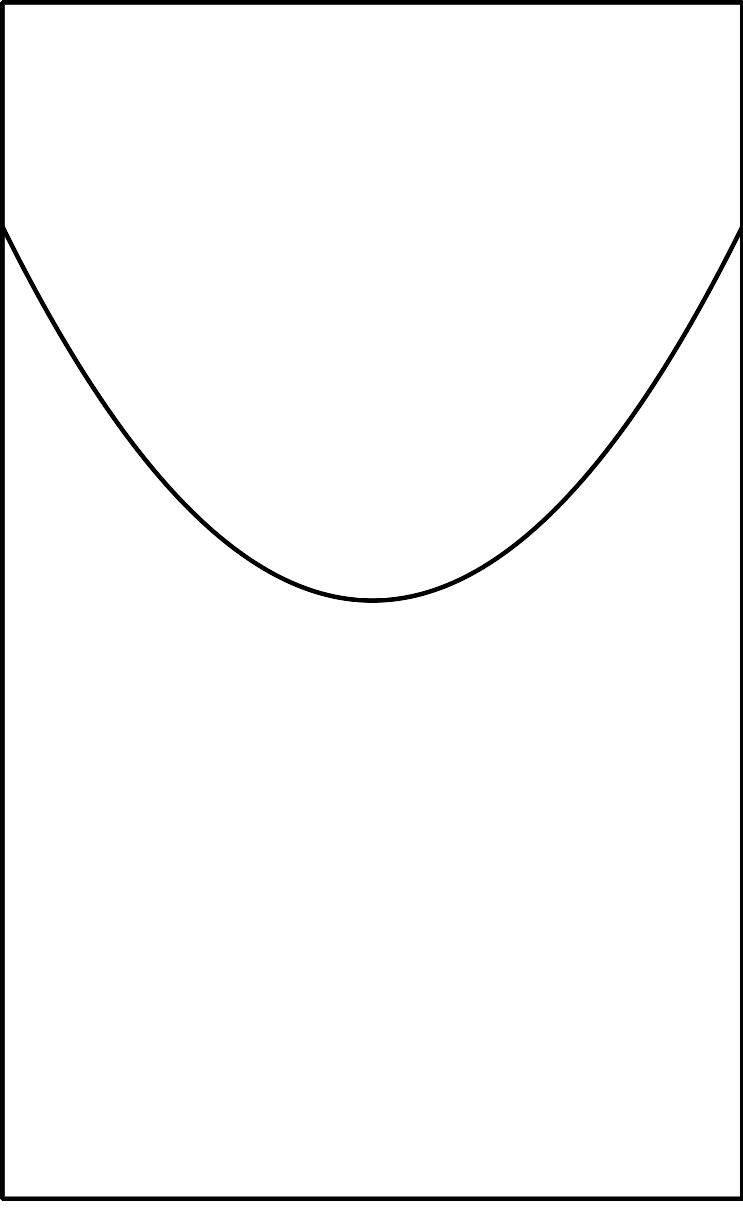
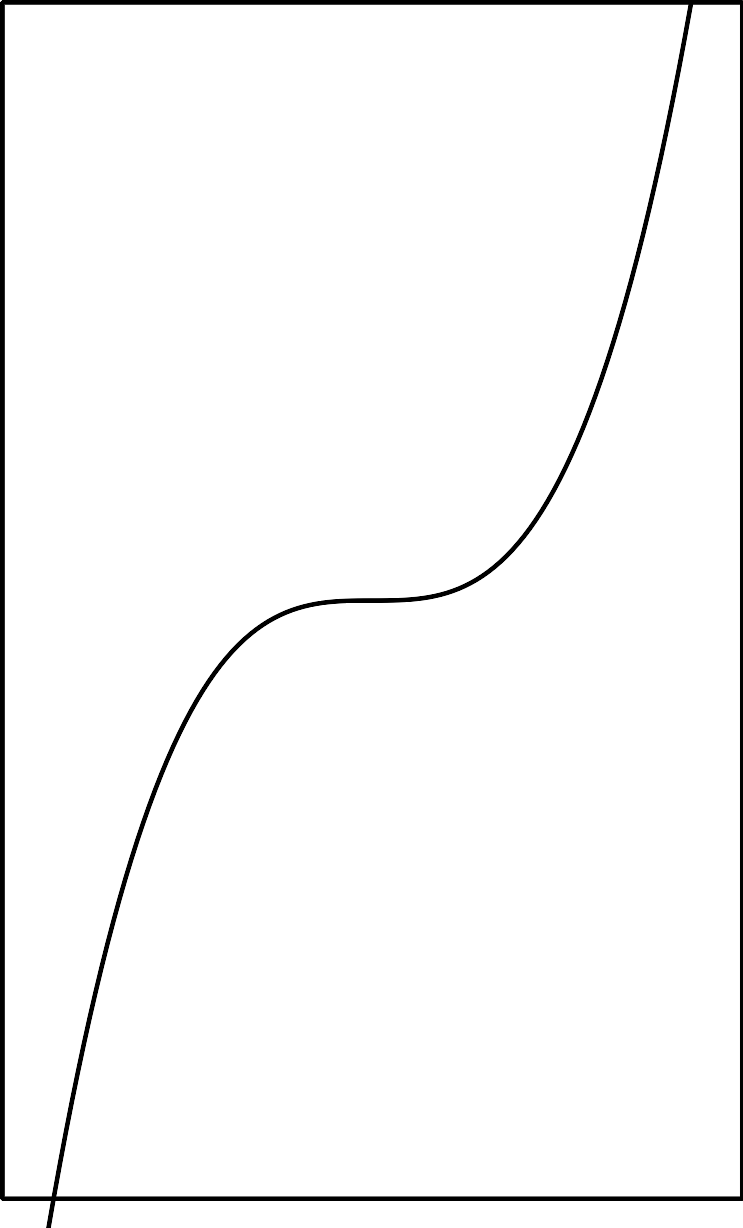
## Lesson 8: Cubes and Cube Roots

