

1 Cubes

1. How many faces does a cube have?
2. How many edges does a cube have?
3. How many vertices does a cube have?
4. How many edges are connected at a vertex? Is the answer the same for all vertices?
5. How many faces have a common edge? Is the answer the same for all edges?
6. To make a 3-inch by 3-inch cube, how many smaller 1-inch by 1-inch cubes do we need? Try to visualize this and draw this below.

7. Suppose you take a 2-inch by 2-inch cube, and paint it green. After that, you cut the cube into multiple cubes with side length 1 inch. How many small cubes will have exactly one face painted green?

Two faces?

Three faces?

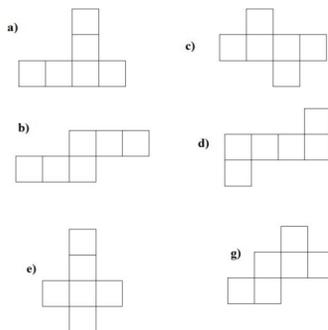
No faces?

8. What about if you do the same with a 3-inch by 3-inch cube?

2 Nets

In math, a net is a pattern that you can cut and fold to make a model of a solid shape.

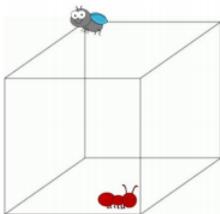
1. From which of the following nets can you make a cube?



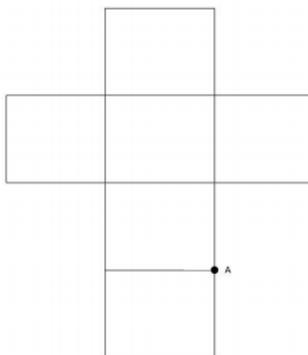
2. This is not the only way to make a cube. How many different nets does a cube have? (Hint: draw out all the possibilities)

3 Challenge

1. Allison Ant (Point A) and Bobby Bug (Point B) are sitting at opposite corners of a cube, as shown below:



Allison Ant's location (Point A) is marked on the net below. Find the position of Bobby Bug and mark it with the letter B.



2. Allison Ant wants to visit Bobby Bug. Draw what you think the shortest route from A to B is on the cube above. Then, draw this route on the net above.
3. Now, using a different color, try to find the shortest route from A to B using the net. Now draw this route on the cube. Is this shorter than the route you found using the cube first?
4. Suppose you have a cube of side length 3. You cut off one inch from each corner, leaving behind a new figure. How many sides does this new figure have? What different shapes would you see on the net of this new figure?
5. How many faces, edges, and vertices does a square pyramid have? Draw its net.
6. Extra Challenge: Draw the nets of a cone and a cylinder. Be careful!