**4.3 PLAYING WITH** $y=x^{2}$ Name: Blk:

* Graph $y=x^{2}$ using $-3\leq x\leq 3$



|  |  |
| --- | --- |
| $$x$$ | $$y$$ |
| $$-3$$ |  |
| $$-2$$ |  |
| $$-1$$ |  |
| $$0$$ |  |
| $$1$$ |  |
| $$2$$ |  |
| $$3$$ |  |

Notice:

* Vertex
* Graph opens
* Manipulation #1: $y=x^{2}+q$

Use a graphing calculator to graph the following functions. Sketch each of the graphs in the space provided.

|  |  |  |  |
| --- | --- | --- | --- |
| $$y=x^{2}+1$$ | $$y=x^{2}+2$$ | $$y=x^{2}-1$$ | $$y=x^{2}-2$$ |

Notice: $\pm q$ moves the graph

* The graph of $y=x^{2}+q$ is the image of $y=x^{2}$ after a of $q$ units
* Manipulation #2: $y=(x-p)^{2}$

Use a graphing calculator to graph the following functions. Sketch each of the graphs in the space provided.

|  |  |  |  |
| --- | --- | --- | --- |
| $$y=(x-1)^{2}$$ | $$y=(x-2)^{2}$$ | $$y=(x+1)^{2}$$ | $$y=(x+2)^{2}$$ |

Notice: $\pm p$ moves the graph

* The graph of $y=(x-p)^{2}$ is the image of $y=x^{2}$ after a of $p$ units
* $y=(x-p)^{2}$ moves the graph
* $y=(x+p)^{2}$ moves the graph
* Manipulation #3: $y=ax^{2}$

Use a graphing calculator to graph the following functions. Sketch each of the graphs in the space provided.

|  |  |
| --- | --- |
| $$y=2x^{2}$$ | $$y=-2x^{2}$$ |
| $$y=\frac{1}{2}x^{2}$$ | $$y=-\frac{1}{2}x^{2}$$ |

Notice:

* $+a$ = graph opens
* $-a$ = graph opens
* $a>1 or a<-1$ =
* $0<a<1 or-1<a<0$ =
* The graph of $y=ax^{2}$ is the image of $y=x^{2}$ after the following transformations:

when $a>1$ =

when $0<a<1$ =

when $a<-1$ =

when $-1<a<0$ =