



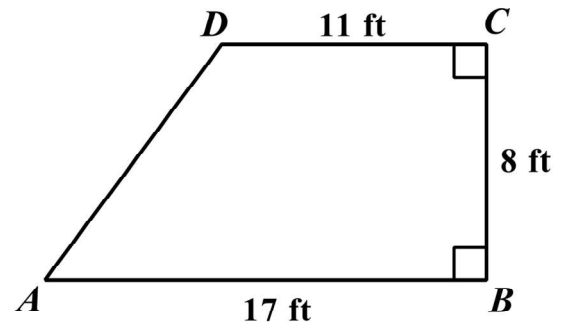
PERIMETER N-GEN MATH® GEOMETRY



We start our unit on measurement and modeling by discussing the simple concept of **perimeter**. For many years, you've learned that **perimeter** represents the **distance** or **length** of the path that surrounds a two-dimensional shape. We now have sophisticated tools that can help us calculate this length.

Exercise #1: An enclosure has the shape of a trapezoid with three known side lengths shown, in feet.

- (a) Determine the length of side \overline{AD} .

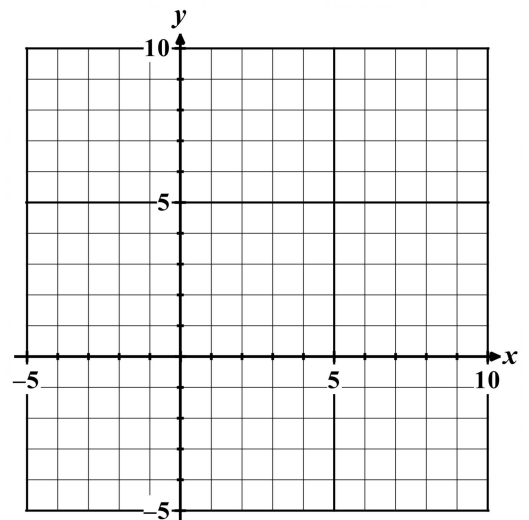


- (b) Determine the perimeter of $ABCD$.

- (c) If the enclosure is to be surrounded on all sides by fencing that costs \$0.75 per linear foot, then how much will it cost to enclose this trapezoid?

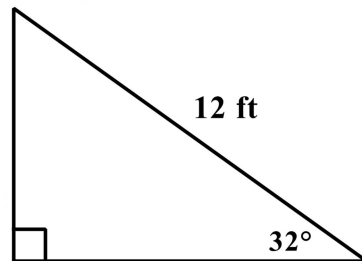
There are no fancy formulas for the perimeter of a figure whose boundary consists of line segments. We simply need to know the length of each one and add these lengths together. Sometimes we may use tools like the Pythagorean Theorem, the distance formula, or right triangle trigonometry to find individual lengths.

Exercise #2: Parallelogram $EFGH$ has vertices at $E(1, 7)$, $F(8, 7)$, $G(4, -3)$, and $H(-3, -3)$. Determine the perimeter of $EFGH$ to the nearest tenth.



When right triangles or right angles are involved in a perimeter problem, we should remember both the Pythagorean Theorem and right triangle trigonometry.

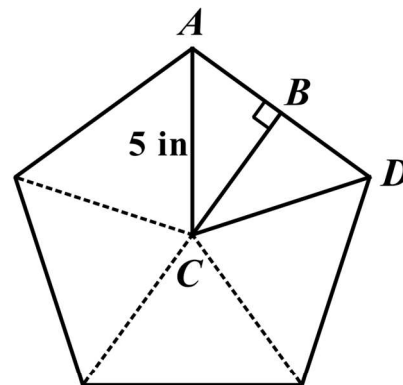
Exercise #3: A wooden frame is being made using wood that costs \$1.25 per linear foot. The frame is in the shape of a right triangle with a hypotenuse that is 12 feet long and which contains an acute angle of 32° . Determine the overall cost the wood needed to make this frame. Show the work involved.



Right triangle trigonometry is a very powerful tool because it can help us determine lengths as long as we have a right triangle with just some known information.

Exercise #4: A regular pentagon is drawn such that the distance from its center to any of its vertices is 5 inches as shown. Point B is at the midpoint of side \overline{AD} and \overline{CB} has been drawn.

