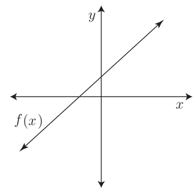
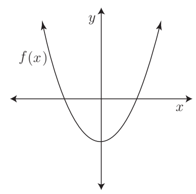
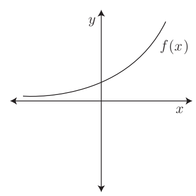
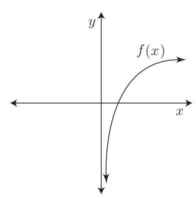
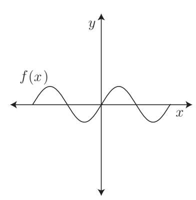
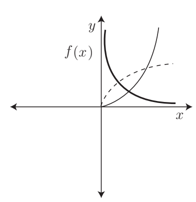
Math 251

Review Notes

1. For each of the functions below, you should be able to move from one representation to another without difficulty.

<table>
<tr><th></th><th>Formula</th><th>Graph</th><th>Numerical</th><th>Situation</th></tr>
<tr><td>Linear</td><td>$y = mx + b$</td><td>
</td><td><table><tr><td>x</td><td>-5</td><td>-2</td><td>1</td><td>4</td></tr><tr><td>$f(x)$</td><td>7</td><td>11</td><td>15</td><td>19</td></tr></table></td><td>Characterized by constant rate of change. Typically pay rates, speeds.</td></tr>
<tr><td>Quadratic</td><td>$y = ax^2 + bx + c$</td><td>
</td><td><table><tr><td>x</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>$f(x)$</td><td>2</td><td>7</td><td>14</td><td>23</td></tr></table></td><td>Characterized by constant rate of change in the rate of change. Typically vertical motion under gravity or area.</td></tr>
<tr><td>Exponential</td><td>$y = ab^x$
$(P = P_0 e^{kt})$</td><td>
</td><td><table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>$f(x)$</td><td>3</td><td>6</td><td>12</td><td>24</td></tr></table></td><td>Characterized by constant relative rate of change. Typically population growth, compound interest, radioactive decay.</td></tr>
<tr><td>Logarithmic</td><td>$y = a \log x$</td><td>
</td><td><table><tr><td>x</td><td>0.1</td><td>1</td><td>10</td><td>100</td></tr><tr><td>$f(x)$</td><td>-1</td><td>0</td><td>1</td><td>2</td></tr></table></td><td>Characterized by slow growth - covers a large span of values. The inverse function of exponential. Typically pH, Richter scale, dB.</td></tr>
<tr><td>Trigonometric</td><td>$y = \sin x$</td><td>
</td><td><table><tr><td>x</td><td>$-\pi$</td><td>$\frac{-\pi}{2}$</td><td>0</td><td>$\frac{\pi}{2}$</td></tr><tr><td>$f(x)$</td><td>0</td><td>-1</td><td>0</td><td>1</td></tr></table></td><td>Characterized by cyclical behavior. Typically tides, pendulums, springs.</td></tr>
<tr><td>Power</td><td>$y = ax^n$
$(n \in \mathbb{Q})$</td><td>
</td><td><table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>$f(x)$</td><td>0</td><td>1</td><td>8</td><td>27</td></tr></table></td><td>Characterized by proportional relationships (inverse or direct). Typically inverse square, as with gravity or direct, as with area or volume.</td></tr>
</table>