1. $log_4 16$
2. $log_3 \frac{1}{3}$
3. $log 1000$
4. $log_5 5^9$
5. $log_2 4^3$
6. $log_7 1$

   Write these equations in log form.

7. $27 = 3^x$
8. $x = 3^7$
9. $x = b^a$

   Write these equations in exponential form.

10. $x = log_3 81$
11. $x = log_5 125$
12. $4 = log_2 x$

    Express each item as fractions with rational denominators.

13. $\dfrac{1}{\sqrt{3}}$
14. $\dfrac{x^2 - 1}{\sqrt{x}}$
15. $\dfrac{1}{2 + \sqrt{7}}$
16. $\dfrac{x^2 - 1}{x - \sqrt{5}}$

    State how each function has been transformed from its parent function.

17. $g(x) = f(x - 4)$
18. $g(x) = f(x + 2) + 3$
19. $g(x) = |x - 5| - 1$
20. $g(x) = \sqrt{x - 3} + 2$. (note: $\sqrt{x}$ is the parent function)

21. Let $f(x) = \frac{1}{2}x^2 + x - 4$ and $g(x) = -x - \frac{3}{2}$

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

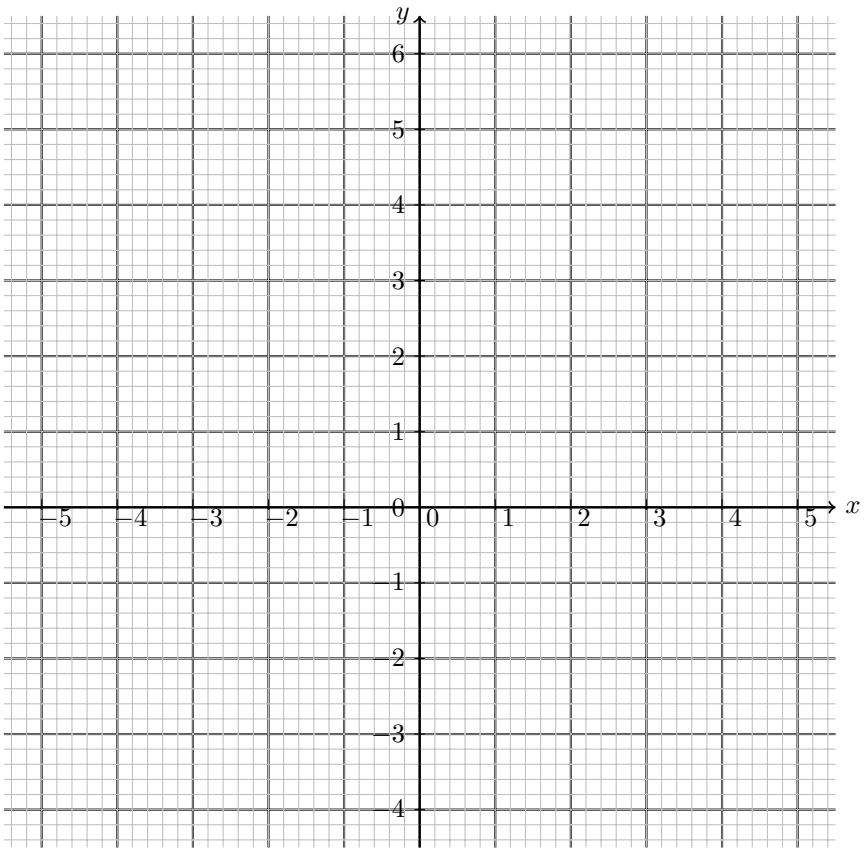
(b) Factor the function f and write down its roots.

(c) Graph the function f, labeling it. Mark the intercepts and graph the axis of symmetry as a dotted line, labeling it with its equation.

(d) Graph g and label it with its name or equation.

(e) Mark the intersections of f and g as ordered pairs.

(f) Select one of the solutions and show that it satisfies the system by substituting it into both functions.

