Geometry Workbook

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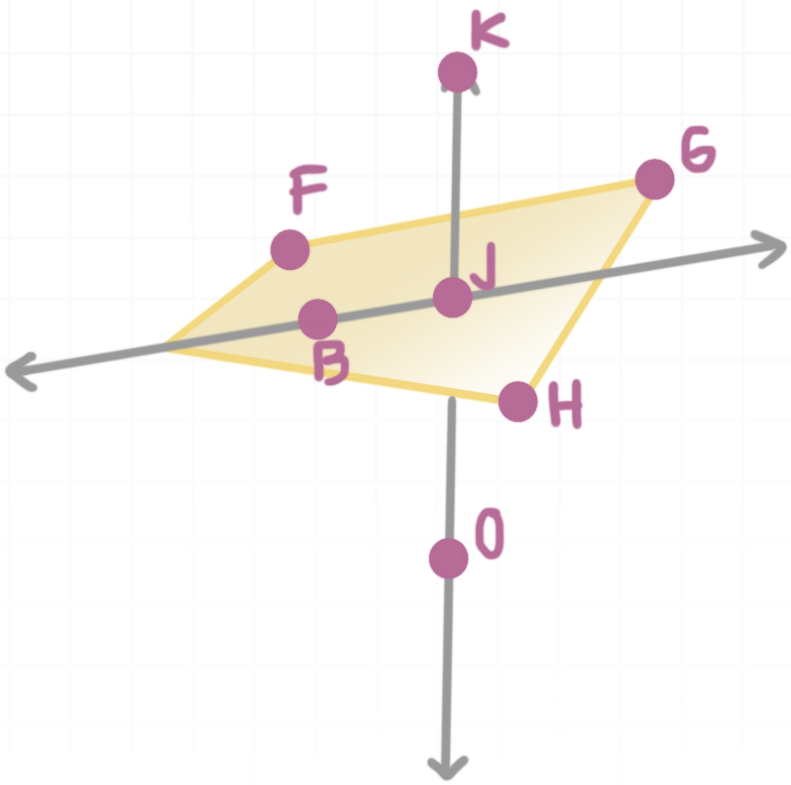
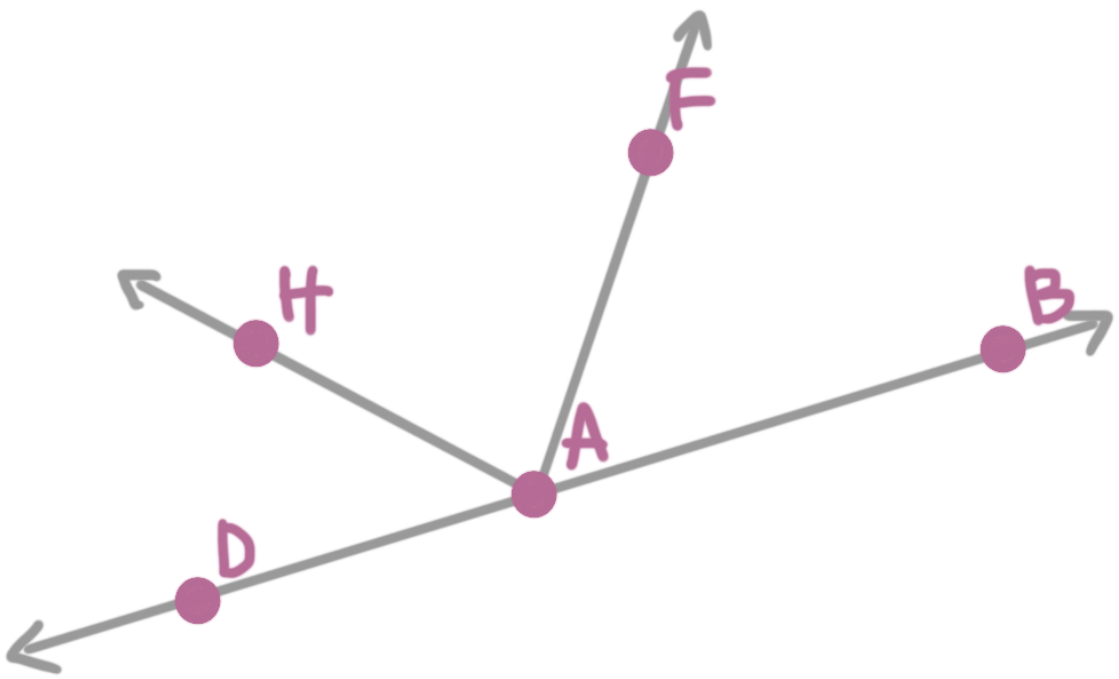
MATH