* Let’s compare equations with cubes and cube roots.

### 8.1: Put Your Arm(s) Up

How are these graphs the same? How are they different?

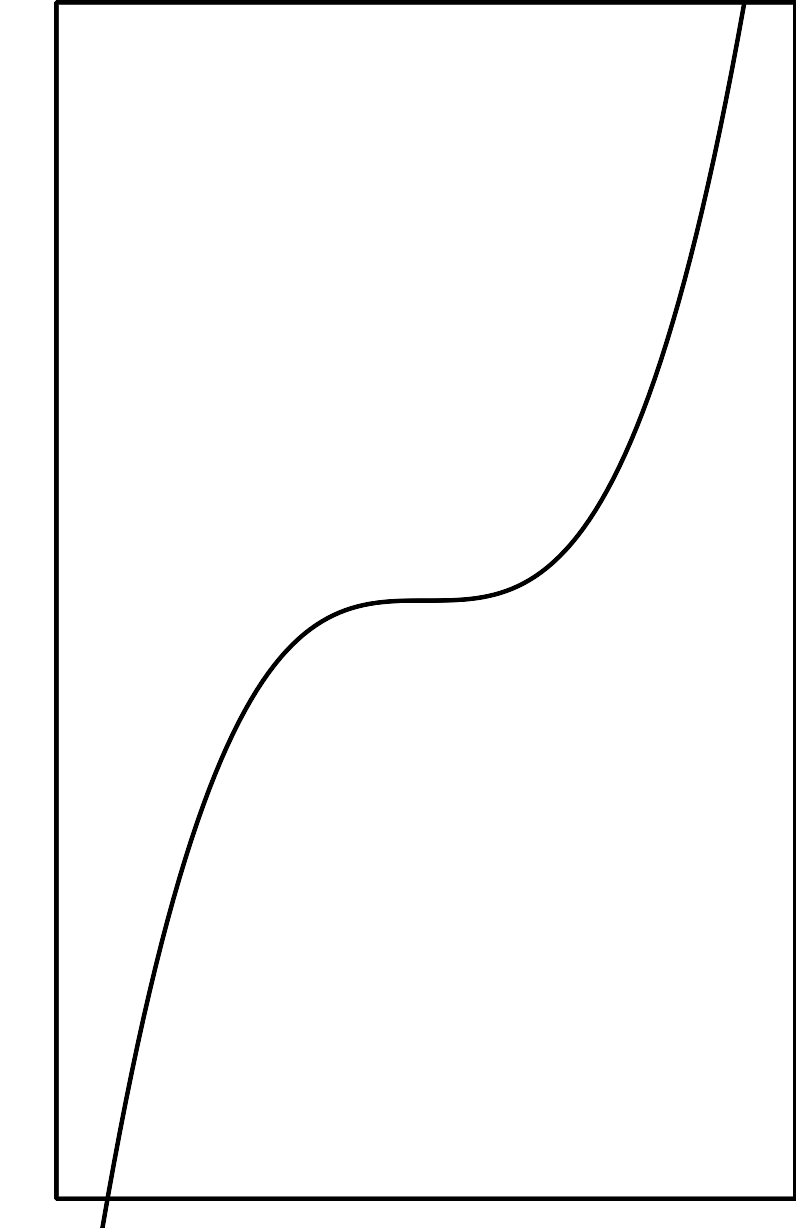




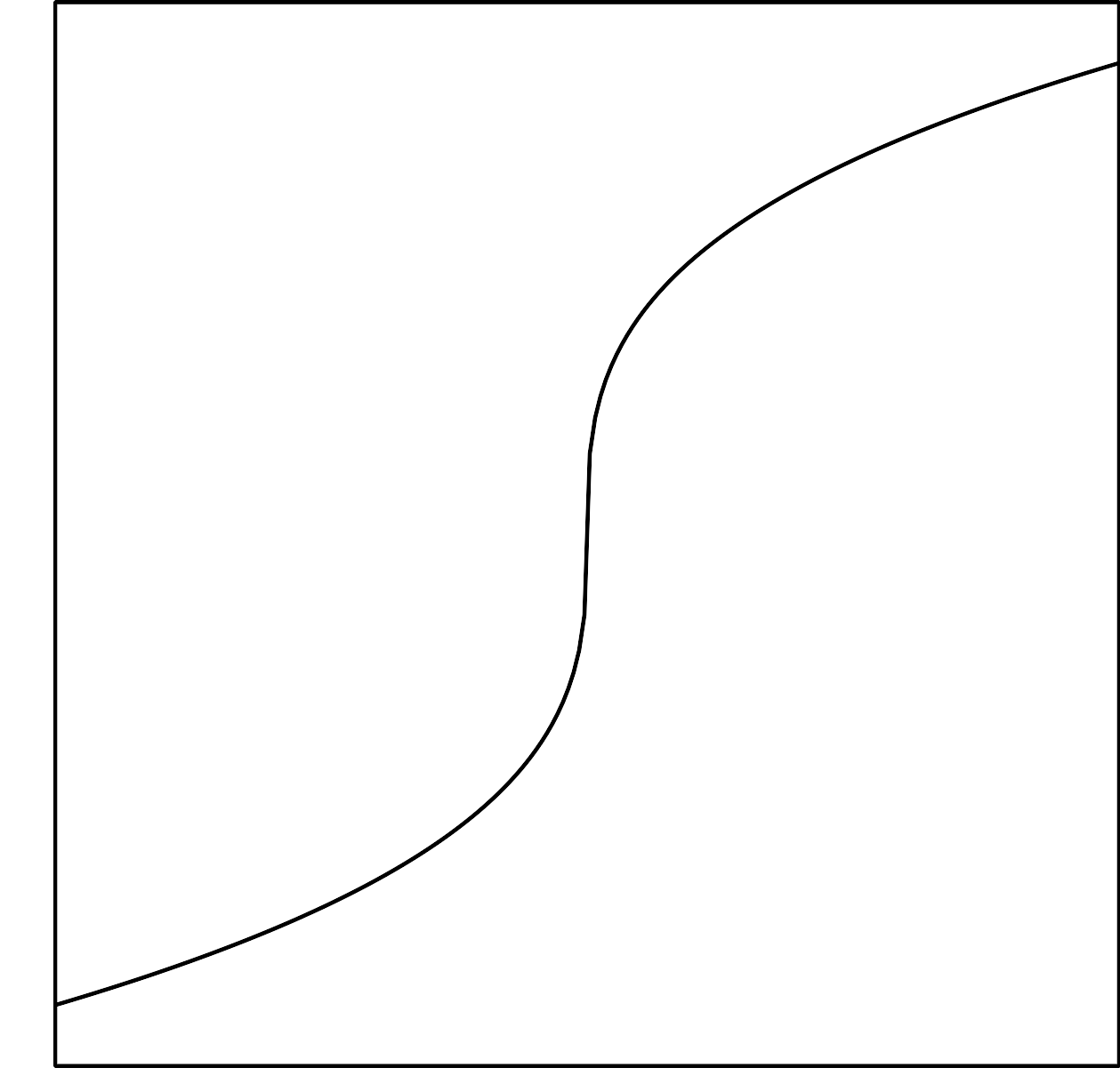
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### 8.2: Finding Cube Roots with a Graph

How many solutions are there to each of the following equations? Estimate the solution(s) from the graph of . Check your estimate by substituting it back into the equation.



