

Homework: Exponents and radicals

Do these problems without a calculator. Answer the first page on loose leaf paper.

Simplify, leaving no negative or fractional exponents.

1. $4^{-1}x^{-2} \times \frac{8}{9}x^4y^{-3} = \frac{2x^2}{9y^3}$

2. $\frac{x\sqrt{25x^4}}{\sqrt[3]{7x^{-6}}} = \frac{5x^5}{\sqrt[3]{7}}$

3. $x^3y^{-3} \div x^{-4}y^2 = \frac{x^7}{y^5}$

4. $(-a^2)^2 = a^4$

5. $\frac{6}{5}(x^{-2}y)^2 \times \frac{1}{3}(x^4y^{-1}) = \frac{2}{5}y$

6. $125^{\frac{4}{3}} = 625$

7. $(1.21)^{\frac{1}{2}} = 1.1$

8. $36^{\frac{1}{4}} = \sqrt{6}$

9. $\sqrt[3]{\frac{x^6y^{-12}}{z^{-3}}} = \frac{x^2z}{y^4}$

10. Let $f(x) = x^2 - 4$.

(a) Rewrite this function in vertex form and state the vertex as an ordered pair.

$$f(x) = (x - 0)^2 - 4. \text{ Vertex: } (0, -4)$$

(b) $g(x) = f(x + 5) + 2$. Write $g(x)$ in vertex form.

$$g(x) = (x + 5)^2 - 2.$$

(c) State the geometric transformation that maps f into g .

Translate left five units and up two units.

(d) Find $f^{-1}(x)$

$$f^{-1}(x) = \sqrt{x + 4}$$

11. Let $f(x) = (x - 2)^2 - 3x$ and $g(x) = 3x - 2$. Find $(f \circ g)(x)$

$$f(g(x)) = ((3x - 2) - 2)^2 - 3(3x - 2) = 9x^2 - 33x + 22$$

12. Let $f(x) = \left(\frac{1}{2}\right)^x$, for $-4 \leq x \leq 4$.

(a) On the grid below, graph f .

(b) Write down the value of $f(0)$.

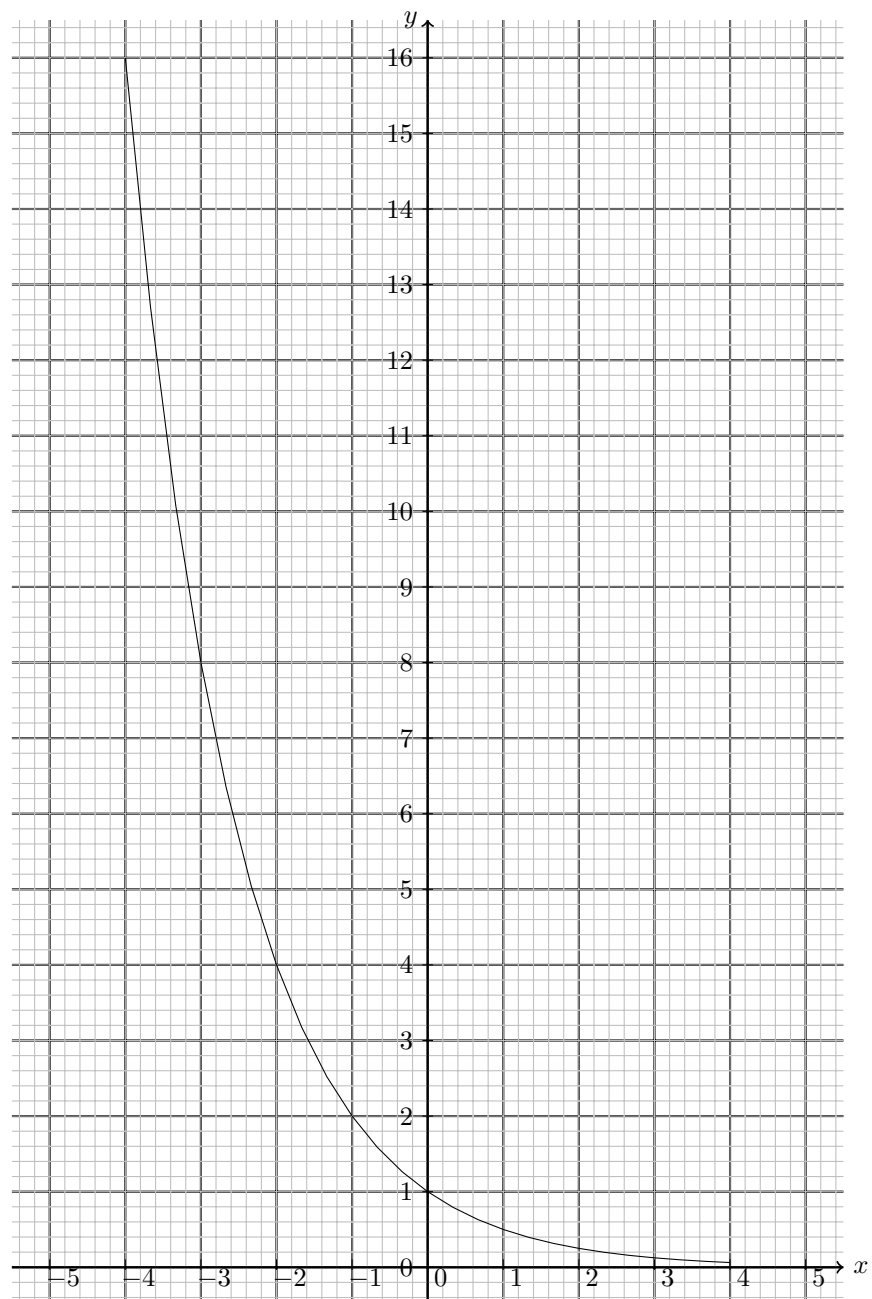
$$f(0) = 1$$

(c) Using the graph, solve for $f(x) = \frac{1}{4}$.

