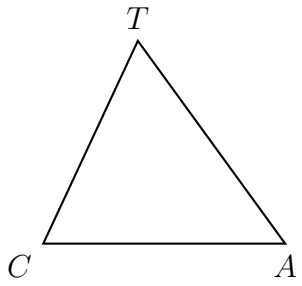
1.12 Test: Length and area

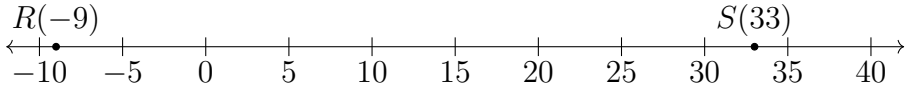
Show units if given. Show calculation as an equation, starting with a capitalized variable.

Line segments, length, number lines

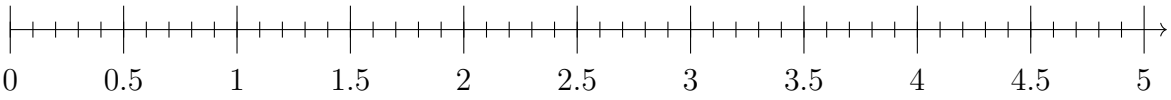
1. Given isosceles $\triangle CAT$ with $\overline{CA} \cong \overline{AT}$. On the diagram mark the congruent line segments with tick marks.



2. Points $R = -9$ and $S = 33$ are shown below. Find RS.



3. Mark and label irrational number $\pi = 3.14159265358...$ on the number line below.

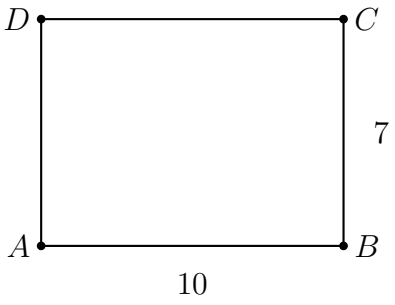


4. Given $\overline{DEF}$, $DE = 5\frac{3}{4}$, and $EF = 8\frac{1}{2}$. Find DF as a mixed fraction.

5. Measure and mark the lengths of the sides of the rectangle in centimeters. Find its perimeter.

Perimeter and area

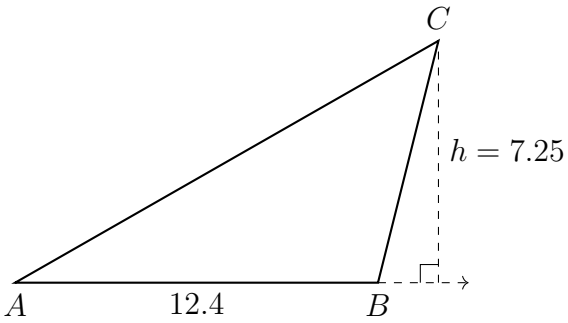
6. The rectangle $ABCD$ with dimensions $AB = 10$ inches, $BC = 7$ in.



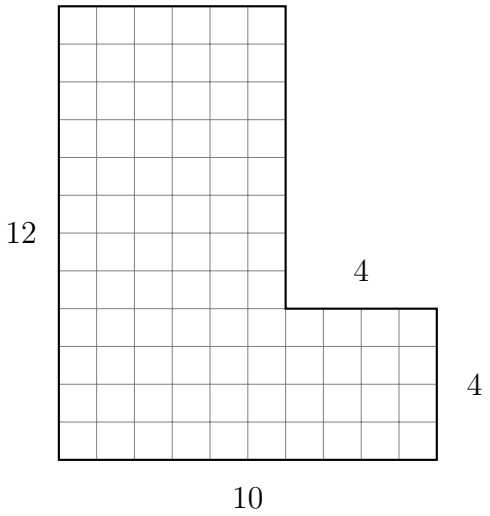
(a) Find the area of the rectangle.

(b) Find its perimeter.

7. The side $\overline{AB}$ of triangle ABC is extended and an altitude to the vertex C is drawn, as shown below. The triangle's height is $h = 7.25$ and its base measures $AB = 12.4$. Find the area of the triangle.



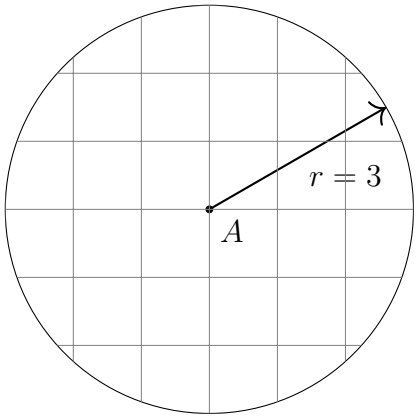
8. Find the area of the compound rectangular shape. Use area formulas for full credit.



