

**Topic 7: Exercises on Graphing**  
**Level 3, Part 1**

1. Sketch (showing critical points) the graphs of: a)  $y = x^{1/3}$ ; b)  $y = x^{1/3} + 2$ .

2. Sketch (showing critical points) the graphs of: a)  $y = x(3 + \sqrt{x})$ ; b)  $y = x(3 + \sqrt{x})$ .

3. Sketch (showing critical points) the graph of  $y = x^2 - |x|$ .

4. Sketch (showing critical points) the graph of  $y = |x| + |x - 2|$ .

5. Use the graph of  $y = \ln x$  to sketch the graphs of: a)  $y = \ln(-x)$ , b)  $y = -\ln x$ .

6. Use the graph of  $f(x) = x^3 - 3x$  (an odd function) to sketch (showing critical points) the graph of  $y = |f(x)|$ . Is this the graph of an even function?

$y = |f(x)|$  is an even function

7. Sketch the graph of  $|x| - |y| = 1$ .

8. Use the graph of  $y = \sin^{-1} x$  to sketch the graphs of:

a)  $y = \sin^{-1} x + \frac{\pi}{2}$

b)  $y = \sin^{-1}(x + 1)$

9. Use the graphs of  $y = x$  and  $y = \sin x$  (both odd functions) to sketch the graph of  $y = x + \sin x$ . Is this the graph of an odd function?

$y = x + \sin x$  is an odd function

10. Sketch the graph of  $y = \frac{1}{x} + \frac{1}{x^2}$ .

11. Sketch the graph of  $y = \frac{1}{x} - \frac{1}{x^2}$ .

12. Use the graphs of  $y = x$  and  $y = e^{-x}$  to sketch the graph of  $y = xe^{-x}$ .



13. Sketch the graph of  $y = \frac{e^x - e^{-x}}{e^x + e^{-x}}$ .