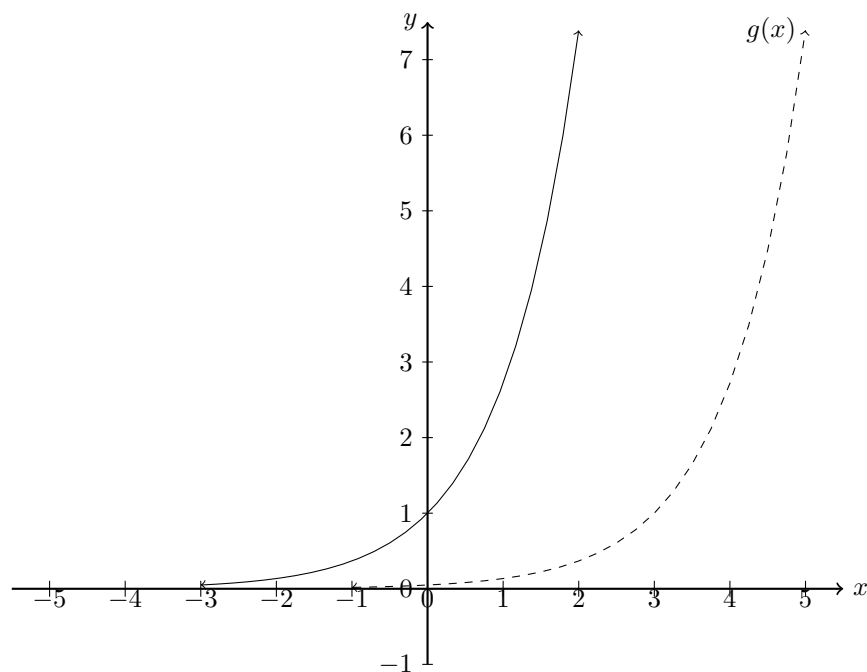
$$f(2) = \frac{1}{4}, \text{ therefore } x = 2$$

(d) What is the value of $f^{-1}(8)$?

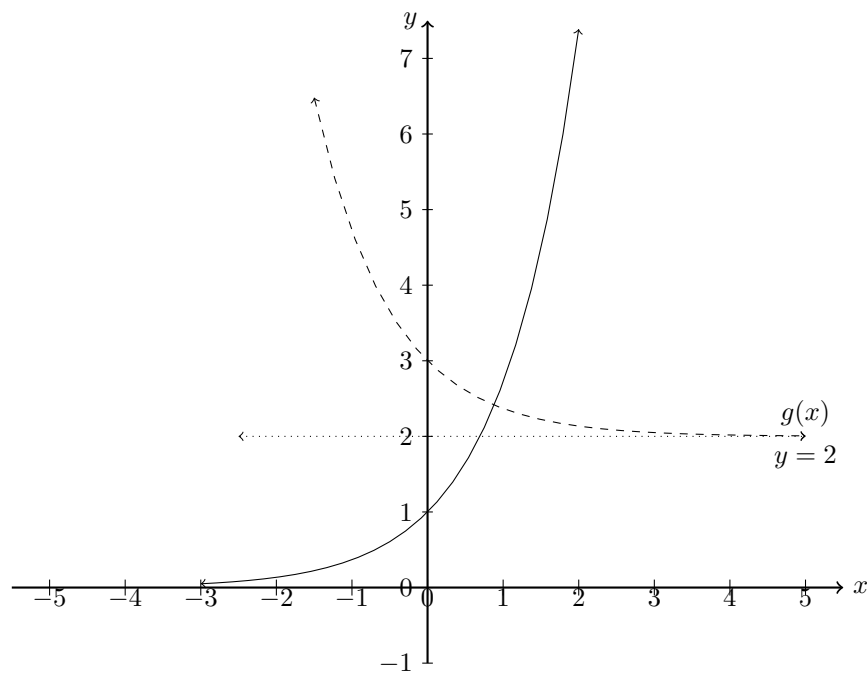
$$f^{-1}(8) = -3$$



13. The function $f(x) = e^x$ is shown on the graph. Sketch $g(x) = f(x - 3)$.



14. The function $f(x) = e^x$ is shown on the graph. Sketch $g(x) = f(-x) + 2$. Plot and label the asymptote.



15. Graph the function $f(x) = x^2 - 4$ over the domain $x \geq 0$ on the grid below.

(a) Label the y -intercept as an ordered pair.

(b) Label the point representing the solution to the equation $f(x) = 0$ as an ordered pair.

(c) Write down the value of $f^{-1}(-3)$ and label the point $(f^{-1}(-3), -3)$.

$$f^{-1}(-3) = 1$$

(d) Graph the inverse function, $f^{-1}(x)$.

