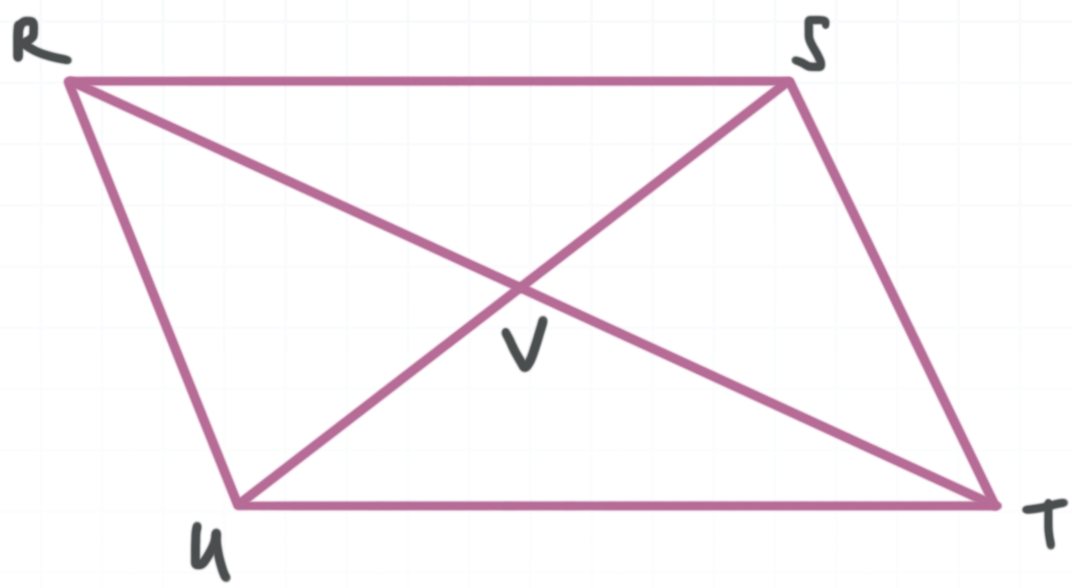
Topic: Measures of quadrilaterals

Question: In parallelogram $RSTU$, $\overline{RT} = 11$, $\overline{US} = 8$, and $\overline{RU} = 5.5$. What is the perimeter of $\triangle STV$? Hint: The perimeter of any polygon is the sum of the lengths of its sides.



Answer choices:

A 11

B 15

C 19

D 24.5

Solution: B

The diagonals of a parallelogram bisect each other, so

$$\overline{VT} = \frac{1}{2}(\overline{RT}) = \frac{1}{2}(11) = 5.5$$

Likewise,

$$\overline{VS} = \frac{1}{2}(\overline{US}) = \frac{1}{2}(8) = 4$$

Opposite sides of a parallelogram are congruent, so

$$\overline{ST} = \overline{RU} = 5.5$$

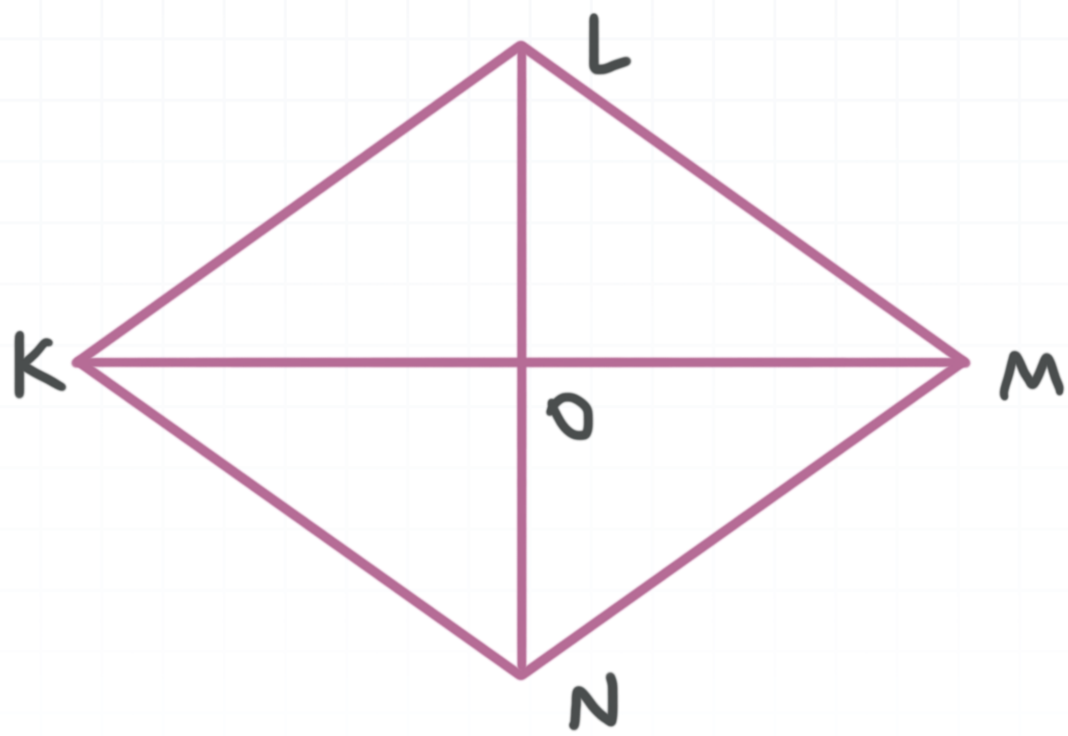
Therefore, the perimeter of $\triangle STV$ is