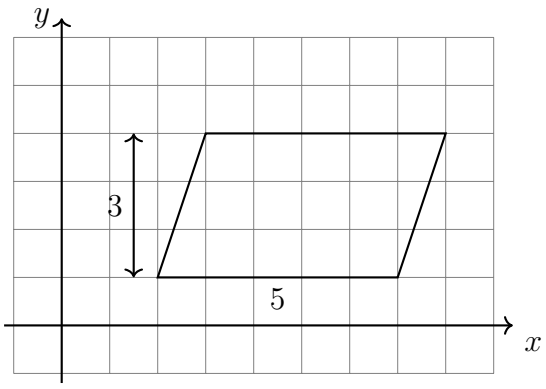
9. Given the circle A with radius $r = 3$. Leave exact answers, in terms of π.

   (a) Find the circumference of circle A.

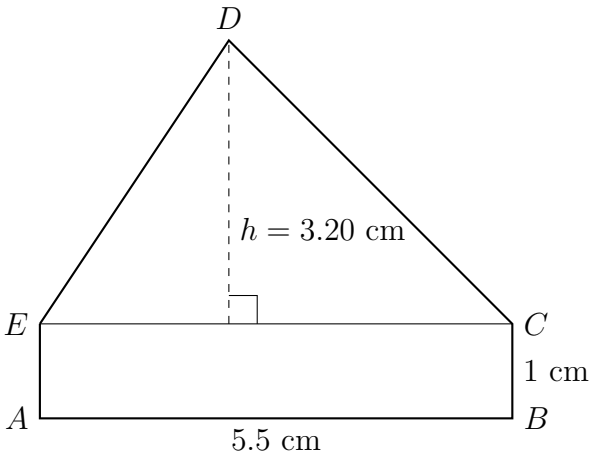
   (b) Find the area of the circle.



10. Find the area of the parallelogram shown with a base $b = 5$ and height $h = 3$.



11. Find the area of shape $ABCDE$ below, a triangle on a rectangle. The altitude h of the triangle is 3.20 centimeters and the base $EC = 5.5$ cm. The rectangle is 1 cm tall. (diagram not to scale)



Precision, percent error

12. Round each value to the *nearest hundredth*.

    (a) $\frac{2}{3}$ (b) $\sqrt{5}$

13. Round each value to the nearest thousand.

    (a) 7,917.5 miles
    (diameter of the earth)

    (b) 2,159.1 miles
    (diameter of the moon)

14. Convert each measure, showing the conversion factor and units.

    (a) Find the length in miles of a 10K race (10 kilometers).

    (b) Find the height in inches of a person 1.8 meters tall.

15. Find the number of minutes in a day.

16. Find the percent error for each approximation.

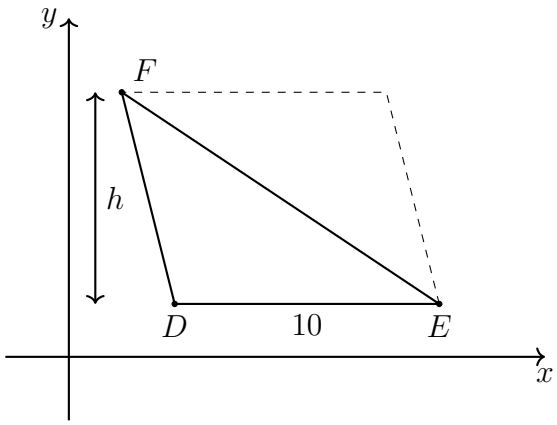
    (a) $7.753 \approx 8$ billion
    (population of the world)

    (b) $4.571 \approx 4\frac{1}{2}$ billion years
    (age of the solar system, NASA)

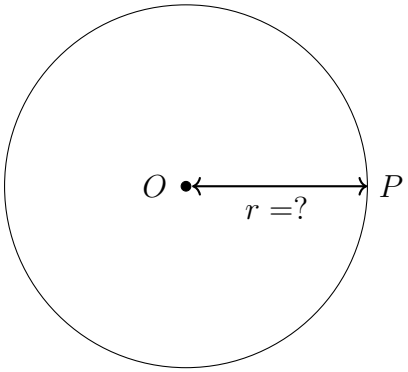
Modeling situations and solving with algebra

