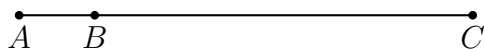


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### 1.13 Extra problems

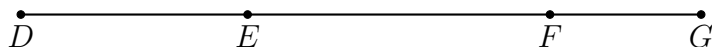
1. Given  $\overline{ABC}$ ,  $AB = \frac{2}{3}$ , and  $AC = 3\frac{1}{3}$ .

Find  $BC$ .



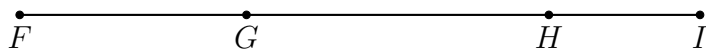
2. Given  $\overline{DEFG}$ ,  $DE = 3\frac{1}{4}$ ,  $EF = 6\frac{1}{4}$ , and  $FG = 1\frac{3}{4}$ . (diagram not to scale)

Find  $DG$ , expressed as a fraction, not a decimal.

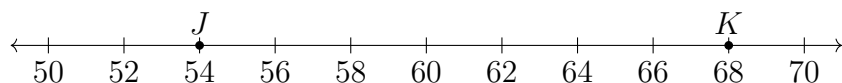


3. Given  $\overline{FGHI}$ ,  $FG = 8\frac{1}{6}$ ,  $GH = 12\frac{1}{3}$ , and  $HI = 5\frac{1}{2}$ . (diagram not to scale)

Find  $FI$ .

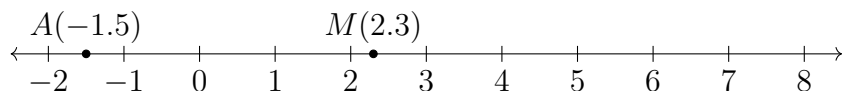


4. Given  $\overleftrightarrow{JK}$  as shown on the number line.

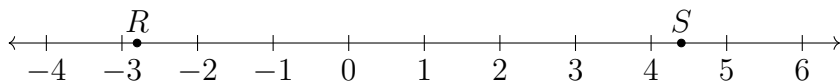


What is the midpoint between the points  $J$  and  $K$ ?

5. The point  $M(2.3)$  is the midpoint of segment  $\overline{AB}$ . Given  $A(-1.5)$ , find the value of  $B$ . Mark and label it below.

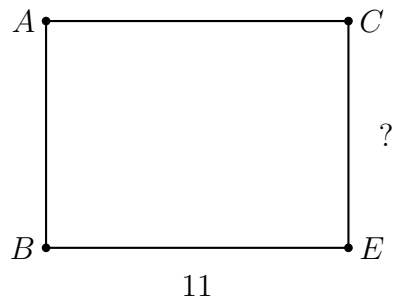


6. Given  $\overleftrightarrow{RS}$  as shown on the number line, with  $R = -2.8$  and  $S = 4.4$ .



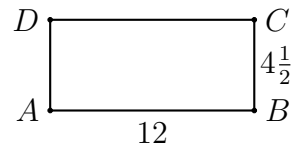
The points  $T$  and  $U$  trisect  $\overline{RS}$ . Find their values, and mark and label them on the number line.

7. A triangle has an area of 68 square centimeters. Its height is 16 centimeters. Find the length of its base.
8. A triangle has an area of 75 square centimeters. Its height is 12 centimeters. Find the length of its base.
9. The rectangle  $BECA$  has an area of 77, with length  $BE = 11$ .
- Write an equation with the unknown  $w$  as the width of the rectangle.
  - Solve.



10. Find the area of rectangle  $ABCD$  having length  $l = 12$  and width  $w = 4\frac{1}{2}$ . Start with a formula of this form, substituting the given values:

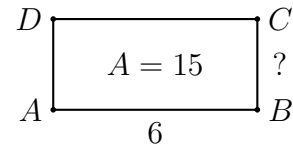
$$A = l \times w$$



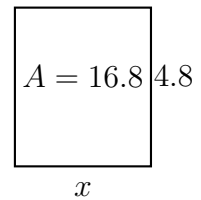
11. Rectangle  $ABCD$  has area  $A = 15$  and base  $b = 6$  but unknown height. Write an equation then solve. Start with this form (for the unknown, use  $h$ ,  $x$ , or  $BC$ ) and state your answer as a fraction:

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$$A = b \times h = 15$$

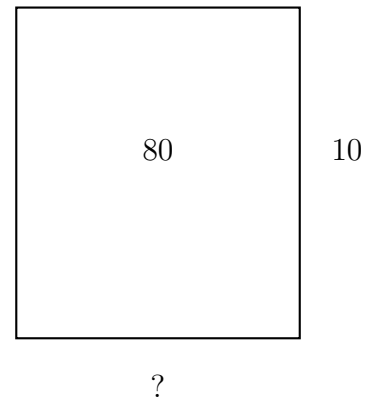


12. Find the base of a rectangle with area  $A = 16.8$  and height  $h = 4.8$ , expressed as a decimal. First write an equation substituting the given values in the area formula.

