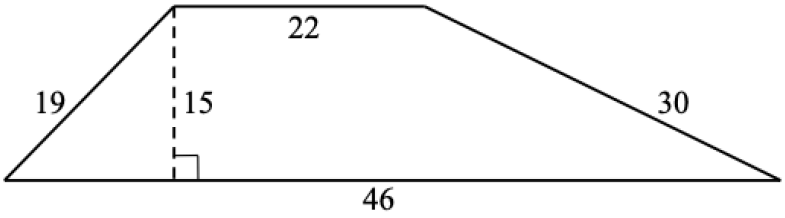
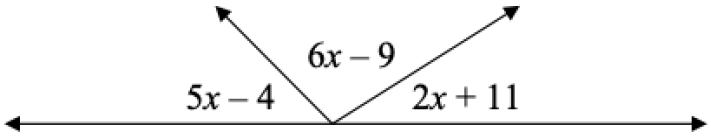
Name: Geometry
Date: Test #1

1) Find the perimeter and area of the following trapezoid:



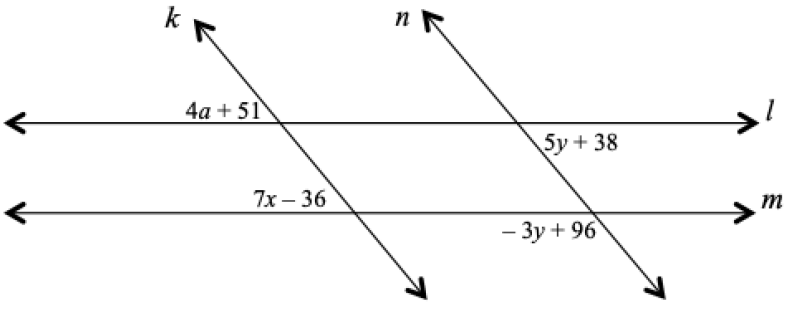
2) Find x and the size of all three angles in the following drawing:



3) Find the sum of the interior angles, the sum of the exterior angles, the size of one interior angle, and the size of one exterior angle in a regular nonagon.

4) If the side of a square is 29 yards, how far, exactly, is it from a corner to the opposite corner?

5) If $l \parallel m$ and $k \parallel n$, find the size of the four angles and find the values of x, y, and a in the following drawing:



6) For a regular heptagon, find, exactly, its radius, its area, and the areas of the inscribed and circumscribed circles if its apothem is 24 and the length of one of its sides is 14.

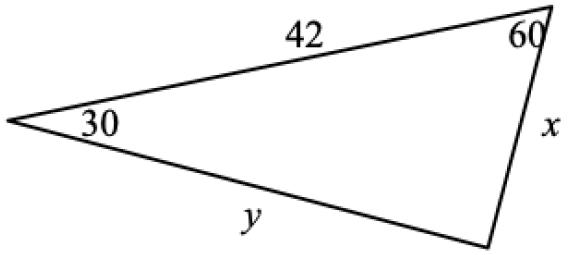
7) For a regular quadrilateral, find, exactly, its apothem, its side length, its area, and the areas of the inscribed and circumscribed circles if the radius is $11\sqrt{2}$.

8) Find the circumference and area of a circle with a radius of 13. Find the answers exactly AND approximately by approximating π as 3.14.

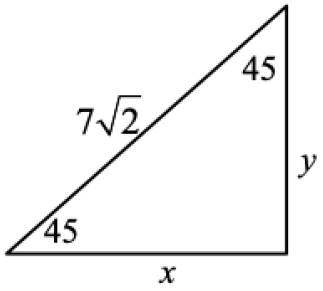
9) The official flag of Trzcinica, Poland is a rectangle and is shown below. Find the perimeter, in inches, and the area, in square inches, of the grey, yellow, and red sections and the perimeter, in inches, and the area, in square inches, of the entire flag.

