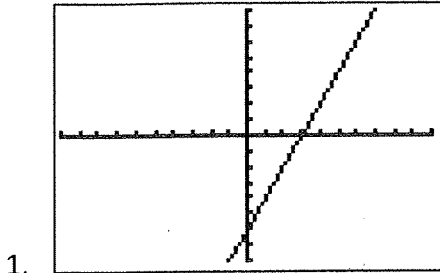


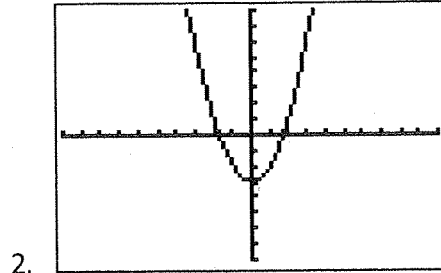
Answer

# Where to Begin and End

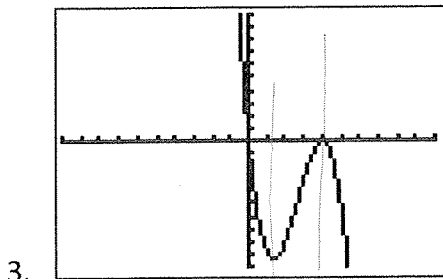
For each function below, state the domain and range, name the intervals where the function is increasing or decreasing, and describe the end behavior.



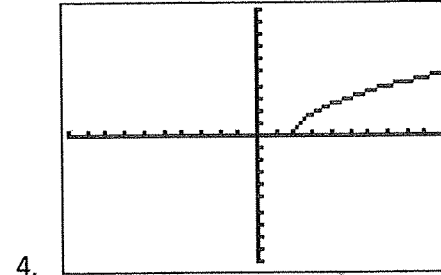
Domain  $(-\infty, \infty)$   
 Range  $(-\infty, \infty)$   
 Increasing  $(-\infty, \infty)$   
 Decreasing —  
 End behavior As  $x \rightarrow \infty$ ,  $y \rightarrow \infty$   
As  $x \rightarrow -\infty$ ,  $y \rightarrow -\infty$



Domain  $(-\infty, \infty)$   
 Range  $[-3, \infty)$   
 Increasing  $(0, \infty)$   
 Decreasing  $(-\infty, 0)$   
 End behavior As  $x \rightarrow \infty$ ,  $y \rightarrow \infty$   
As  $x \rightarrow -\infty$ ,  $y \rightarrow \infty$

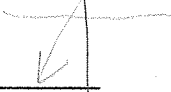


Domain  $(-\infty, \infty)$   
 Range  $(-\infty, \infty)$   
 Increasing  $(1, 4)$   
 Decreasing  $(-\infty, 1)$   $(4, \infty)$   
 End behavior As  $x \rightarrow \infty$ ,  $y \rightarrow -\infty$   
As  $x \rightarrow -\infty$ ,  $y \rightarrow \infty$



Domain  $[2, \infty)$   
 Range  $[0, \infty)$   
 Increasing  $(2, \infty)$   
 Decreasing —  
 End behavior As  $x \rightarrow \infty$ ,  $y \rightarrow \infty$   
As  $x \rightarrow 2$ ,  $y \rightarrow 0$

Left → Right

5.  $f(x) = 3x + 5$  *Linear w/ positive slope* 

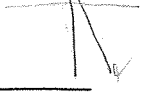
Domain  $(-\infty, \infty)$

Range  $(-\infty, \infty)$

Increasing  $(-\infty, \infty)$

Decreasing  $\text{—}$

End behavior As  $x \rightarrow \infty, y \rightarrow \infty$   
 $x \rightarrow -\infty, y \rightarrow -\infty$

6.  $f(x) = -3x + 5$  *Linear w/ negative slope* 


Domain  $(-\infty, \infty)$

Range  $(-\infty, \infty)$

Increasing  $\text{—}$

Decreasing  $(-\infty, \infty)$

End behavior  $x \rightarrow \infty, y \rightarrow -\infty$   
 $x \rightarrow -\infty, y \rightarrow \infty$

7.  $f(x) = x^2$  *Parabola Function* 


Domain  $(-\infty, \infty)$

Range  $[0, \infty)$

Increasing  $(0, \infty)$

Decreasing  $(-\infty, 0)$

End behavior  $x \rightarrow \infty, y \rightarrow \infty$   
 $x \rightarrow -\infty, y \rightarrow \infty$

8.  $f(x) = (x + 3)^2$  *left 3* 


Domain  $(-\infty, \infty)$

Range  $[0, \infty)$

Increasing  $(-3, \infty)$

Decreasing  $(-\infty, -3)$

End behavior  $x \rightarrow \infty, y \rightarrow \infty$   
 $x \rightarrow -\infty, y \rightarrow \infty$

9.  $f(x) = -2x^2 - 2$  *reflect over x, stretch down 2, starting pt* 

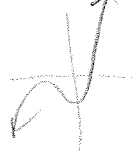
Domain  $(-\infty, \infty)$

Range  $(-\infty, -2]$

Increasing  $(-\infty, 0)$

Decreasing  $(0, \infty)$

End behavior  $x \rightarrow \infty, y \rightarrow -\infty$   
 $x \rightarrow -\infty, y \rightarrow -\infty$

10.  $f(x) = x^3 + 6x^2 + 9x$  

Domain  $(-\infty, \infty)$

Range  $(-\infty, \infty)$

Increasing  $(-\infty, -3) \cup (-1, \infty)$

Decreasing  $(-3, -1)$

End behavior As  $x \rightarrow \infty, y \rightarrow \infty$   
 $x \rightarrow -\infty, y \rightarrow -\infty$