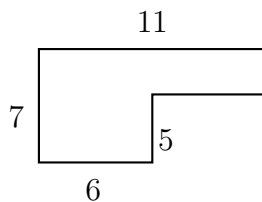


13. Find the length of the base of a rectangle with area  $A = 80$  and height  $h = 10$ . Start with the form (use  $b$  or  $x$ ):

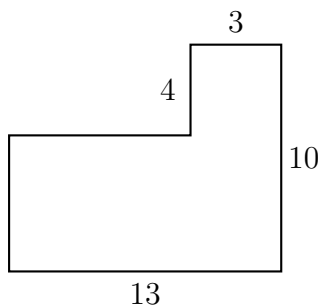
$$A = b \times h = 80$$



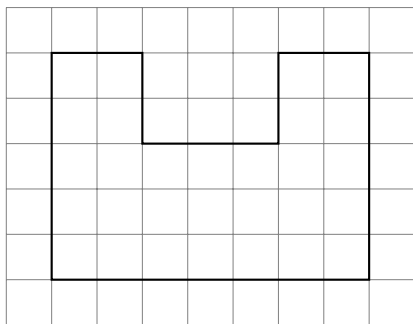
14. Find the area and perimeter of the shape shown below. Mark the missing side lengths first. All angles are  $90^\circ$ .  
*(not drawn to scale)*



15. Find the area and perimeter of the shape shown below. Mark the missing side lengths first. All angles are  $90^\circ$ .  
*(not drawn to scale)*

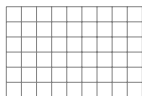


16. Find the area  $A$  of the shape shown below in terms of unit squares.

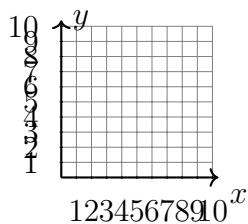


17. On the grid below, accurately draw and label two adjacent squares, one with a side length of 4 cm, the other with a side length of 3 cm. The grid is in centimeters.

Find the area  $A$  and perimeter  $P$  of combined shape.



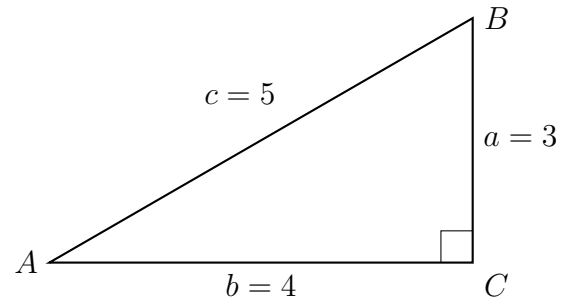
18. On the graph, draw polygon ABCDEF with vertices A(1, 1), B(1, 4), C(3, 4), D(3, 7), E(8, 7), and F(8, 1). Find the perimeter and the area of the polygon.



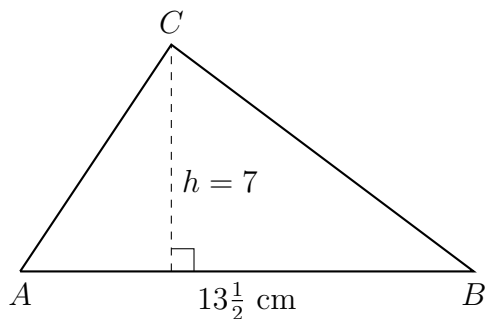
19. Draw and label a triangle  $\triangle ABC$  with base  $\overline{AB}$  8 centimeters long and altitude of 5 centimeters. (show the altitude as a dotted line, and make sure it is perpendicular to the base)

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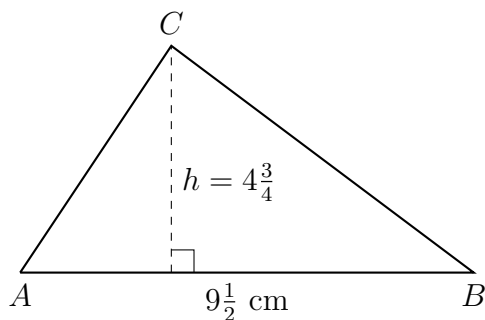
20. Find the area of  $\triangle ABC$  shown below (not actual size) with  $m\angle C = 90^\circ$  and the lengths of the triangle's sides as  $a = 3$ ,  $b = 4$ , and  $c = 5$ .



