## MATH 100 Some Review Activities

We have been considering functional relationships between pairs of quantities that we represent by variables. We are learning to characterize some special kinds of functions by analyzing patterns of change.

We have employed the concepts of change, rate of change, and percent change.
We have utilized words, tables, graphs, and formulas to represent functions and to aid in our analysis.

Linear: $\mathbf{y}=\mathbf{m x}+\mathrm{b}$
Significance of m :
Significance of b:
Quadratic: $\mathbf{y}=\mathbf{a x}{ }^{2}+b x+c$ or $y=a(x-h)^{2}+k$
Significance of a:
Significance of c:
Significance of (-b/2a):
Significance of $\frac{-b \pm \sqrt{b^{2}-4 a c}}{2 a}$ :
Significance of (h, k):
Exponential: $y=P(c)^{x}=\mathbf{P}(1+r)^{\mathbf{x}}$
Significance of P :
Significance of c :
Significance of r:
Power: $\mathbf{y}=\mathbf{k x}^{\text {p }}$
Significance of k:
Significance of p:

## Examples:

Consider the three functional relationships shown below. One is linear, one is exponential, one is quadratic and one is a power function. Identify each relationship by type and determine a formula for each relationship. In each case, determine the value of y when $\mathrm{x}=$ 5 , and then determine the value of x when $\mathrm{y}=50$.

| $\Delta x$ | $x$ | $y$ | $\Delta y$ |
| :---: | :---: | :---: | :---: |
|  | 0 | -3 |  |
|  | 1 | 2 |  |
|  | 2 | 7 |  |
|  | 3 | 12 |  |
|  | 4 | 17 |  |
|  | 5 |  |  |


| $\Delta x$ | $x$ | $y$ | $\Delta y$ | Ratio |
| :---: | :---: | :---: | :---: | :---: |
|  | 0 | 0 |  |  |
|  | 1 | 50 |  |  |
|  | 2 | 81.225 |  |  |
|  | 3 | 107.88 |  |  |
|  | 4 | 131.95 |  |  |
|  | 5 |  |  |  |


| $\Delta x$ | $x$ | $y$ | $\Delta y$ | Ratio |
| :---: | :---: | :---: | :---: | :---: |
|  | 0 | 100 |  |  |
|  | 1 | 70 |  |  |
|  | 2 | 49 |  |  |
|  | 3 | 34.3 |  |  |
|  | 4 | 24.01 |  |  |
|  | 5 |  |  |  |


| $\Delta x$ | $x$ | $y$ | $\Delta y$ | $\Delta \Delta y$ |
| :---: | :---: | :---: | :---: | :---: |
|  | 0 | -5 |  |  |
|  | 1 | 0 |  |  |
|  | 2 | 9 |  |  |
|  | 3 | 22 |  |  |
|  | 4 | 39 |  |  |
|  | 5 |  |  |  |

1. Write an equation for the parabola that has a maximum value of 1000 when $x=25$ and when $x$ is zero the value of the function is 800 . What are the x -intercepts of this parabola?
2. Find an equation for a quadratic function that fits this description. "Our factory has the lowest average cost of production when we produce 2,500 units per month. The average cost of producing a unit at that level of production is $\$ 30$. The Engineering Department says that any increase or decrease of production by one unit from that level will increase our average cost by $\$ 0.01$.
3. Simplify and write any numerical answers as decimals to the nearest 0.1 .
a. $\sqrt{100 x^{100}}$
b. $x \cdot \frac{1}{x^{4}}$
c. $64^{\frac{3}{2}}$
d. $(-8)^{\frac{5}{3}}$
e. $-2(3 x-5)$
f. $4 \ln \left(e^{2}\right)$
g. $5 e^{\ln (2)}$
g. $\left(\frac{2}{3} \cdot \frac{7}{8} \div \frac{2}{9}\right)$
h. $4 \cdot 2^{3}$
4. Solve each equation.
a. $2 x^{2}-4 x-30=0$
b. $500=1000(0.8)^{x}$
c. $300=30 x^{2.5}$
d. $1000=500 x^{15}$