NAMING SIMPLE GEOMETRIC FIGURES

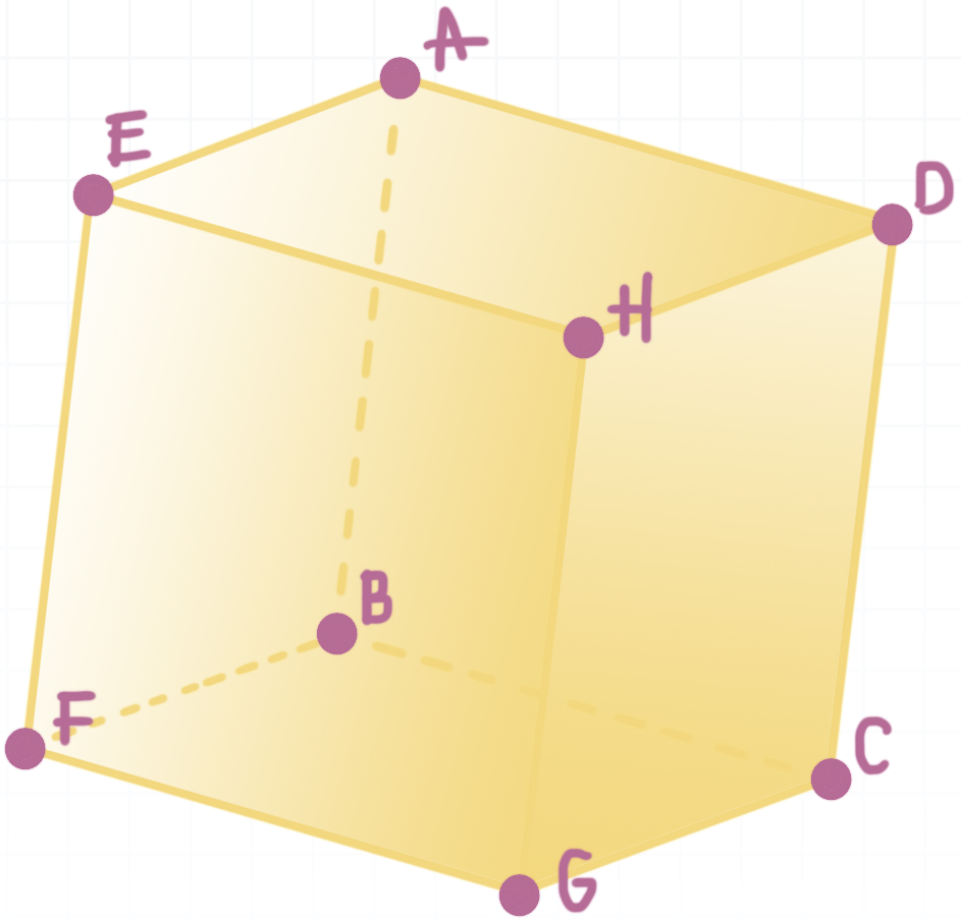
■ 1. Name the intersection of $\overline{BJ}$ and $\overline{KO}$.