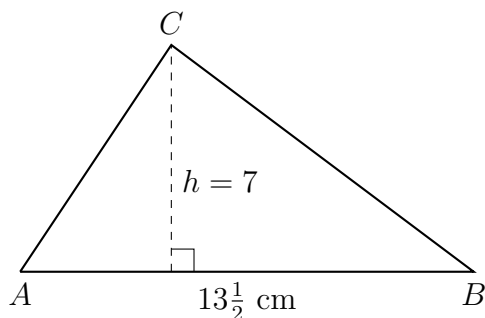
21. Find the area of  $\triangle ABC$ . The altitude  $h$  of the triangle is 7 centimeters and the base  $AB = 13\frac{1}{2}$  cm. (diagram not to scale)



22. 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)



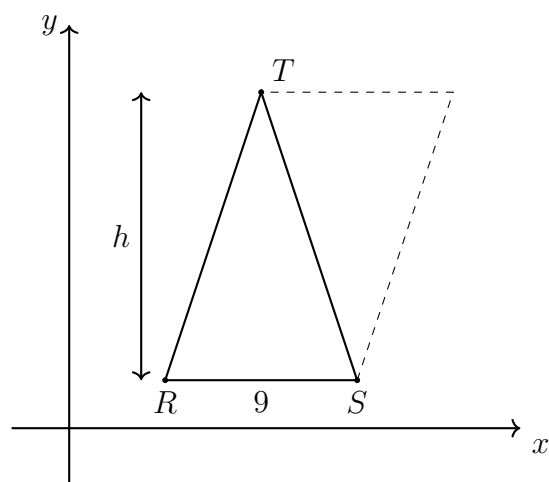
23. Find the area of  $\triangle ABC$ . The altitude  $h$  of the triangle is 7 centimeters and the base  $AB = 13\frac{1}{2}$  cm. (diagram not to scale)



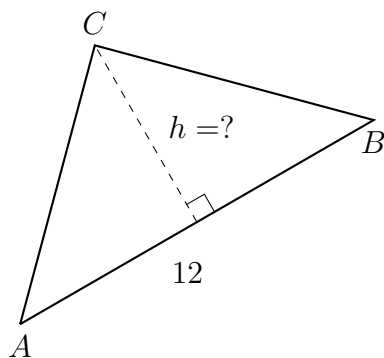
24. Find the height of the  $\triangle RST$ , having an area of  $A = 117$  and base  $RS = 9$ .

Start by substituting values in the area formula:

$$A = \frac{1}{2}bh = 117$$

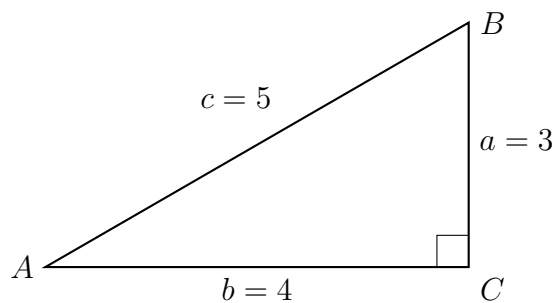


25. One side of the  $\triangle ABC$  has a length  $AB = 12$ . The triangle's area is 60. Find the length of the altitude  $h$  of the triangle to vertex  $C$  and perpendicular to side  $\overline{AB}$ .

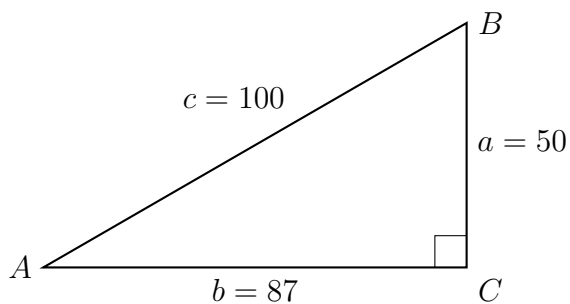


26. Find the area of  $\triangle ABC$  shown below (not actual size) with  $m\angle C = 90^\circ$  and the lengths of the triangle's sides as  $a = 3$ ,  $b = 4$ , and  $c = 5$ .

