# Algebra 2 Unit 1 worksheet: The squaring and cubing functions

Name _____ Date _____ Period _____

**1.** For $y = x^2$, and then for $y = x^3$, give (a) the domain, (b) the range, (c) the inputs where the graph falls and the inputs where it rises, (d) the lowest point, if there is one, and (e) how many inputs give the output 5, and how many give the output −5.

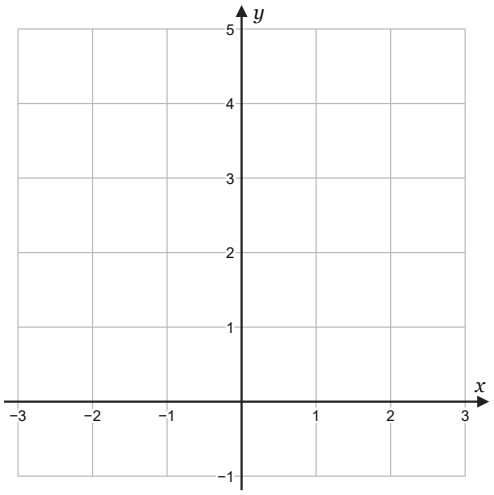
**2.** The point (4, 16) lies on the graph of $y = x^2$, and the point (3, 27) lies on the graph of $y = x^3$. Without squaring or cubing anything, give the point of $y = x^2$ with input −4 and the point of $y = x^3$ with input −3. Name the symmetry you used for each.


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**3.** (a) Sketch $y = x^2$ and the absolute value parent $y = |x|$ on one grid for $-2 \le x \le 2$, plotting five key points of each.

(b) Find every point where the two graphs meet.

(c) For which inputs is the parabola below the V?




**4.** The inputs of $y = x^2$ are limited to $a \le x \le 3$, where $a$ is a negative number, and the range is then $0 \le y \le 16$. Find $a$. Explain why the right end, $x = 3$, does not give the top of the range.

**5.** Leah is told only that two different inputs, $a$ and $b$, give the same output of $y = x^2$.

(a) What must be true of $a$ and $b$? Explain using the graph.

(b) Can two different inputs give the same output of $y = x^3$? Explain.

**6.** Ryan says the graph of $y = x^2$ falls the whole way across the inputs $-4 \le x \le 1$, because the output at $x = -4$ is 16 and the output at $x = 1$ is only 1. Explain what is wrong with his reasoning, say what the graph really does on this stretch, and give its range there.

**7.** Mia's ice tray makes cubes with edges 2 cm long. Her new tray makes cubes with edges 2 times as long. (a) Find the volume of one old cube and of one new cube. (b) How many times as much ice is in one new cube as in one old cube? How many times as large is one face of a new cube as one face of an old cube? (c) Explain why the two answers to (b) differ, using the rules $y = x^2$ and $y = x^3$.


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