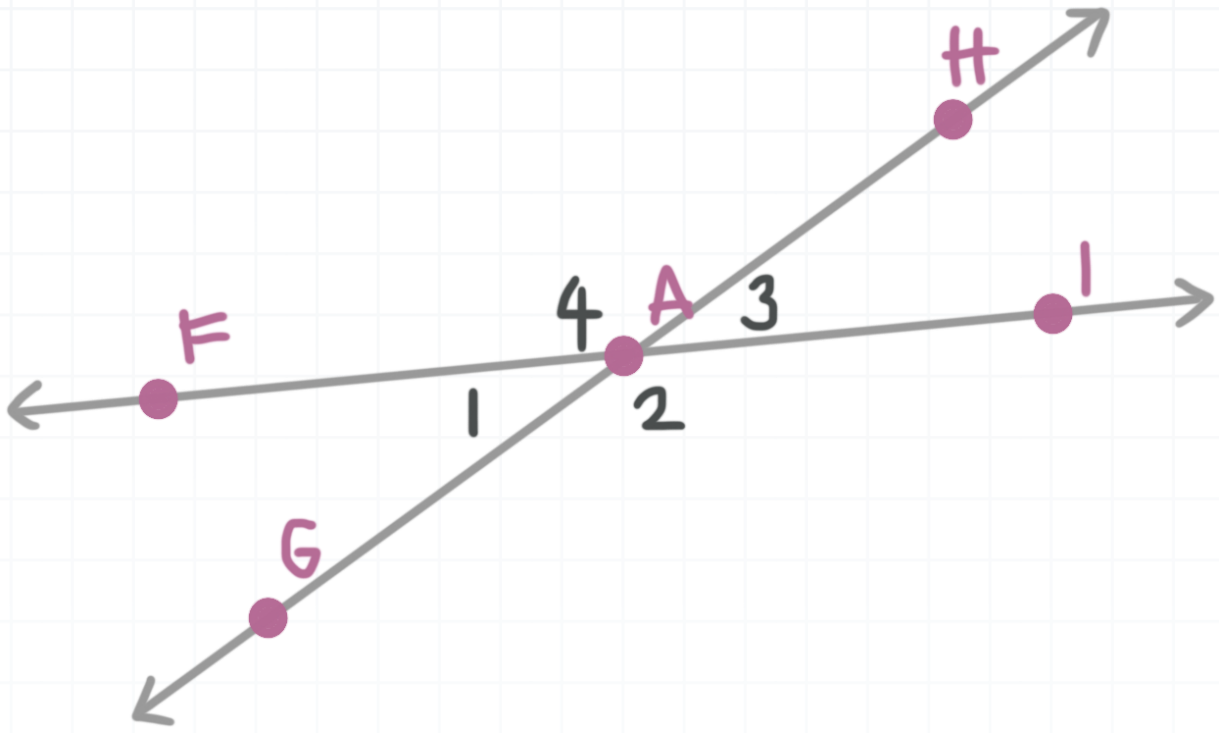
■ 2. Name the angle that forms a linear pair with $\angle DAF$.



