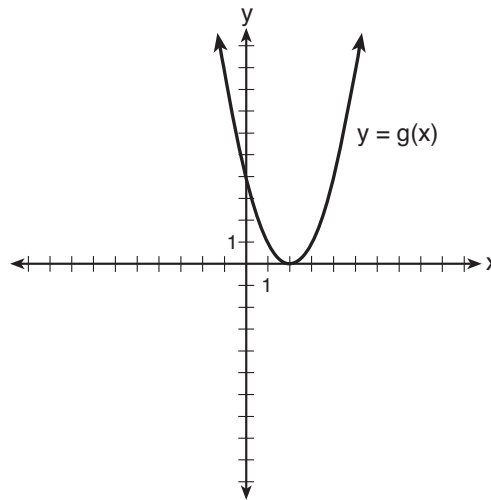


Answer on lined paper. Show work.

1. In an arithmetic sequence, the first term is 15 and the second term is 9.
 - (a) Find the common difference.
 - (b) Find the sixth term.
 - (c) Find the sum of the first six terms of the sequence.
2. Given that for a geometric sequence $u_1 = 54$ and $u_4 = 16$
 - (a) Find the value of r .
 - (b) Given that u_k is the first term of the sequence with a value less than one, find k .
 - (c) Find the sum of the infinite series S_∞
3. The first three terms of an arithmetic sequence are $u_1 = 7.1$, $u_2 = 7.4$, and $u_3 = 7.7$.
 - (a) Find the common difference.
 - (b) Given that the k th term of the sequence, $u_k = 11$. Find k .
4. Let $f(x) = 3x - 4$ and $g(x) = (x + 1)^2$
 - (a) Find $(f \circ g)(3)$
 - (b) Find $f^{-1}(x)$
5. Simplify the expression $\sqrt{a^2} \cdot \sqrt{a^3}$
6. $(x^2 - 5x - 1)(2x + 1) - 2x(x^2 + 2x - 7)$
7. What is the inverse of the function $y = \frac{3}{x+2}$?
8. Let $x = \ln 3$ and $y = \ln 7$. Write down the following expressions in terms of x and y .
 - (a) $\ln \frac{7}{3}$
 - (b) $\ln 63$
 - (c) $\ln 9$
9. Using the quadratic formula or otherwise, find the solution set to $2x^2 - 5x - 3 = 0$.
10. Simplify the complex expression $3ai(3 - 2i)$.
11. Simplify the expression $\left(\frac{x^{-3}}{x^5}\right)^{\frac{1}{4}}$ to one with positive integer exponents and radicals.

12. The function g is defined by graph of $y = g(x)$ below.

- (a) Write down the equation for $g(x)$ in factored form.
- (b) The function $h(x)$ is made by reflecting g across the x -axis. What is the equation for $h(x)$?