17. The $\triangle DEF$ has an area $A = 30$ and base $DE = 10$. Find its height h.

Start with $A = \frac{1}{2}bh = 30$



18. Given circle O with area $A = 121\pi$ square centimeters. Find the radius, OP.

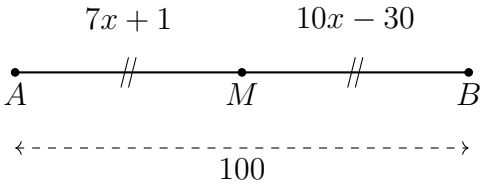


Start with the formula

$A = \pi r^2 = 121\pi$

19. A rectangle has an area of 44 square inches. Its width is 4 inches. Find its length.

20. Given that point M bisects $\overline{PQ}$, $PM = 7x + 1$, $MQ = 10x - 30$, $PQ = 100$. Circle True or False for each equation.



(a) T F $7x + 1 = 100$

(b) T F $7x + 1 = 10x - 30$

(c) T F $(7x + 1) + (10x - 30) = 100$

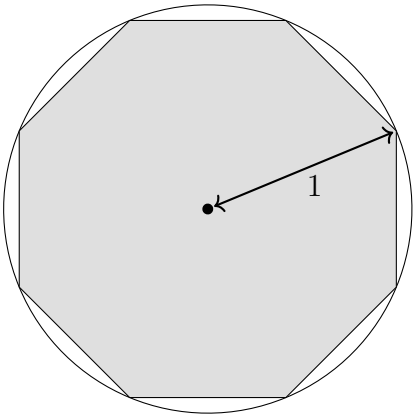
(d) T F $2(10x - 30) = 100$

21. The perimeter of a square classroom is approximately 80 feet. Find its area.

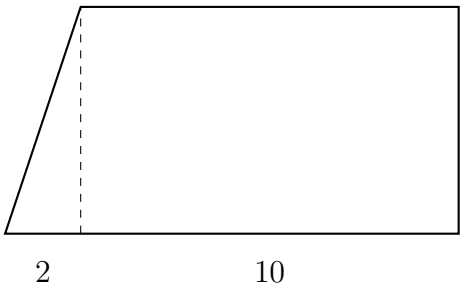
22. Below an octagon is inscribed in a circle, the Archimedes used to approximate π. The area of the octagon is $A_{octagon} \approx 2.8284$.

    (a) Find the area of the circle with $r = 1$.

    (b) Find the percent error of Archimede's approximation using a hexagon.



23. The total area of the figure shown is $A = 55$ square centimeters. The triangle with a base of 2 cm is adjacent to a rectangle with a 10 cm base. Find the height.

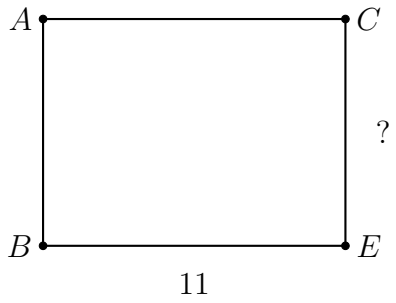


Extra problems

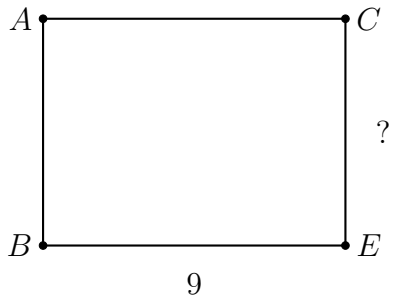
24. A triangle has an area of 68 square centimeters. Its height is 16 centimeters. Find the length of its base.

25. A triangle has an area of 75 square centimeters. Its height is 12 centimeters. Find the length of its base.

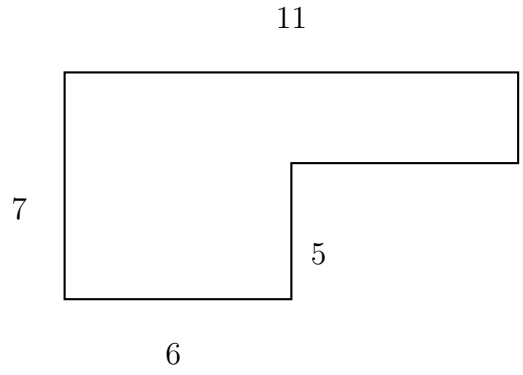
26. The rectangle $BECA$ has an area of 77, with length $BE = 11$.
    (a) Write an equation with the unknown w as the width of the rectangle.
    (b) Solve.