3. Name three non-collinear points.

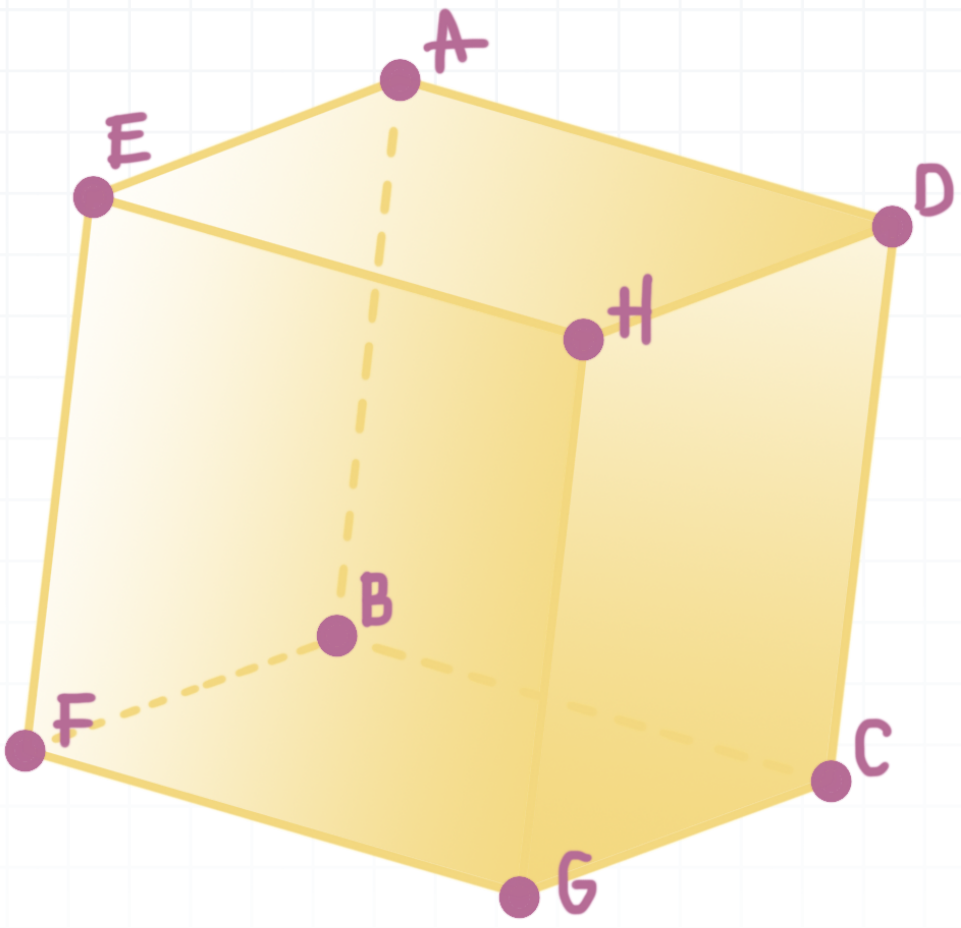


4. Name a pair of vertical angles.



■ 5. $\overline{XY}$ is an angle bisector of $\angle WXZ$. Write the congruence statement that follows.

■ 6. Name the intersection of plane AEH and plane GCD.

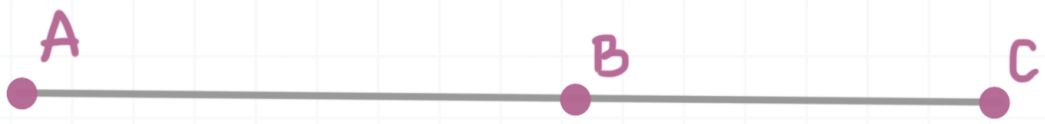


■ 7. $\overline{AB} \perp \overline{CD}$ and they intersect at E. Draw a sketch of this and include all necessary labels on your diagram.

■ 8. Sketch the following: $\overline{AB}$ lies on plane DEF and C is contained in $\overline{AB}$.

LENGTH OF A LINE SEGMENT

1. In the line segment, $AB = 14$ and $BC = 10$. Find AC.



2. R lies between S and T. $ST = 30$ and $SR = 17$. Find RT.

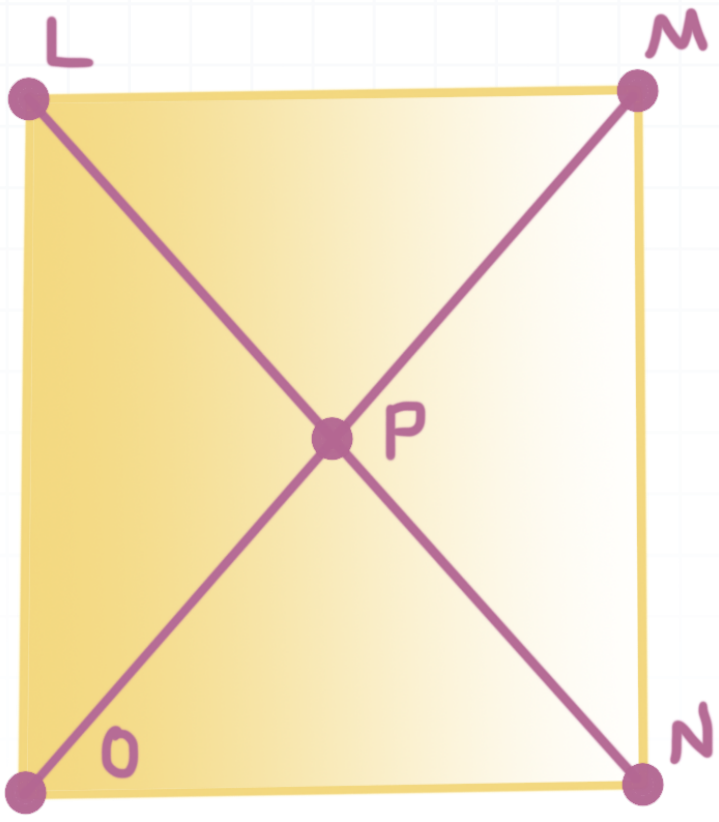
3. $JM = 2MP$ and $JP = 30$. Find JM and MP.