10) Ben makes a dollhouse for his daughter Phoebe that is an exact replica of their actual house, only much smaller. To build the dollhouse, Ben creates a scale model that is a fraction of the size of their actual house but similar in shape. All of the dimensions of the dollhouse are exactly proportional to those of their full-sized house. The height of the front door in the dollhouse is 4 inches, while the height of the actual front door in their house is 78 inches. If the kitchen in their actual house is 468 inches long, how long, in inches, is the kitchen in the dollhouse?

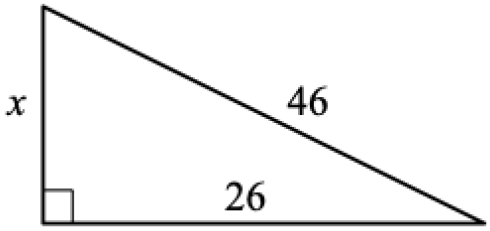
11) Find x and y in the following triangle.



12) Find x and y in the following triangle.



13) If the following triangle is a right triangle, find x exactly:



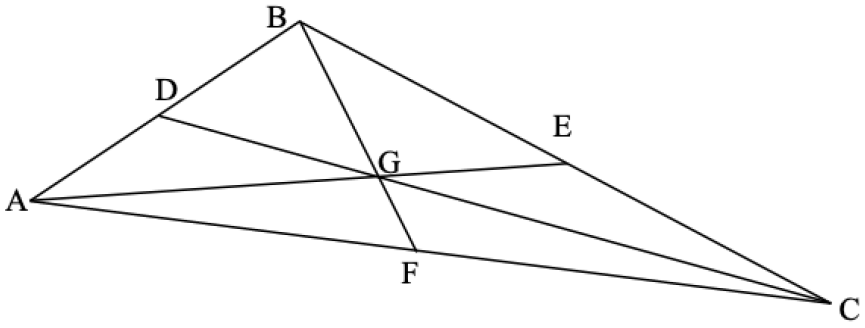
14) Plot the points A (-5,4), B (2,6), C (5,-6), and D (-2,-8) all on the same graph. Find the midpoint, distance, and slope between points A and B, B and C, C and D, and D and A. Use this information to determine the exact geometric shape of ABCD.

15) Find (exactly AND approximately) the surface area and volume for a sphere with a diameter of 11.

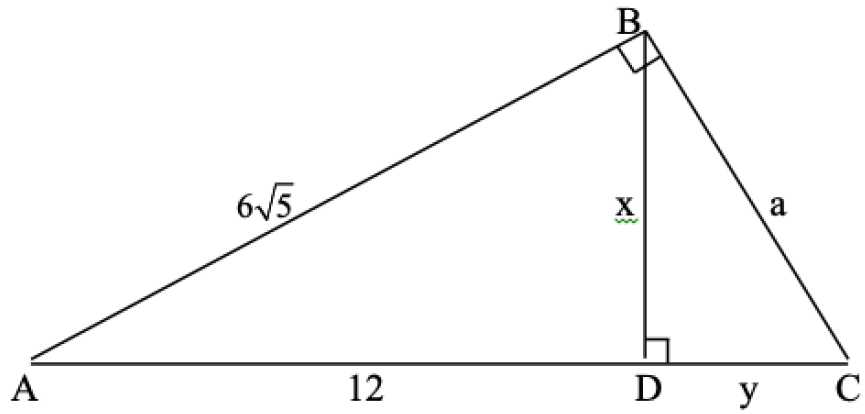
16) Find (exactly AND approximately) the surface area and volume for a right cylinder with a diameter of 8 and a height of 15.

17) Find (exactly AND approximately) the surface area and volume for a right cone with a radius of 20 and a slant height of 29.

18) AE, BF, and CD are all medians of triangle ABC, and they all intersect at point G. If the area of triangle DBC = 57, what is the area of quadrilateral ADGF? If GF = 4, DC = 27, and BE = 10, what is the perimeter of triangle BGC?



19) If BD is an altitude of right triangle ABC and AB = $6\sqrt{5}$ while AD = 12, find *a*, *x*, and *y*.



20) Find the surface area and volume for a right, regular, hexagonal prism with a height of 7 and a perimeter around its base of 84.