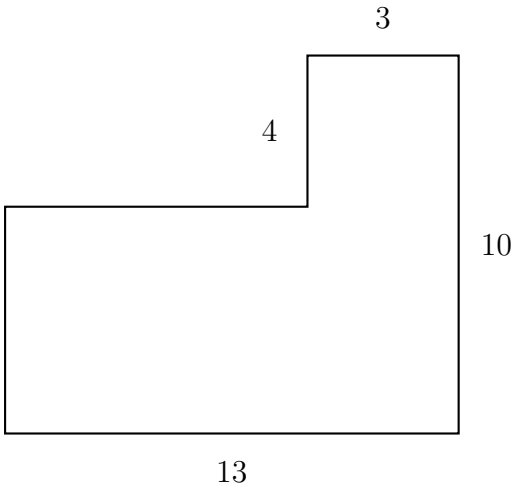
27. The rectangle $BECA$ has an area of 63, with length $BE = 9$.
    (a) Write an equation with the unknown w as the width of the rectangle.
    (b) Solve.



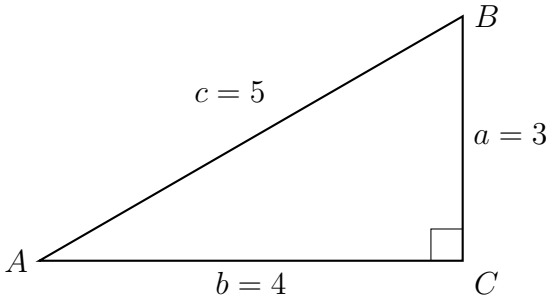
28. Find the area and perimeter of the shape shown below. Mark the missing side lengths first. All angles are 90°. *(not drawn to scale)*



29. Find the area and perimeter of the shape shown below. Mark the missing side lengths first. All angles are 90°. *(not drawn to scale)*

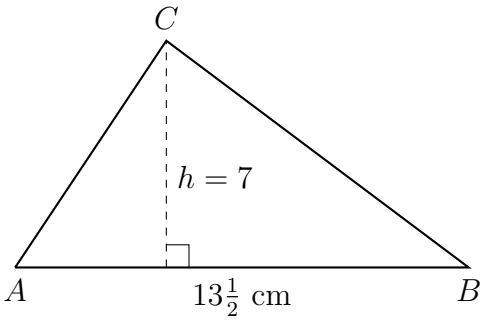


30. Find the area of $\triangle ABC$ shown below (not actual size) with $m\angle C = 90°$ and the lengths of the triangle's sides as $a = 3$, $b = 4$, and $c = 5$.

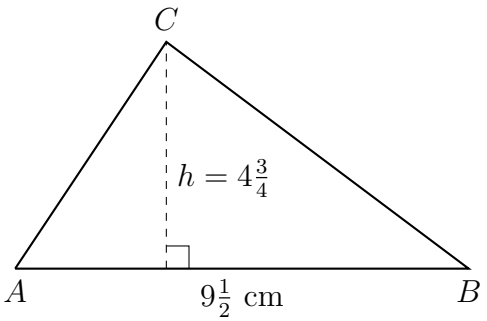


31. Find the area of $\triangle ABC$. The altitude h of the triangle is 7 centimeters and the base

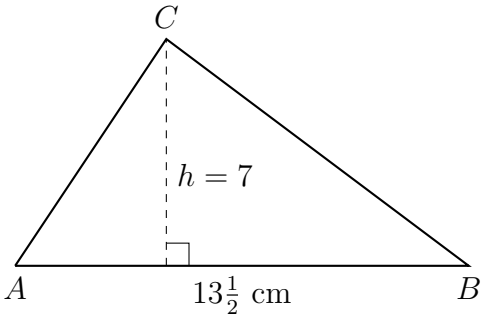
$AB = 13\frac{1}{2}$ cm. (diagram not to scale)



32. Find the area of $\triangle ABC$. The altitude h of the triangle is $4\frac{3}{4}$ centimeters and the base $AB = 9\frac{1}{2}$ cm. (diagram not to scale)



33. Find the area of $\triangle ABC$. The altitude h of the triangle is 7 centimeters and the base $AB = 13\frac{1}{2}$ cm. (diagram not to scale)



34. Find the area A of the shape shown below in terms of unit squares.