4. B lies between L and N. $LB = x$, $BN = 2x + 5$, and $LN = 17$. Write an equation that can be used to find the value of x. Then find x.

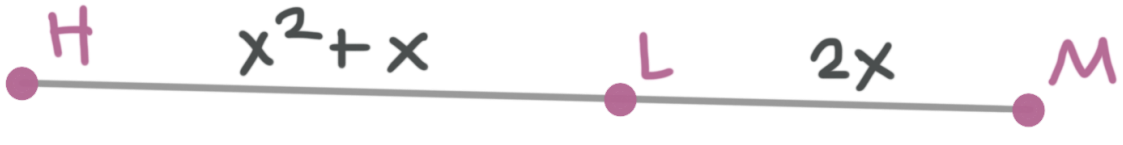
5. $\overline{AB}$ bisects $\overline{DC}$ at E. $DC = 8$ cm, $AB = 10$ cm, and $AE = 4$ cm. Find DE and EB.

6. P lies between M and O. $MP = 3x - 4$, $PO = 2x + 2$, and $MO = 3x + 12$. Find x and MO.

■ 7. The diagonals of a square bisect each other and are also congruent. The diagram below show diagonals $\overline{LN}$ and $\overline{MO}$ intersecting at P. Because they are bisectors, P is the midpoint of each segment. If $LP = 4.5$ inches, find MO.



■ 8. $HM = 10$. Use the diagram to find x and HL.



