

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

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

Name: _____ Date: ____/____/____ Score: _____

This algebra 2 expressions equations models test checks structure of expressions and modeling with equations in 45 minutes, with 8 questions for a total of 20 points.

This 20-point test covers the structure of expressions and modeling with equations. It includes interpreting a model, factoring, the Binomial Theorem, rearranging formulas, solving by graph and by algebra, and building equations from real situations. Allow about 45 minutes, show all work, and use a calculator only where needed.

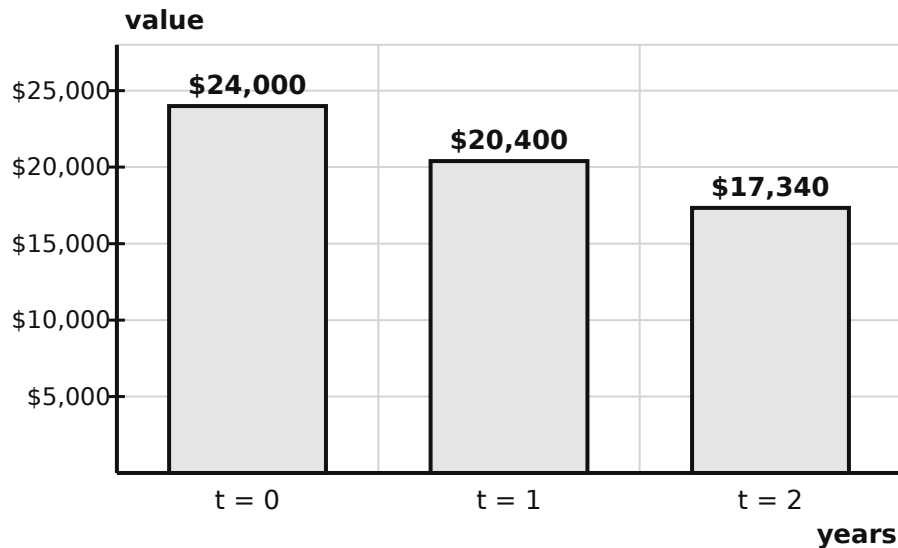
Test information

- **Grade:** Algebra 2
- **Chapter:** Structure of Expressions and Modeling with Equations
- **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
- **Time:** 45 minutes
- **Total:** 20 points (Question 1: 2 pts; Question 2: 2 pts; Question 3: 3 pts; Question 4: 2 pts; Question 5: 3 pts; Question 6: 3 pts; Question 7: 3 pts; Question 8: 2 pts)

Algebra 2 Expressions Equations Models Test: questions 1-5

Question 1: Interpret a model (2 points)

The value of a used car is $V(t) = 24000(0.85)^t$ dollars, where t is the number of years since it was bought.



Value of the car at the end of each year.

- Explain what 24000 and 0.85 mean in this situation. (1 point)
- Find the value of the car after 3 years. (1 point)

Question 2: Factor completely (2 points)

- Factor $x^4 - 16y^4$ completely over the real numbers. (1 point)
- Factor $x^2 + 49$ over the complex numbers. (1 point)

Question 3: Binomial Theorem (3 points)

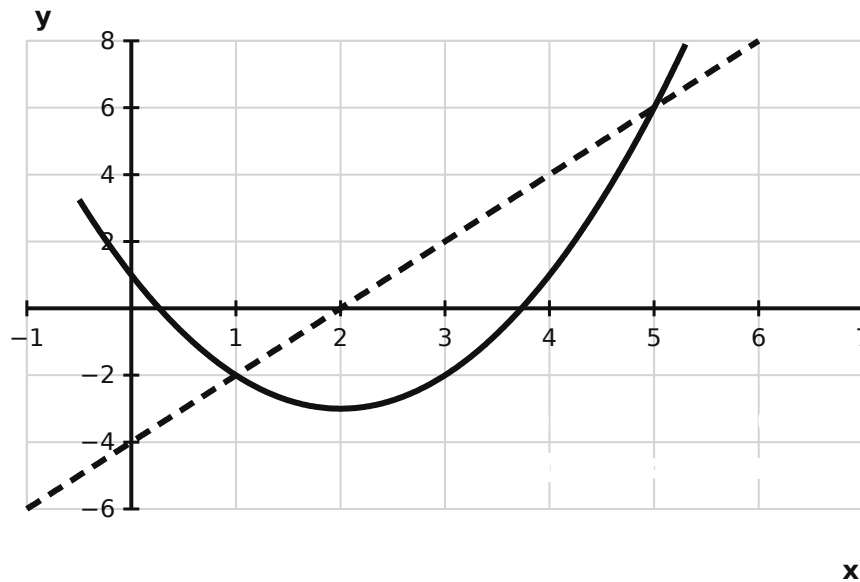
- Expand $(x+3)^4$. (2 points)
- Find the coefficient of x^2 in the expansion of $(x-2)^5$. (1 point)