### 8.3: Cube Root Equations



1. Use the graph of to estimate the solution(s) to .
2. Use the meaning of cube roots to find an exact solution to the equation . How close was your estimate?
3. Find the solution of the equation using the meaning of cube roots. Use the graph to check that your solution is reasonable.

### 8.4: Solve These Equations With Cube Roots in Them

Here are a lot of equations:

1. Without solving, identify 3 equations that you think would be the least difficult to solve and 3 equations that you think would be the most difficult to solve. Be prepared to explain your reasoning.
2. Choose 4 equations and solve them. At least one should be from your “least difficult” list and at least one should be from your “most difficult” list.

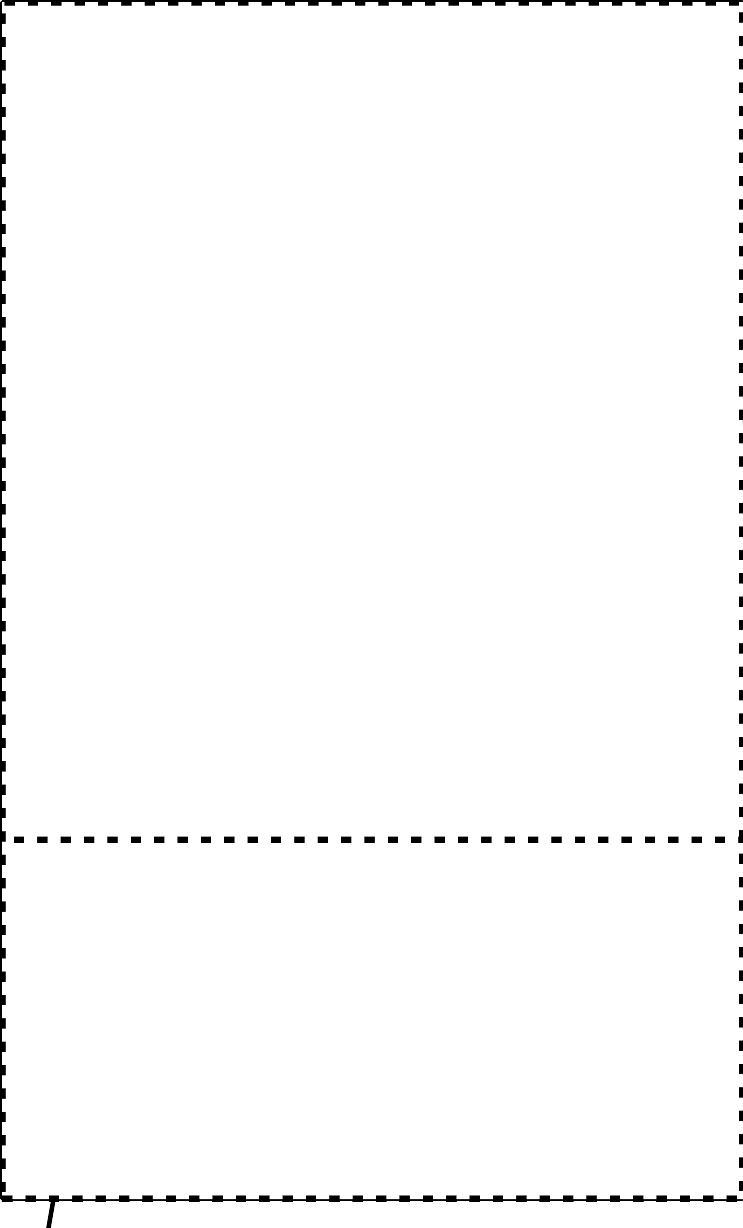
#### Are you ready for more?

All of these equations were equivalent to equations that could be written in the form for some constants , , and . Find a formula that would solve any such equation for in terms of , , and .

### Lesson 8 Summary

Every number has exactly one cube root. You can see this by looking at the graph of .

If is any number, for example, -4, then we can see that crosses the graph in one and only one place, so the equation will have the solution . This is true for any number : will cross the graph in exactly one place, and will have one solution, .



In an equation like , we can isolate the cube root and cube each side:

While cubing each side of an equation won’t create an equation with solutions that are different than the original equation, it is still a good idea to always check solutions in the original equation because little mistakes can creep in along the way.



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