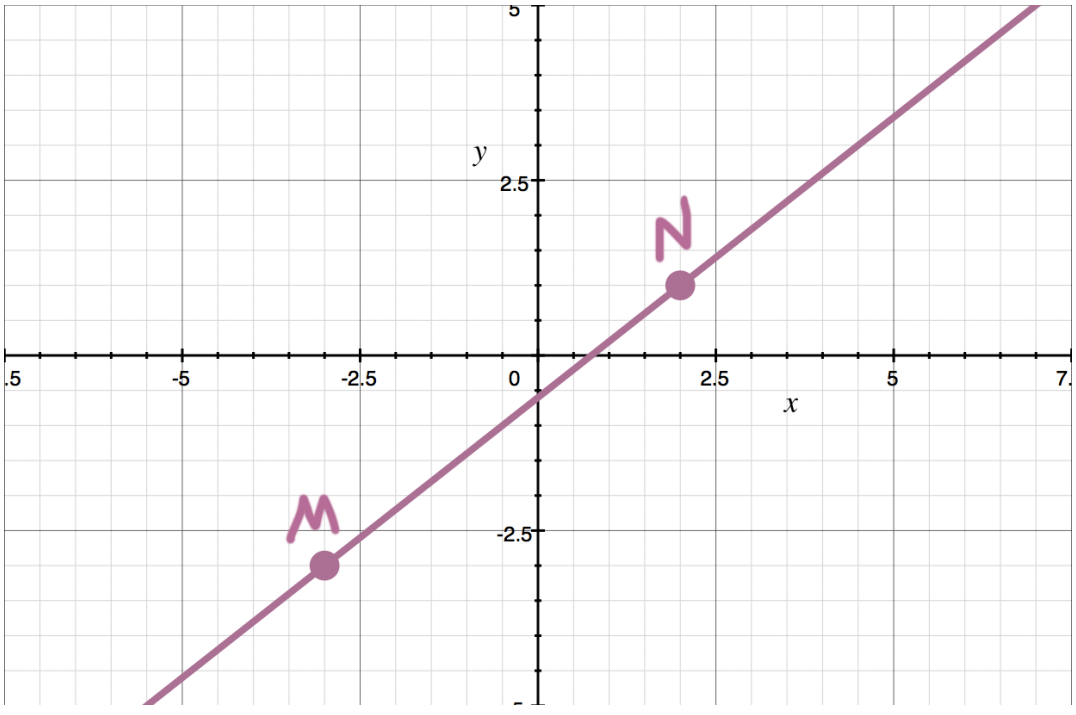
SLOPE AND MIDPOINT OF A LINE SEGMENT

- 1. Find the length of $\overline{AB}$ given $A(-2,3)$ and $B(4,3)$.

- 2. Find the length of $\overline{EF}$ given $E(-3,-2)$ and $F(1,1)$.

- 3. Find the length of $\overline{JK}$ given $J(0,6)$ and $K(2,-4)$.

- 4. Find the slope of line MN.



- 5. Find the slope of the line passing through $S(-6,6)$ and $T(2,-4)$.

- 6. J is the midpoint of $\overline{RF}$. Find the coordinates of J if $R(-4,6)$ and $F(0,-2)$.

- 7. P is the midpoint of $\overline{XY}$. Find the coordinates of X if $P(-3,6)$ and $Y(0,2)$.

- 8. E is a midpoint of $\overline{LM}$. $LE = 2x + 3$ and $LM = 6x - 4$. Find x and LM.

PARALLEL, PERPENDICULAR, OR NEITHER

■ 1. $\overline{AB} \perp \overline{CD}$. The slope of $\overline{AB}$ is $2/3$. Find the slope of $\overline{CD}$.

■ 2. $\overline{MN} \parallel \overline{ST}$, and the slope of $\overline{MN}$ is -2. Find the slope of $\overline{ST}$.

■ 3. Are $\overline{XY}$ and $\overline{AB}$ parallel, perpendicular, or neither? $X(4,-3)$, $Y(-2,1)$, $A(1,3)$, and $B(3,6)$. Use the slopes of the lines to justify your answer.

■ 4. Are $\overline{EF}$ and $\overline{GH}$ parallel, perpendicular, or neither? $E(-1,4)$, $F(0,2)$, $G(-1,0)$, and $H(1,4)$. Use the slope of the lines to justify your answer.

■ 5. Write the equation of a line in slope-intercept form that's perpendicular to the given line and passes through $(2,3)$.

$$y = \frac{1}{2}x + 2$$

■ 6. Write the equation of a line parallel to $y = 3x - 2$ that passes through $(0,3)$.

■ 7. A square has opposite sides parallel and consecutive sides perpendicular and all sides are congruent. Quadrilateral $SQRE$ has coordinates $S(0,3)$, $Q(4,0)$, $R(1,-4)$, and $E(-3,-1)$. Determine whether or not $SQRE$ is a square by showing that the opposite sides are parallel and consecutive sides are perpendicular and that all sides are congruent.

■ 8. A square has opposite sides parallel and consecutive sides perpendicular and all sides are congruent. Quadrilateral $SQRE$ has coordinates $S(0,3)$, $Q(4,0)$, $R(1,-4)$, and $E(-3,-1)$. Determine if the diagonals of the square are perpendicular. Determine if the diagonals are congruent.

DISTANCE BETWEEN TWO POINTS IN TWO DIMENSIONS

- 1. Find the length of $\overline{GH}$ given $G(-2,1)$ and $H(4,1)$.

- 2. Find the length of $\overline{XY}$ given $X(-4,1)$ and $Y(0,2)$.

