### Lesson 24 Practice Problems

1. The function $h$ represents the height of an object $t$ seconds after it is launched into the air. The function is defined by $h\left(t\right)=-5t^{2}+20t+18$. Height is measured in meters.
* Answer each question without graphing. Explain or show your reasoning.
	1. After how many seconds does the object reach a height of 33 meters?
	2. When does the object reach its maximum height?
	3. What is the maximum height the object reaches?
1. The graphs that represent a linear function and a quadratic function are shown here.
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* The quadratic function is defined by $2x^{2}−5x$.
* Find the coordinates of $R$ without using graphing technology. Show your reasoning.
1. Diego finds his neighbor's baseball in his yard, about 10 feet away from a five-foot fence. He wants to return the ball to his neighbors, so he tosses the baseball in the direction of the fence.
* Function $h$, defined by $h\left(x\right)=-0.078x^{2}+0.7x+5.5$, gives the height of the ball as a function of the horizontal distance away from Diego.
* Does the ball clear the fence? Explain or show your reasoning.
1. Clare says, “I know that $\sqrt{3}$ is an irrational number because its decimal never terminates or forms a repeating pattern. I also know that $\frac{2}{9}$ is a rational number because its decimal forms a repeating pattern. But I don’t know how to add or multiply these decimals, so I am not sure if $\sqrt{3}+\frac{2}{9}$ and $\sqrt{3}⋅\frac{2}{9}$ are rational or irrational."
	1. Here is an argument that explains why $\sqrt{3}+\frac{2}{9}$ is irrational. Complete the missing parts of the argument.
		1. Let $x=\sqrt{3}+\frac{2}{9}$. If $x$ were rational, then $x−\frac{2}{9}$ would also be rational because . . . .
		2. But $x−\frac{2}{9}$ is not rational because . . . .
		3. Since $x$ is not rational, it must be . . . .
	2. Use the same type of argument to explain why $\sqrt{3}⋅\frac{2}{9}$ is irrational.
* (From Unit 7, Lesson 21.)
1. The following expressions all define the same quadratic function.
* $x^{2}+2x−8$
* $\left(x+4\right)\left(x−2\right)$
* $\left(x+1\right)^{2}−9$
	1. What is the $y$-intercept of the graph of the function?
	2. What are the $x$-intercepts of the graph?
	3. What is the vertex of the graph?
	4. Sketch a graph of the quadratic function without using technology. Make sure the $x$-intercepts, $y$-intercept, and vertex are plotted accurately.
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* (From Unit 7, Lesson 22.)
1. Here are two quadratic functions: $f\left(x\right)=\left(x+5\right)^{2}+\frac{1}{2}$ and $g\left(x\right)=\left(x+5\right)^{2}+1$.
* Andre says that both $f$ and $g$ have a minimum value, and that the minimum value of $f$ is less than that of $g$. Do you agree? Explain your reasoning.
* (From Unit 7, Lesson 23.)
1. Function $p$ is defined by the equation $p\left(x\right)=\left(x+10\right)^{2}−3$.
* Function $q$ is represented by this graph.
* Which function has the smaller minimum? Explain your reasoning.
* 
* (From Unit 7, Lesson 23.)
1. Without using graphing technology, sketch a graph that represents each quadratic function. Make sure the $x$-intercepts, $y$-intercept, and vertex are plotted accurately.
* $f\left(x\right)=x^{2}+4x+3$
* 
* $g\left(x\right)=x^{2}−4x+3$
* 
* $h\left(x\right)=x^{2}−11x+28$
* 
* (From Unit 7, Lesson 22.)



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