

Transformations of Functions and Their Graphs

Grade 11 – Algebra 2 math · Test · Standards: F-BF.B.3, F-IF.C.7b

Name: _____ Date: _____ Class: _____

This test covers transformations of the quadratic, root, absolute value, and exponential parent functions, together with even and odd functions. Name the order of the transformations, track a key point, and state domain and range as requested. No calculator is needed. The test is worth 20 points.

Standards: F-BF.B.3, F-IF.C.7b · **Level:** Grade 11 Algebra 2

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Describe a transformation (2 points)

Describe the graph of $g(x) = -2(x + 4)^2 - 5$ as a transformation of $f(x) = x^2$, and give the vertex.

Question 2 Write an equation (2 points)

Write the equation of the cube root function obtained from $f(x) = \sqrt[3]{x}$ by a vertical stretch by 4, a shift right 5, and a shift up 3.

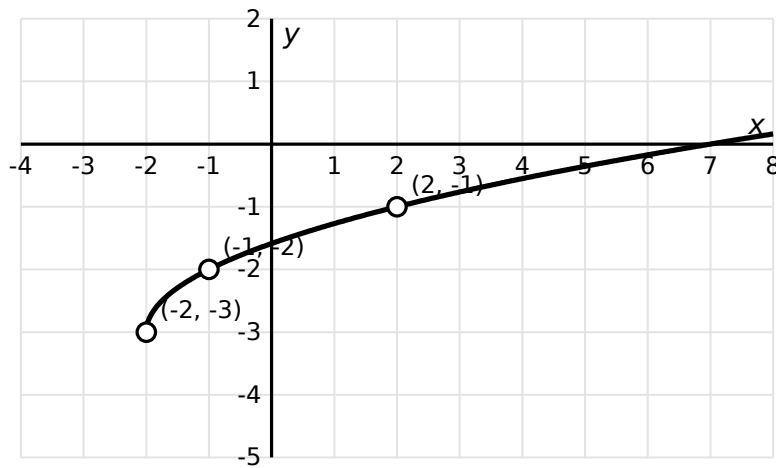
Question 3 Even or odd (3 points)

Classify each function as even, odd, or neither, and show the work.

- a. $f(x) = x^6 - 2x^2$ (1 point)
- b. $g(x) = x^5 + 4x^3$ (1 point)
- c. $h(x) = x^3 + x^2$ (1 point)

Question 4 Square root graph (3 points)

The graph of a square root function is shown with the points $(-2, -3)$, $(-1, -2)$, and $(2, -1)$.



Graph of a root function.

- Write its equation. (1 point)
- State the domain. (1 point)
- State the range. (1 point)

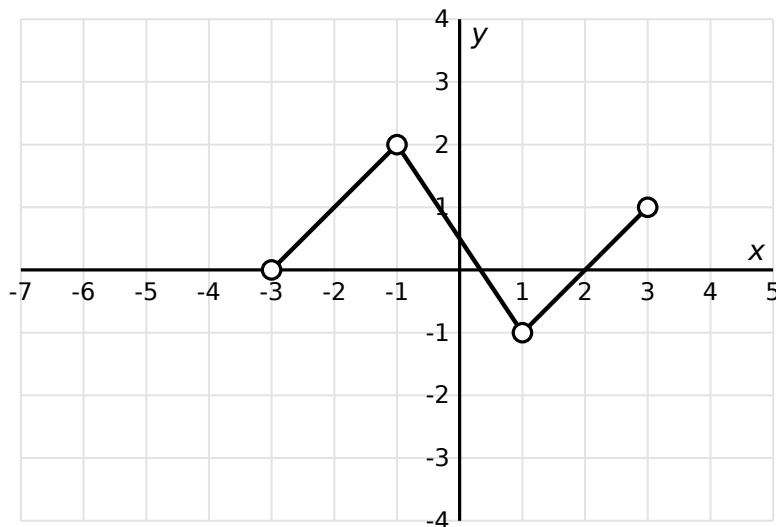
Question 5 An exponential transformation (3 points)

Let $g(x) = 3^{x+2} - 4$ and $f(x) = 3^x$.

- Describe the transformation from f to g . (1 point)
- Give the equation of the horizontal asymptote of g . (1 point)
- Find the y-intercept of g . (1 point)

Question 6 Transform a graph (3 points)

The graph of f consists of segments joining $(-3, 0)$, $(-1, 2)$, $(1, -1)$, and $(3, 1)$.



Graph of f .

- a. List the vertices of $g(x) = f(x + 2) - 1$. (2 points)
- b. List the vertices of $h(x) = -f(x)$. (1 point)

Question 7 Profit model (2 points)

A bakery's daily profit, in dollars, is $P(n) = -(n - 40)^2 + 900$ when n cakes are sold. Describe P as a transformation of n^2 , and state the greatest profit and the number of cakes that gives it.

Question 8 A compression that equals a stretch (2 points)

For $f(x) = x^2$, let $g(x) = f(2x)$. Show that $g(x) = 4x^2$, and give the point of g that matches the point $(2, 4)$ of f .