$$\overline{VT} + \overline{VS} + \overline{ST} = 5.5 + 4 + 5.5$$

$$\overline{VT} + \overline{VS} + \overline{ST} = 15$$

Topic: Measures of quadrilaterals

Question: In rhombus $KLMN$, $\overline{LN} = 9$ and $\overline{OM} = 6$. What is the perimeter of $KLMN$?



Answer choices:

A 24

B 26

C 28

D 30

Solution: D

The diagonals of a rhombus are perpendicular bisectors of each other, so

$$LO = \frac{1}{2}(\overline{LN}) = \frac{1}{2}(9) = 4.5$$

And $m\angle MOL = 90^\circ$. Since $\triangle LOM$ is a right triangle, we can use the Pythagorean theorem to find the length $\overline{LM}$.

$$(\overline{LO})^2 + (\overline{OM})^2 = (\overline{LM})^2$$

$$4.5^2 + 6^2 = (\overline{LM})^2$$

$$20.25 + 36 = (\overline{LM})^2$$

$$56.25 = (\overline{LM})^2$$

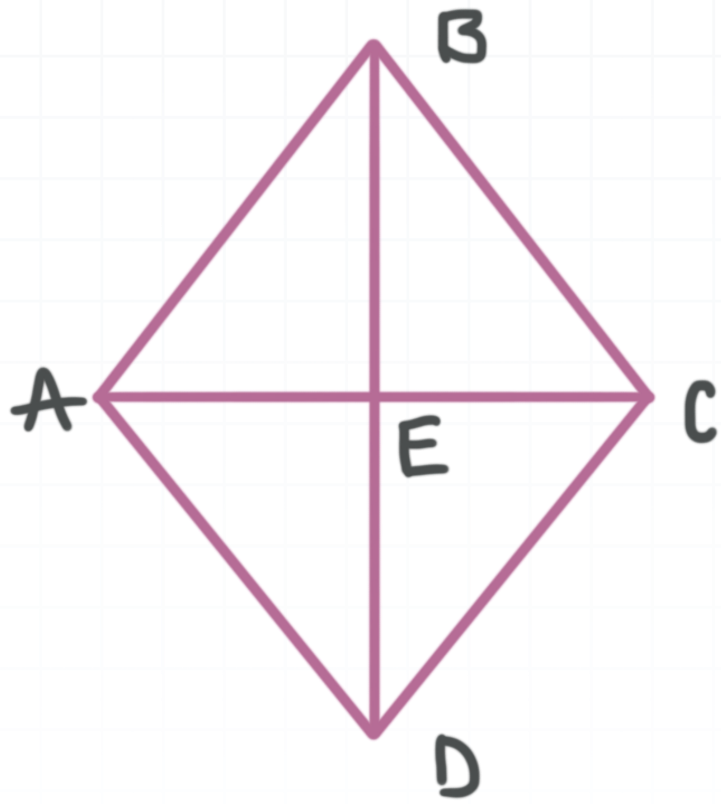
$$7.5 = \overline{LM}$$

All sides of a rhombus are congruent, so the perimeter of $KLMN$ is

$$4(\overline{LM}) = 4(7.5) = 30$$

Topic: Measures of quadrilaterals

Question: In rhombus $ABCD$, $\overline{BC} = 6$ and $m\angle BCE = 60^\circ$. What is $m\angle EDA$?



Answer choices:

A 15°

B 30°

C 45°

D 60°

Solution: B

The diagonals of a rhombus are perpendicular to each other, so

$$m\angle CEB = 90^\circ$$

The sum of the measures of the interior angles of a triangle is 180°, which means that in triangle BCE,

$$m\angle EBC + m\angle CEB + m\angle BCE = 180^\circ$$

$$m\angle EBC + 90^\circ + 60^\circ = 180^\circ$$

$$m\angle EBC + 150^\circ = 180^\circ$$

$$m\angle EBC = 30^\circ$$

Since $ABCD$ is a rhombus, $\overline{BC}$ is parallel to $\overline{AD}$. Therefore, the diagonal $\overline{BD}$ is a transversal that crosses a pair of parallel lines (the extensions of $\overline{BC}$ and $\overline{AD}$ to infinity in both directions). Notice that $\angle EDA$ and $\angle EBC$ are a pair of alternate interior angles, which means they're congruent, so

$$m\angle EDA = m\angle EBC = 30^\circ$$