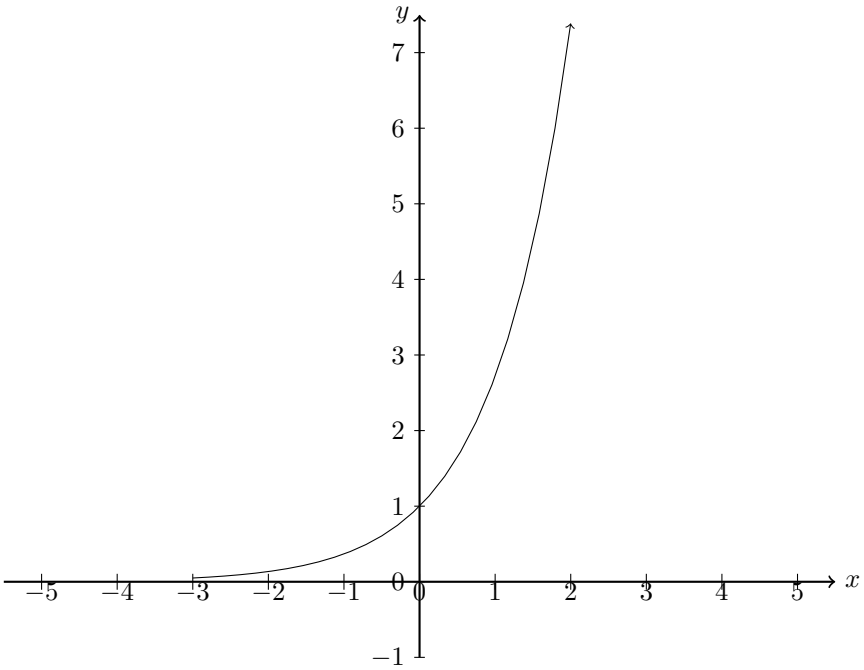


22. Let $f(x) = \sqrt{x} - 16$ and $g(x) = (x-4)^4$

(a) Find $(f \circ g)(x)$

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

23. The function $f(x) = e^x$ is shown on the graph. Sketch $g(x) = -f(x-4) + 3$. Plot and label the asymptotes.



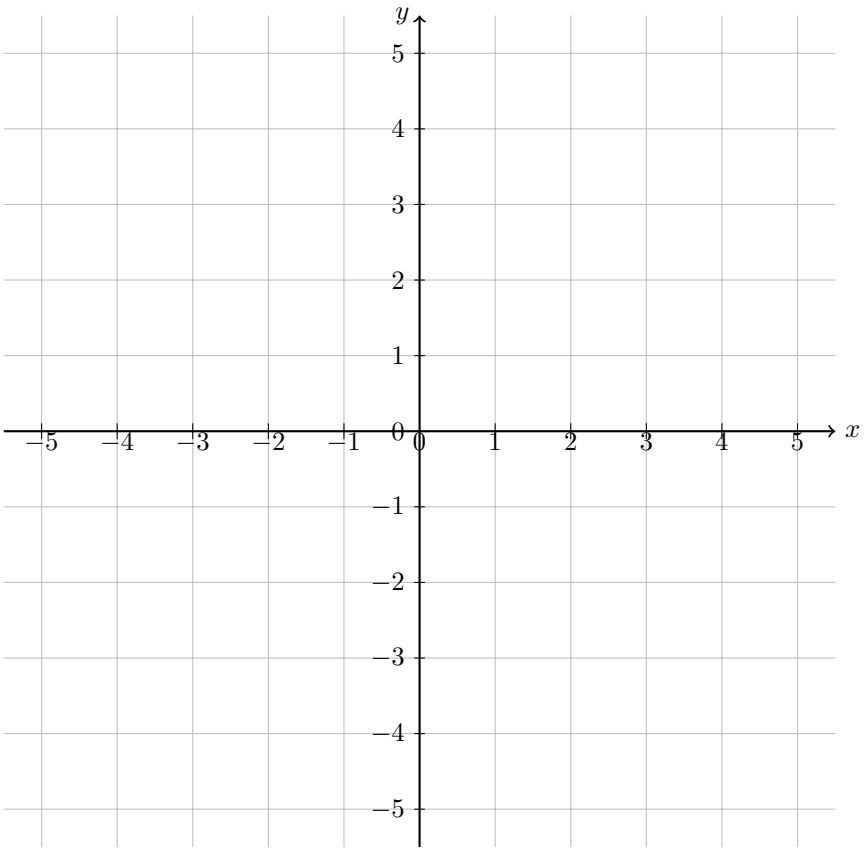
24. Graph the function $f(x) = x^2 - 4$ over the domain $x \geq 0$ on the grid below.

(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 $(f^{-1}(-3), -3)$.

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



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

26. $\frac{x^2\sqrt{12x^6}}{xy\sqrt[5]{32x^{-5}}}$

27. $a^3b^{-3} \div a^{-4}b^{\frac{1}{2}}$

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

29. $25^{\frac{3}{2}}$

30. $\sqrt[3]{\frac{16a^9b^{-3}}{z^{-4}}}$

31. $\sqrt{20}$

32. $\sqrt{12x^4}$

33. $4\sqrt{x} - 3\sqrt{x}$

34. $\frac{1}{2}\sqrt{ab^2} + \frac{3}{2}b\sqrt{a}$

35. $x^2\sqrt{xy^3} + 3y\sqrt{xy}$

36. $(x^2 + x - 5)(x - 1)$

37. $(2x^2 - 4x + 1)(3x - 1)$

38. Let $f(x) = (4x + 8)^2 - 3x$ and $g(x) = \frac{1}{2}x - 2$. Find $(f \circ g)(x)$

Express each item as fractions with rational denominators.