(a) What is the measure of $\angle ACB$ in this diagram?



(b) Determine the length of \overline{AB} . Leave your answer in exact form.

(c) Determine the perimeter of the pentagon to the nearest tenth of an inch.





PERIMETER
N-GEN MATH® GEOMETRY HOMEWORK

FLUENCY

1. A right triangle has a hypotenuse that measures 22 inches and one leg measures 9 inches. Which of the following is closest to the perimeter of this triangle in inches?

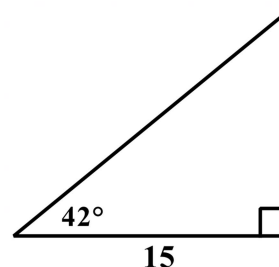
- (1) 48.2
(2) 51.1
(3) 52.5
(4) 52.9

2. An isosceles triangle has a base that is 28 cm long and base angles that measure 72° each. Which of the following is the perimeter of this triangle to the nearest centimeter?

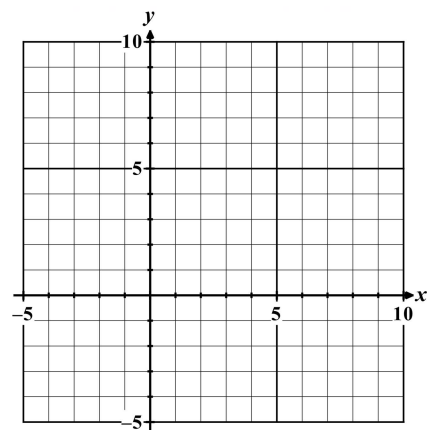
- (1) 87 cm
(2) 92 cm
(3) 106 cm
(4) 119 cm

3. Given the right triangle shown below, which of the following expressions could correctly calculate its perimeter?

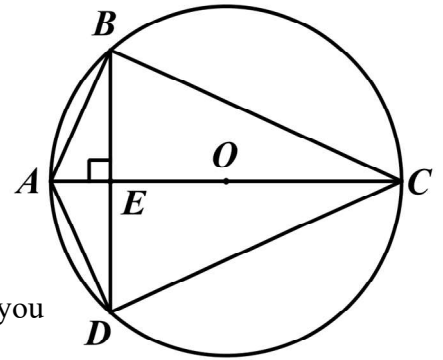
- (1) $15 + 15 \tan 42^\circ + \frac{15}{\cos 42^\circ}$
(2) $15 + 15 \cos 42^\circ + 15 \sin 42^\circ$
(3) $15 + \frac{15}{\tan 42^\circ} + 15 \cos 42^\circ$
(4) $15 + 15 \tan 42^\circ + 15 \sin 42^\circ$



4. A triangle has vertices at $A(-4, -2)$, $B(4, 8)$, and $C(7, -2)$. Determine the perimeter of $\triangle ABC$ to the nearest tenth.



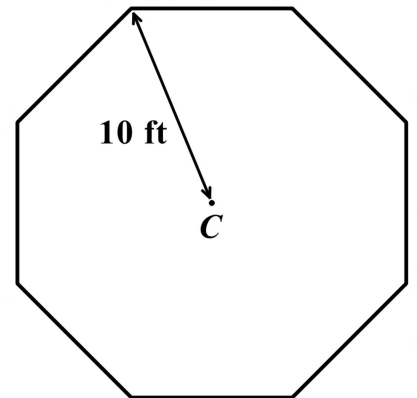
5. Kite $ABCD$ is inscribed in circle O such that $BD = 12$ and $AE = 4$.
- (a) Determine the length of \overline{CE} (see Unit 9 – Lesson 4).



- (b) Determine the perimeter of $ABCD$ to the nearest tenth. Show how you arrived at your answer.

APPLICATIONS

6. Isabelle is designing a fenced in enclosure for her dog. She wants to make it in the shape of a regular octagon as shown, where the distance from the center of the octagon to any of its vertices is 10 feet.
- (a) Determine the length of one side of the regular octagon to the nearest hundredth of a foot.



- (b) What is the perimeter of the enclosure to the nearest foot?
- (c) Isabelle can choose to purchase boards that are 6 feet long, 8 feet long, or 10 feet long to surround the enclosure. Which board length would you recommend and why?

