1. Write an equation for the graph of $y=f(x)$ obtained by the given transformation:
(a) Shift 1 upward
(b) Shift 2 downward
(c) Shift 3 to the right
(d) Shift 4 to the left
(e) Reflect about the $x$-axis
(f) Reflect about the $y$-axis
(g) Stretch horizontally by a factor of 5
(h) Shrink horizontally by a factor of 6
2. Find a function resulting from reflecting $f(x)=x^{2}-x$ about the line $x=2$.
3. Find a function resulting from reflecting $f(x)=2^{x}$ about the line $y=3$.
4. A portion of the graph of $y=x \ln x$ is shown


Use transformations to create a function that has the following graph:

5. Graph $y=\sqrt{2-x}$ by hand
6. Graph $y=\left|x^{2}-1\right|$ by hand
7. Let $f(x)=\sqrt{x+2}$ and $g(x)=\ln \left(x^{2}-3\right)$. Find and state the domain of:
(a) $f+g$
(b) $f-g$
(c) $f g$
(d) $f / g$
8. Let $f(x)=\sqrt{x+2}$ and $g(x)=\ln \left(x^{2}-3\right)$. Find and state the domain of:
(a) $f \circ g$
(b) $g \circ f$
(c) $f \circ f$
(d) $f \circ g$
9. Express the function $P(x)=\ln (\sqrt{x}+3)$ in the form $f \circ g \circ h$
10. An airplane is traveling parallel to the ground at a speed of 600 mph . The plane is at an altitude of 6 miles, and flies directly over your head at noon.
(a) Let $s$ be the distance between you and the airplane (assume you are standing still), and let $d$ be the distance the airplane has traveled. Find a function $f$ such that $s=f(d)$.
(b) Let $t$ be the number of hour elapsed since noon. Find a function $g$ such that $d=g(t)$.
(c) Find $f \circ g$. What does this function represent?