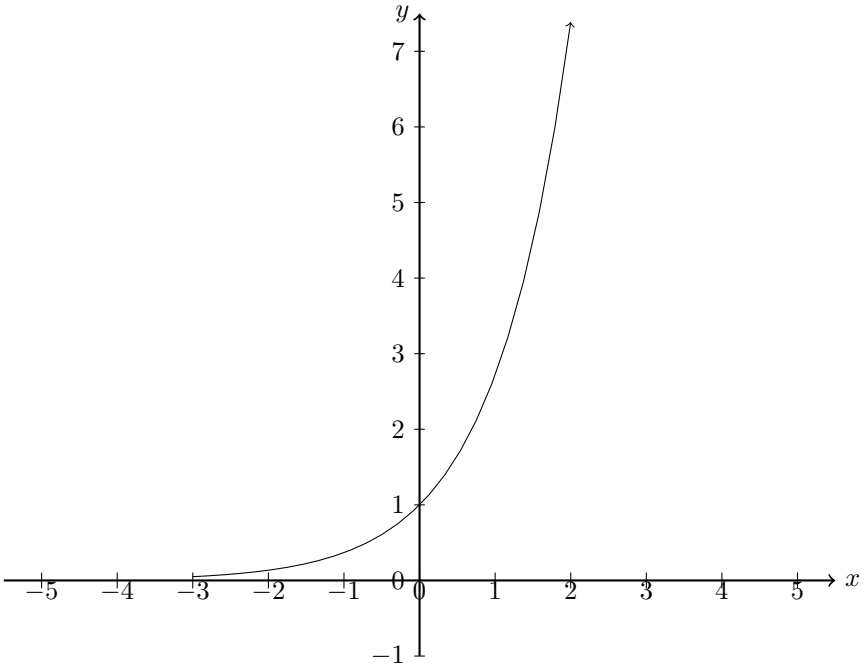
39. $\frac{1}{\sqrt{2}}$

40. $\frac{1 - x}{\sqrt{x}}$

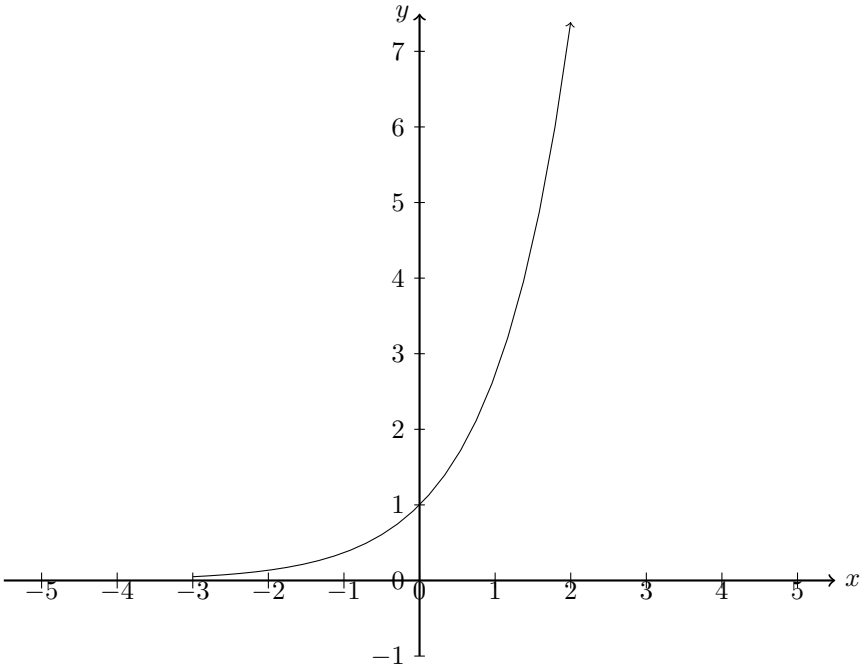
41. $\frac{7}{3 + \sqrt{5}}$

42. $\frac{x^2 - 3}{x - \sqrt{3}}$

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



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



Simplify, leaving no negative or fractional exponents.

1. $5x^{-3}y \times 2x^3y^{-3}$

2. $\sqrt[3]{a^6b}$

3. $x^{\frac{3}{2}} \times (\frac{x}{z^4})^{\frac{1}{2}}$

4. $(a^6b^2)^{\frac{1}{2}} \div a^{-2}b$