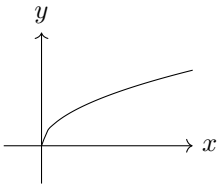
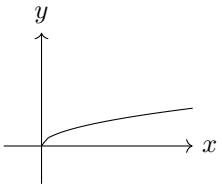
MATH 2B/5B Prep: Graphing Functions

1. Graph the function $\frac{1}{2}\sqrt{x-2}$.

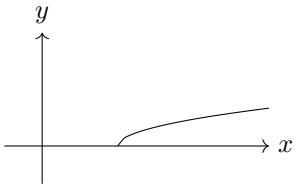
Solution: First, recall the graph of $\sqrt{x}$:



Now there are two transformations to do, stretch vertically by a factor of 1/2 and shifting right by 2.



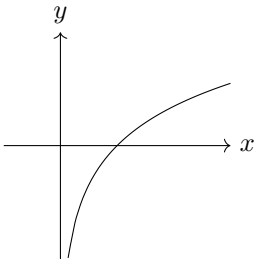
Vertical stretch by 1/2



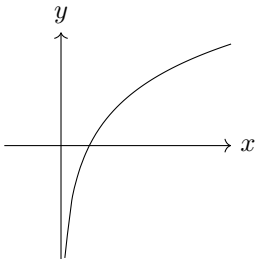
Shift right by 2

2. Graph the function $\ln(2x) + 3$.

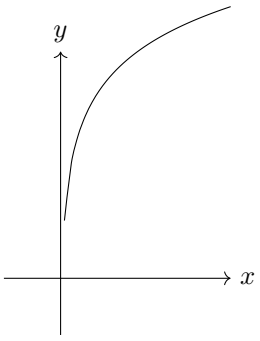
Solution: There are two transformations to do here, shrink horizontally by a factor of 2 and then shift up by 3 units.



Graph of $\ln(x)$



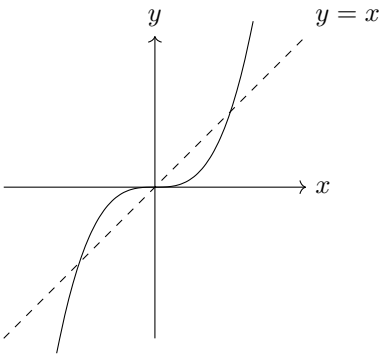
Horizontal shrink by 2



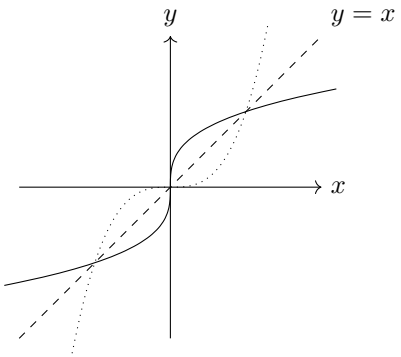
Shift up by 3

3. Graph the function $\sqrt[3]{x}$. Use the fact that $\sqrt[3]{x}$ is the inverse of x^3.

Solution: Remember that we can obtain the graph of the inverse function by reflecting the graph over the line $y = x$.



Graph of $y = x^3$



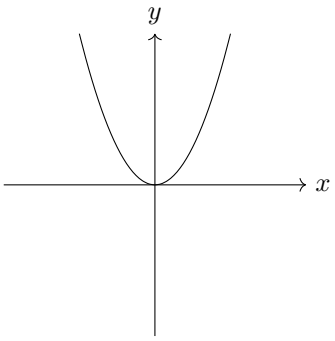
Graph of $y = \sqrt[3]{x}$

4. Sketch $y = x^2 - 4x + 5$ from the graph of $y = x^2$. Hint: Complete the square.

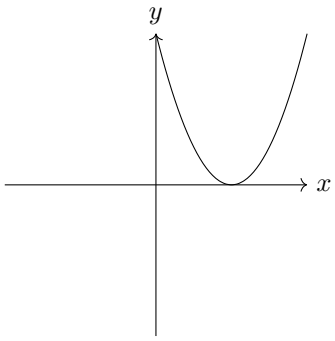
Solution: To complete the square, notice that

$$y = x^2 - 4x + 5 = (x^2 - 4x + 4) + 1 = (x - 2)^2 + 1$$

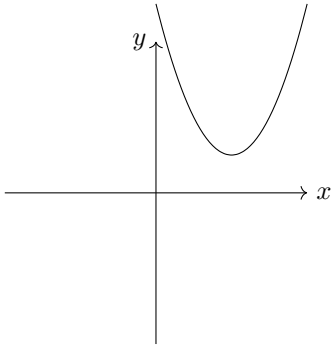
Therefore we can get the graph from the graph of $y = x^2$ by shifting right by 2 units and then up by 1. Sketching this gives:



Graph of x^2



Shift right by 2



Shift up by 1