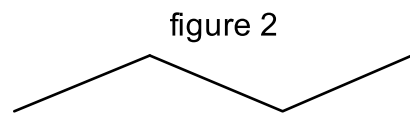
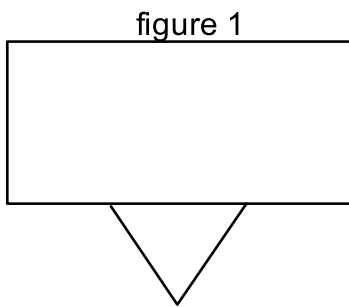


1. How many regular tilings (by regular polygons, edge-to-edge) of the plane are there ? Describe each of them. Why can't you tile the plane using regular pentagons ?
2. At noon a car leaves town heading due west at 90mph. At 1:30pm a second car leaves town heading due north at 60mph. How far apart (as the proverbial crow flies) are the two cars at 2pm ? Draw a picture and show and explain your work. Give the name of the theorem you are using. .
3. Describe the types of symmetry that each of the following figures possess

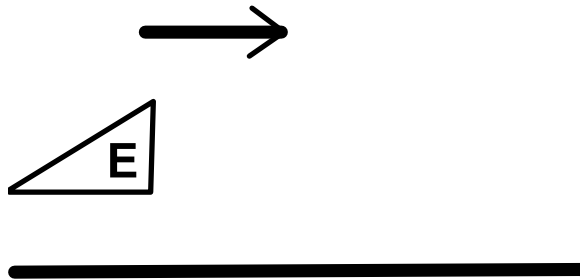


4. An ice cream soda glass is in the shape of a cone of height six inches. It has a capacity of 16 fluid ounces when filled to the rim. How high is the soda in the glass when it contains 2 fluid ounces ?
5. Draw a picture of an annulus. Find its area if the radius of the inner circle is $\sqrt{2}$ inches and the radius of the outer circle is 3 inches. Be sure to include the units.
6. Find the volumes and surface areas of a sphere of radius 2 inches and a right cylinder of radius 5 inches and height 3 inches. Be sure to include the units.
7. Suppose you are on a balcony at a condo on the beach. If h is how high above sea level you

are, measured in feet, then the formula derived in textbook $d = 1.2 \cdot \sqrt{h}$ gives the distance to the horizon. What are the units of d ?

8. How many rigid motions are there and what are their names ? Which ones preserve orientation ? Which ones reverse orientation ?

9. Draw the image of the triangle E (and its label, the letter E) under the pictured glide reflection, where the length of the segment with the arrow indicates the length of the glide.



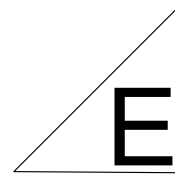
10. A birthday cake has been baked in a “square” cake pan that measures 9” by 9” by 2”. When baked, the cake rises one inch above the rim of the pan. The top and the sides are frosted. Find the volume of the cake and the surface area that is frosted. (Indicate which is which and give the units.)

11. A clockwise rotation of 73 degrees is equivalent to what counterclockwise rotation ?

12. MathTomato Inc produces canned tomato products. Their cans are cylinders. Without calculating any volume, say what would happen to the volume if the radius and height of the can is tripled. Also explain what would happen to the surface area. Explain.

13. A circle has area 9π square inches. Find its radius. A sphere has surface area 64π square inches. Find its radius. Be sure to indicate which is which. Then find the volume and surface area of a cylinder whose radius is 2 inches and whose height is 5 inches. Be sure to include the units.

14. Draw the image of the triangle E (and its label, the letter E) under the dilation with pictured center and scaling factor $\frac{1}{2}$. Explain each steps of your construction. Without doing any measurements, describe how the dilation has changed the area of the triangle.



15. A circular carpet of radius 2 feet is made by sewing a two-inch wide braid around around and around. Estimate the length of the braid.

16. A circle is inscribed in a square. What percentage of the area of the square is inside the circle ?

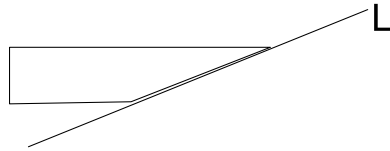
17. How many liters does a cube that measures 30 cm on side hold ? (Where a liter is the volume of a cube measuring 10 cm on a side.)

18. Describe the shape we used in class to form a tiling of the plane .

19. In *Gulliver's Travels*, the Lilliputians are described as being similar to six foot tall Gulliver but only six inches tall. Explain why it would take 1728 of the Lilliputians' rations to feed Gulliver. And if Gulliver's shirt were cut up, how many Lilliputian shirts could be made ?

20. If an 8 inch diameter feeds one person, then how many people will be fed by a pizza of diameter 16 inches ?

21. Complete the following figure to give it a reflection symmetry about the slanted line L



22. Describe all the symmetries of a regular hexagon.

23. Find the area of an equilateral triangle where each side has length 2 inches. Be sure to include the units.

24. Complete the following figure to give it point symmetry about the point O.



25. Review everything else.