EXTRA CREDIT

21) Find the surface area and volume for a right, regular, pentagonal prism with a height of 16, a radius of 15, and a side length of 24.

22) Find the surface area and volume for a right, regular, triangular prism with a height of 17 and a diameter of a circle inscribed in its base of 18.

Answer Key

1) The perimeter is 117, and the area is 510.

2) $x = 14$ 66°, 75°, 39°

3) 1,260°, 360°, 140°, 40°

4) $29\sqrt{2}$ yards

5) 27° and 153° $x = 27$, $y = 23$, $a = -6$

6) Radius = 25, Area = 1,176, Inscribed = 576π, Circumscribed = 625π

7) Apothem = 11, Side Length = 22, Area = 484, Inscribed = 121π, Circumscribed = 242π

8) Circumference $= 26\pi$ exactly and 81.64 approximately
Area $= 169\pi$ exactly and 530.66 approximately

9) Grey: Perimeter = 159 inches Area = 1,081 square inches
Yellow: Perimeter = 162 inches Area = 690 square inches
Red: Perimeter = 159 inches Area = 1,081 square inches
Flag: Perimeter = 216 inches Area = 2,852 square inches

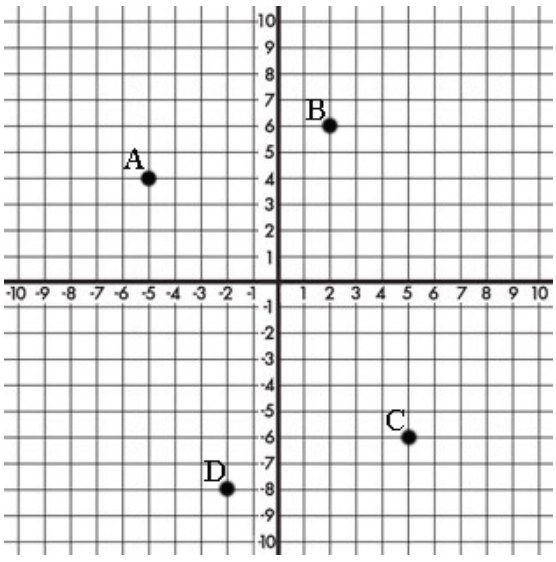
10) 24 inches

11) $x = 21,\ y = 21\sqrt{3}$

12) $x = 7,\ y = 7$

13) $x = 12\sqrt{10}$

14) AB: Midpoint $= (\frac{-3}{2}, 5)$, Distance = $\sqrt{53}$, Slope = $\frac{2}{7}$
BC: Midpoint $= (\frac{7}{2}, 0)$, Distance = $3\sqrt{17}$ Slope = $\frac{-4}{1}$
CD: Midpoint $= (\frac{3}{2}, -7)$, Distance = $\sqrt{53}$, Slope = $\frac{2}{7}$
DA: Midpoint $= (\frac{-7}{2}, -2)$, Distance = $3\sqrt{17}$ Slope = $\frac{-4}{1}$
ABCD is a parallelogram.



15) Exact surface area $= 121\pi$ Exact volume $= \frac{1331}{6}\pi$

Approximate surface area ≈ 379.94 Approximate volume $\approx 696.55\overline{6}$

16) Exact surface area $= 152\pi$ Exact volume $= 240\pi$

Approximate surface area ≈ 477.28 Approximate volume ≈ 753.6

17) Exact surface area $= 980\pi$ Exact volume $= 2,800\pi$

Approximate surface area $\approx 3,077.2$ Approximate volume $\approx 8,792$

18) The area of triangle ADGF = 38, and the perimeter of triangle BGC = 46.

19) $a = 3\sqrt{5}, \quad x = 6, \quad y = 3$

20) Surface Area $= 588\sqrt{3} + 588$ Volume $= 2,058\sqrt{3}$

Extra Credit

21) Surface Area $= 3,000$ Volume $= 8,640$

22) Surface Area $= 1,404\sqrt{3}$ Volume $= 4,131\sqrt{3}$