### Lesson 15 Practice Problems

1. Select **all** of the quadratic expressions in vertex form.
	1. $\left(x−2\right)^{2}+1$
	2. $x^{2}−4$
	3. $x\left(x+1\right)$
	4. $\left(x+3\right)^{2}$
	5. $\left(x−4\right)^{2}+6$
2. Here are two equations. One defines function $m$ and the other defines function $p$.
* $m\left(x\right)=x\left(x+6\right)$
* $p\left(x\right)=\left(x+3\right)^{2}−9$
	1. Show that the expressions defining $m$ and $p$ are equivalent.
	2. What is the vertex of the graph of $m$? Explain how you know.
	3. What are the $x$-intercepts of the graph of $p$? Explain how you know.
1. Which equation is represented by the graph?
* 
	1. $y=\left(x−1\right)^{2}+3$
	2. $y=\left(x−3\right)^{2}+1$
	3. $y=-\left(x+3\right)^{2}−1$
	4. $y=-\left(x−3\right)^{2}+1$
1. For each equation, write the coordinates of the vertex of the graph that represents the equation.
	1. $y=\left(x−3\right)^{2}+5$
	2. $y=\left(x+7\right)^{2}+3$
	3. $y=\left(x−4\right)^{2}$
	4. $y=x^{2}−1$
	5. $y=2\left(x+1\right)^{2}−5$
	6. $y=-2\left(x+1\right)^{2}−5$
2. For each function, write the coordinates of the vertex of its graph and tell whether the graph opens up or down.

| * function
 | * coordinates of vertex
 | * graph opens up or down?
 |
| --- | --- | --- |
| * $f\left(x\right)=\left(x−4\right)^{2}−5$
 | *
 | *
 |
| * $g\left(x\right)=-x^{2}+5$
 | *
 | *
 |
| * $h\left(x\right)=2\left(x+1\right)^{2}−4$
 | *
 | *
 |

1. Here is a graph that represents $y=x^{2}$.
	1. Describe what would happen to the graph if the original equation were modified as follows:
		1. $y=-x^{2}$
		2. $y=3x^{2}$
		3. $y=x^{2}+6$
	* 
	1. Sketch the graph of the equation $y=-3x^{2}+6$ on the same coordinate plane as $y=x^{2}$.
* (From Unit 6, Lesson 12.)
1. Noah is going to put $2,000 in a savings account. He plans on putting the money in an account and leaving it there for 5 years. He can put the money in an account that pays 1% interest monthly, an account that pays 6% interest every six months, or an account that pays 12% interest annually.
* Which account will give him the most money in his account at the end of the 5 years?
* (From Unit 5, Lesson 16.)
1. Here are four graphs. Match each graph with a quadratic equation that it represents.
* Graph A
* 
* Graph B
* 
* Graph C
* 
* Graph D
* 
	1. Graph A
	2. Graph B
	3. Graph C
	4. Graph D
	5. $y=-x^{2}+3$
	6. $y=\left(x+1\right)\left(x+3\right)$
	7. $y=x^{2}−3$
	8. $y=\left(x−1\right)\left(x−3\right)$
* (From Unit 6, Lesson 12.)
1. The table shows some input and output values of function $f$. Describe a possible rule for the function by using words or by writing an equation.

| * $x$
 | * $f\left(x\right)$
 |
| --- | --- |
| * -3
 | * -8
 |
| * 0
 | * -2
 |
| * 4
 | * 6
 |
| * 10
 | * 18
 |

* (From Unit 4, Lesson 5.)



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