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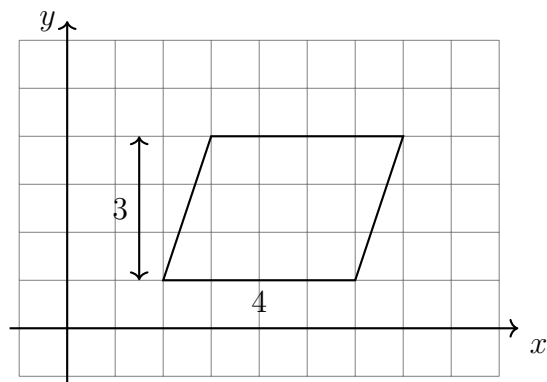


27. Find the area of  $\triangle ABC$  shown below (not actual size) with  $m\angle C = 90^\circ$  and the lengths of the triangle's sides as  $a = 50$ ,  $b = 87$ , and  $c = 100$ .



28. A parallelogram is shown on the  $x$ - $y$  plane having a base  $b = 4$  and height  $h = 3$ .

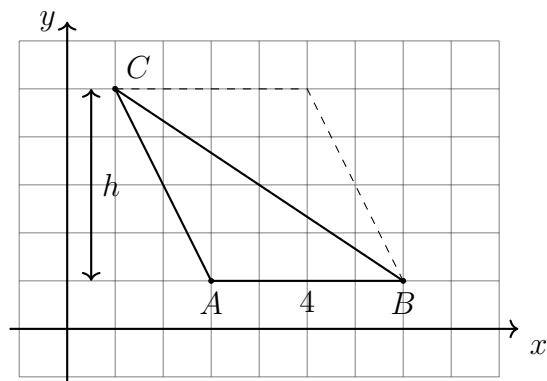
Find its area, showing the calculation.



29. The  $\triangle ABC$  is shown below with  $A(3, 1)$ ,  $B(7, 1)$ , and  $C(1, 5)$ . The length of the base of the triangle is  $AB = 4$ .

(a) Find the height  $h$ .

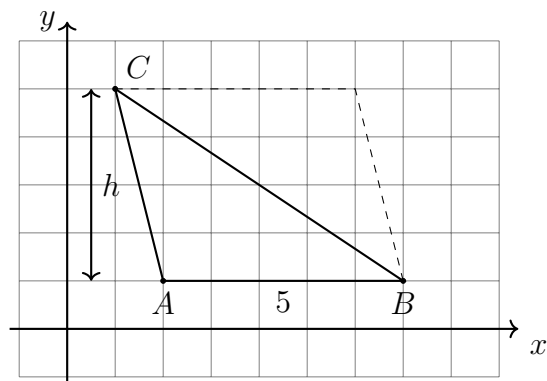
(b) Find the triangle's area, showing the calculation.



30. The  $\triangle ABC$  is shown below with  $A(2, 1)$ ,  $B(7, 1)$ , and  $C(1, 5)$ . The length of the base of the triangle is  $AB = 5$ .

(a) Find the height  $h$ .

(b) Find its area, showing the calculation.





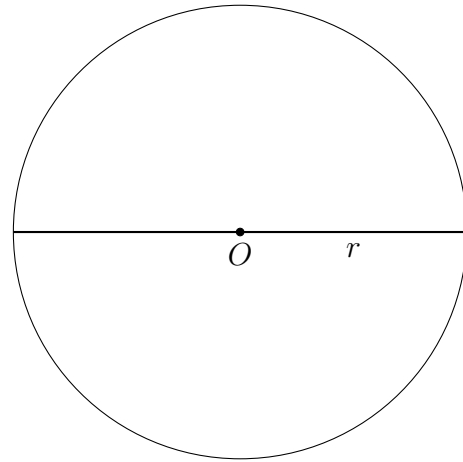
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31. Find the radius and circumference of circle  $O$  with diameter  $D = 15$  centimeters.

(a) Write down the radius.