13. Let $f(x) = x^2 - 8x + 3$

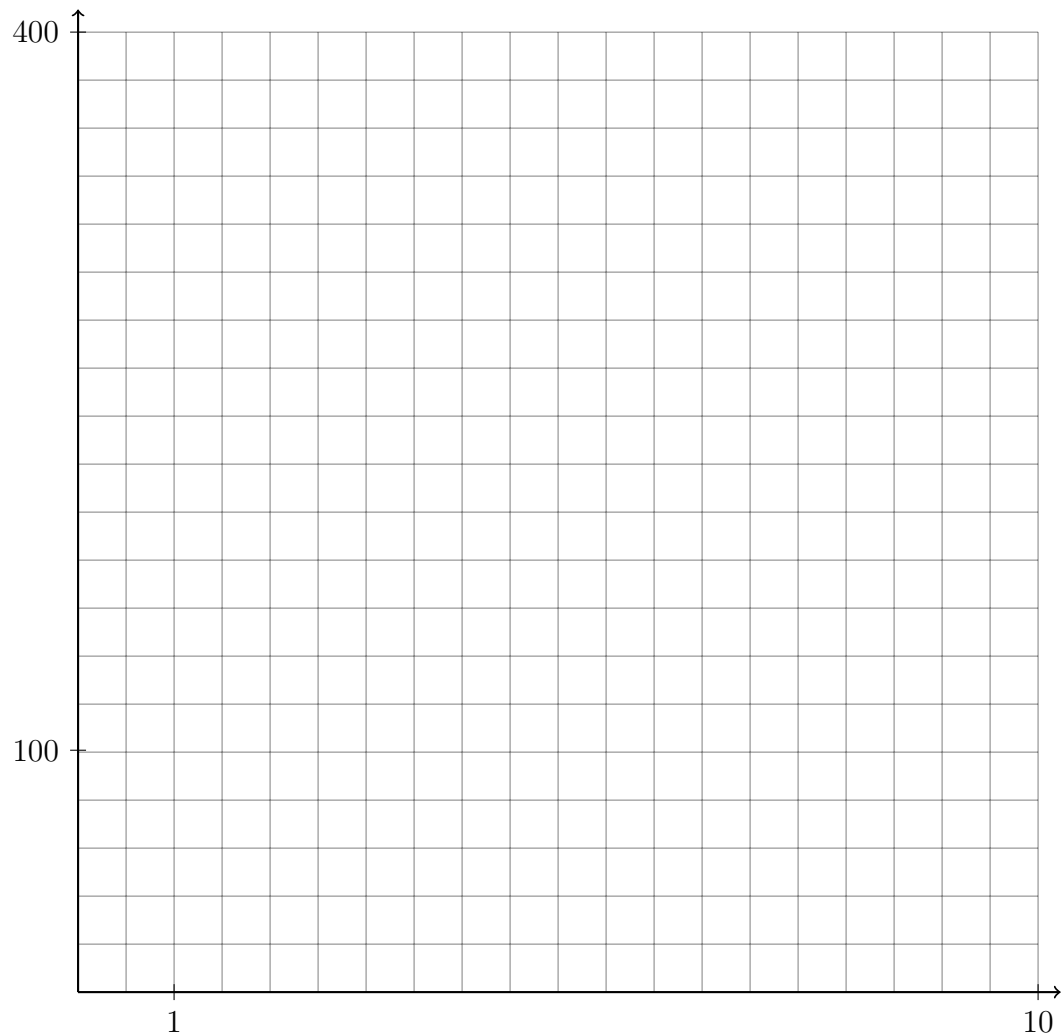
- (a) Rewrite quadratic in vertex form and state the vertex as an ordered pair.
- (b) The parabola is translated vertically by k units to make the function $g(x)$. The equation $g(x) = 0$ has one solution. Find k .

14. Use your knowledge of the binomial expansion and combinatorics to answer the following questions.

- (a) Write down the first 5 rows of Pascal's triangle.
- (b) Find ${}_9C_4$.
- (c) Expand the binomial $(x + 1)^5$.
- (d) What is the coefficient of the x^3 term of the expansion of $(x + 1)^9$?

For these last two pages, answer in the space provided

15. Graph $g(x) = 30(1.5)^{\frac{x}{2}} - 5$ on the set of axes below.

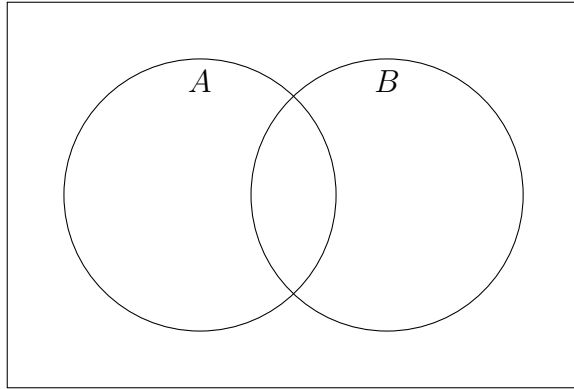


Is the function an example of exponential growth or exponential decay? Justify your answer algebraically.

16. Let A and B be independent events, where $P(A) = 0.5$ and $P(B) = 0.6$.

(a) Find $P(A \cap B)$

(b) Fill in the probability value for each area in the Venn diagram representing the situation. (there are four values)



(c) Find $P(A \cup B)$

(d) Find $P(A \cap B')$

17. The function $f(x) = e^x$ is shown on the graph. Sketch $g(x) = f(x - 3) - 1$. Plot and label the asymptote(s).