Question 4: Rearrange formulas (2 points)

- Solve $S = 2\pi r^2 + 2\pi r h$ for h . (1 point)
- Solve $y = \frac{2x+5}{x-1}$ for x . (1 point)

Question 5: Where two graphs meet (3 points)

The graph shows $f(x) = x^2 - 4x + 1$ (solid) and $g(x) = 2x - 4$ (dashed).



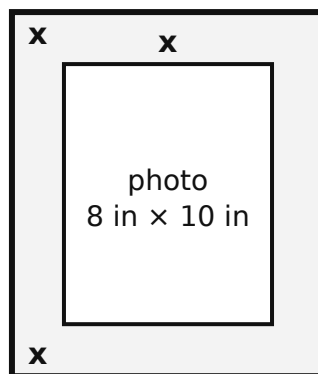
Graphs of f and g .

- Use the graph to estimate the solutions of $f(x) = g(x)$. (1 point)
- Solve $f(x) = g(x)$ algebraically to confirm. (2 points)

Algebra 2 Expressions Equations Models Test: questions 6-8

Question 6: Picture frame (3 points)

A rectangular photo measures 8 inches by 10 inches. Noah adds a frame of uniform width x inches. The photo and frame together have an area of 168 square inches.



The frame has the same width on all four sides.

- Write an equation for x . (1 point)
- Solve it and state the width of the frame. Explain why one solution is rejected. (2 points)

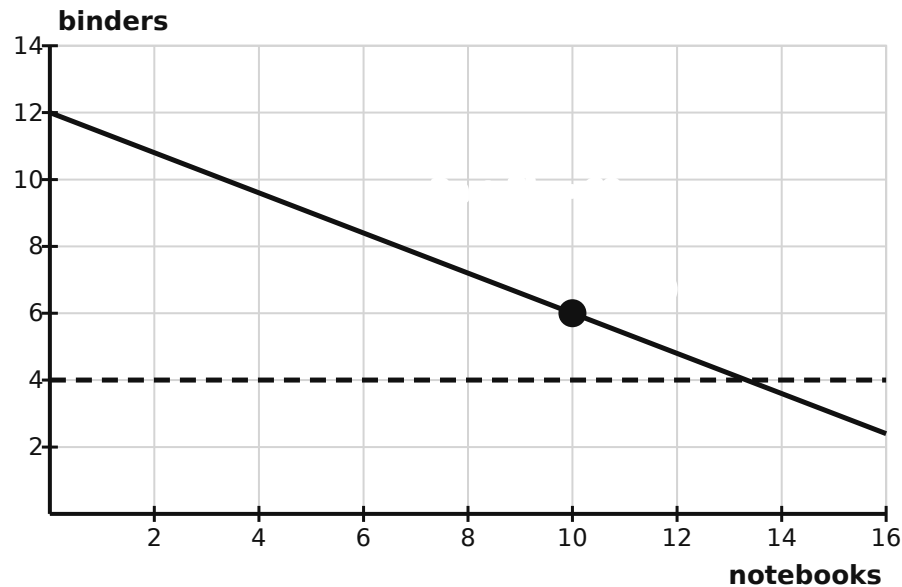
Question 7: Savings account growth (3 points)

Jamal deposits \$3,500 in an account that pays 6% interest compounded annually.

- Write a function $A(t)$ for the balance after t years. (1 point)
- Write an equation that says the balance is \$5,000. (1 point)
- Find the least whole number of years after which the balance is at least \$5,000. (1 point)

Question 8: Constraints (2 points)

At the school store, notebooks cost \$3 each (n of them) and binders cost \$5 each (b of them). Diego can spend at most \$60 and needs at least 4 binders.



The point (10, 6) is plotted for reference.

- Write two inequalities that describe his purchase. (1 point)
- Is buying 10 notebooks and 6 binders possible? Justify. (1 point)

How to use this algebra 2 expressions equations models test

Take this algebra 2 expressions equations models test without notes, then grade it with the test answer key out of 20 points.

