point for the correct powers of 3; (b) 1 point.

Question 4: Rearrange formulas (2 points)

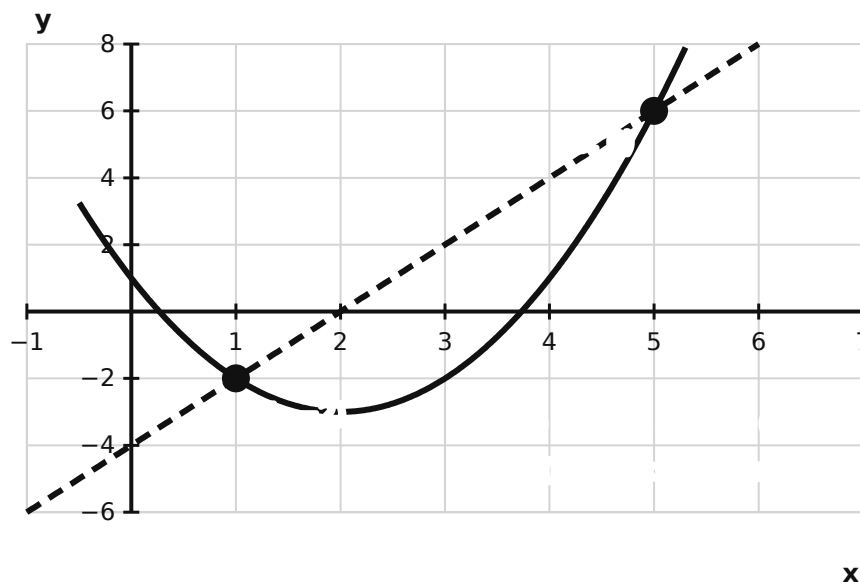
- a. $2\pi rh = S - 2\pi r^2$, so $h = \frac{S - 2\pi r^2}{2\pi r}$.
b. $y(x - 1) = 2x + 5$, so $xy - y = 2x + 5$ and $x(y - 2) = y + 5$. Then $x = \frac{y + 5}{y - 2}$.

Scoring: 1 point for each correct formula.

Question 5: Where two graphs meet (3 points)

- a. The graphs cross at $x = 1$ and $x = 5$.
b. $x^2 - 4x + 1 = 2x - 4$ gives $x^2 - 6x + 5 = 0$, so $(x - 1)(x - 5) = 0$ and $x = 1$ **or** $x = 5$. Check:
 $f(1) = g(1) = -2$ and $f(5) = g(5) = 6$.

Scoring: (a) 1 point for both values; (b) 1 point for the quadratic equation in standard form, 1 point for the factored solutions.



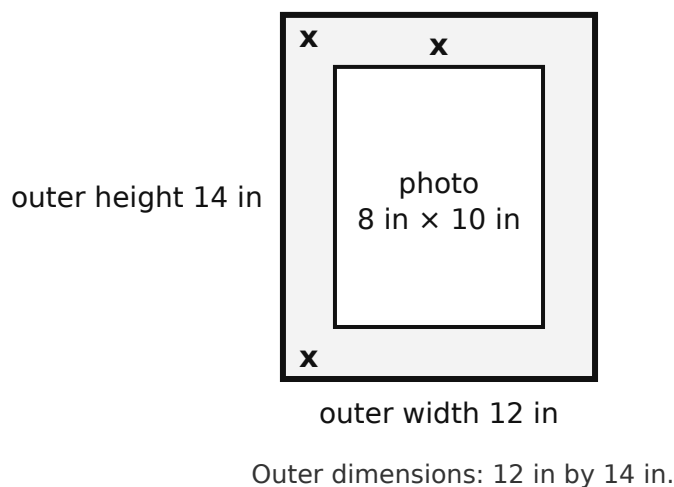
The graphs cross at $(1, -2)$ and $(5, 6)$.

Algebra 2 Expressions Test Answer Key: questions 6-8

Question 6: Picture frame (3 points)

- a. The outer rectangle is $8+2x$ by $10+2x$, so $(8+2x)(10+2x)=168$.
- b. Expanding gives $4x^2+36x+80=168$, so $4x^2+36x-88=0$ and $x^2+9x-22=0$. Then $(x+11)(x-2)=0$. The width cannot be negative, so reject $x=-11$. The frame is **2 inches** wide, and $12 \cdot 14 = 168$.

Scoring: (a) 1 point; (b) 1 point for the solved equation, 1 point for choosing 2 inches with the reason.



Question 7: Savings account growth (3 points)

- a. $A(t) = 3500(1.06)^t$.
- b. $3500(1.06)^t = 5000$.
- c. $A(6) = 3500(1.06)^6 \approx 4964.82$ is below 5000, and $A(7) \approx 5262.71$ is above. The least whole number is **7 years**.

Scoring: 1 point per part. Accept 1.06 written as $1+0.06$.

Question 8: Constraints (2 points)

- a. $3n+5b \leq 60$ and $b \geq 4$.
- b. $3(10)+5(6)=60 \leq 60$ and $6 \geq 4$, so **yes**, the plan is possible. It lies on the boundary of the cost limit.

Scoring: (a) 1 point for both inequalities; (b) 1 point for checking both conditions.



The shaded region holds all possible purchases.

Scoring summary

Total

20 points: add the points of every question of this algebra 2 expressions test answer key.

How to use this algebra 2 expressions test answer key

Use this algebra 2 expressions test answer key to score the test fairly and to see which skills need more practice.