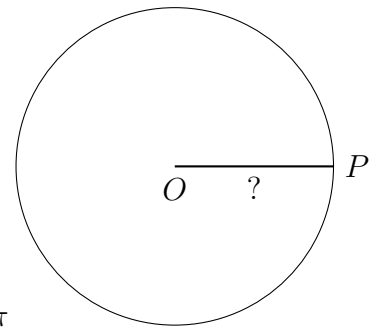
(b) State the circumference in terms of  $\pi$

(c) Express the circumference as a decimal, rounding to the *nearest hundredth*.



32. Given circle  $O$  with area  $A = 64\pi$  square centimeters.

Find the radius of circle,  $OP$ . Start with the formula



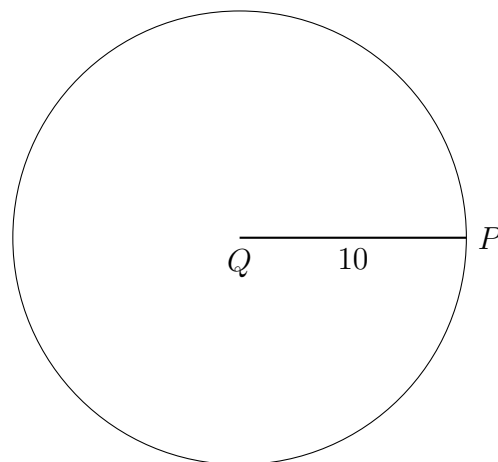
$$A = \pi r^2 = 64\pi$$

33. Find the area of the given circle  $Q$  with radius  $r = 10$  centimeters.

Start with the formula

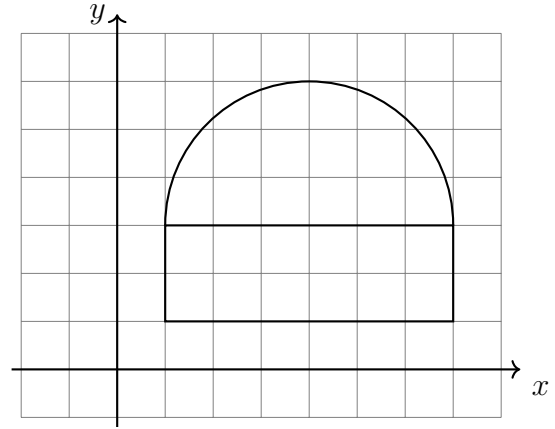
$$A = \pi r^2$$

(a) State the area in terms of  $\pi$

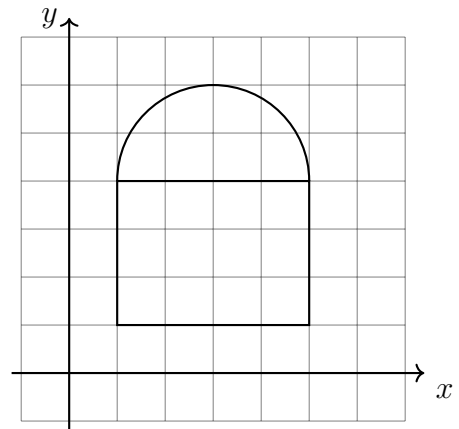


(b) Now round to the nearest hundredth

34. Find the area of the shape shown below composed of a rectangle and circular cap. Leave your answer as an exact value in terms of  $\pi$ .



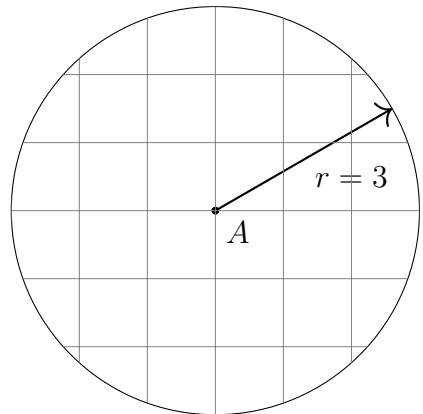
35. Find the *perimeter* of the shape shown below composed of a rectangle and circular cap. Leave your answer as an exact value in terms of  $\pi$ .



36. Given the circle  $A$  with radius  $r = 3$ . Leave exact answers, in terms of  $\pi$ .

(a) Find the circumference of circle  $A$ .

(b) Find the area of the circle.



Name:

**Challenge problems**

37. A square is partitioned into two rectangles. The sum of the perimeters of the two rectangles is 36. Find the area of the square.

