Coreq Support for Section 4.2

# Topic 1: Determining if the Graph of a Quadratic Function Opens Up or Down

For a quadratic function of the form $f\left(x\right)=a(x-h)^{2}+k$, the value of $a$ determines the direction that the parabola opens.

If $a>0$, the parabola opens up and has a minimum value at the vertex. If $a<0$, the parabola opens down and has a maximum value at the vertex.

# Topic 2: Determining Relative Maximum and Relative Minimum Values of a Function

In section 3.2, we learned how to identify relative maximum and minimum values of a function when given its graph.

When a function changes from increasing to decreasing at a point $(c,f\left(c\right))$, then $f$ is said to have a relative maximum at $x=c$. The relative maximum value is $f(c)$.

When a function changes from decreasing to increasing at a point $(c,f\left(c\right))$, then $f$ is said to have a relative minimum at $x=c$. The relative minimum value is $f(c)$.

# Topic 3: Writing Revenue and Profit Functions

Revenue is defined as the dollar amount received by selling $x$ items at a price of $p$ dollars per item, that is, $R=xp$.

The Law of Supply and Demand states that as the quantity $x$increases, the price $p$ tends to decrease. Likewise, if the quantity decreases, the price tends to increase. Thus, the price $p$ is often modeled with a linear function that is called the demand function.

Profit is equal to revenue minus cost. We can say that $P\left(x\right)=R\left(x\right)-C(x)$ where $x$ represents the quantity of an item.