- 3. Find the perimeter of $\triangle EFG$ if $E(1,1)$, $F(1,6)$, and $G(5,4)$.

- 4. Find the area of square $ABCD$ given $A(-8,0)$, $B(0,6)$, $C(6,-2)$, and $D(-2,-8)$.

DISTANCE BETWEEN TWO POINTS IN THREE DIMENSIONS

- 1. Find the distance between points with coordinates $(3,8,0)$ and $(3,8,6)$.

- 2. Find the distance between points with coordinates $(2,5,-3)$ and $(2,8,1)$.

- 3. Find the distance between points with coordinates $(1,1,1)$ and $(5,5,5)$.

- 4. Find the distance between points with coordinates $(9,6,3)$ and $(-9,-6,-3)$.

MIDPOINT OF A LINE SEGMENT IN THREE DIMENSIONS

- 1. Find the midpoint between points with coordinates $(3,8,0)$ and $(3,8,6)$.

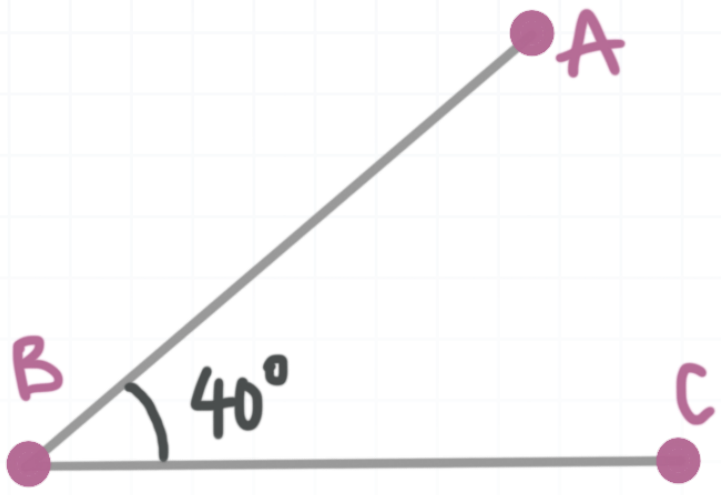
- 2. Find the midpoint between points with coordinates $(2,5,-3)$ and $(2,8,1)$.

- 3. Find the midpoint between points with coordinates $(1,1,1)$ and $(5,5,5)$.

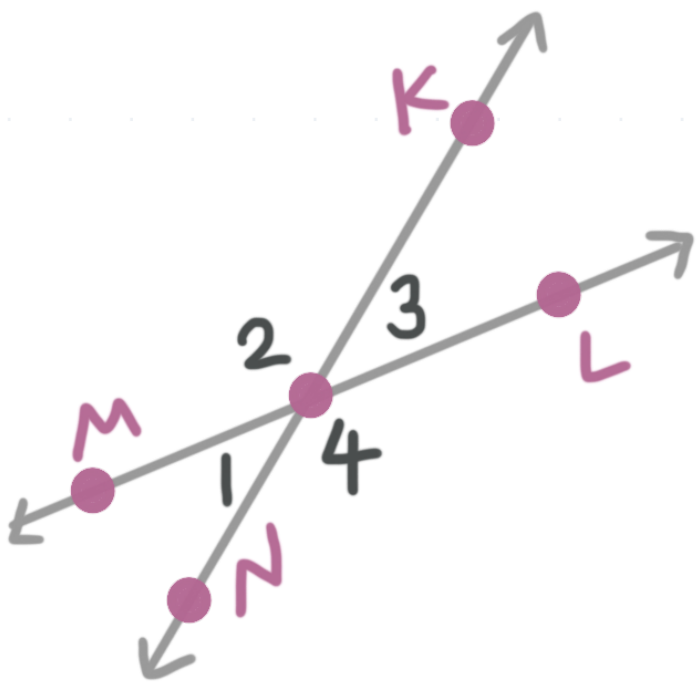
- 4. Find the midpoint between points with coordinates $(9,6,3)$ and $(-9,-6,-3)$.

MEASURES OF ANGLES

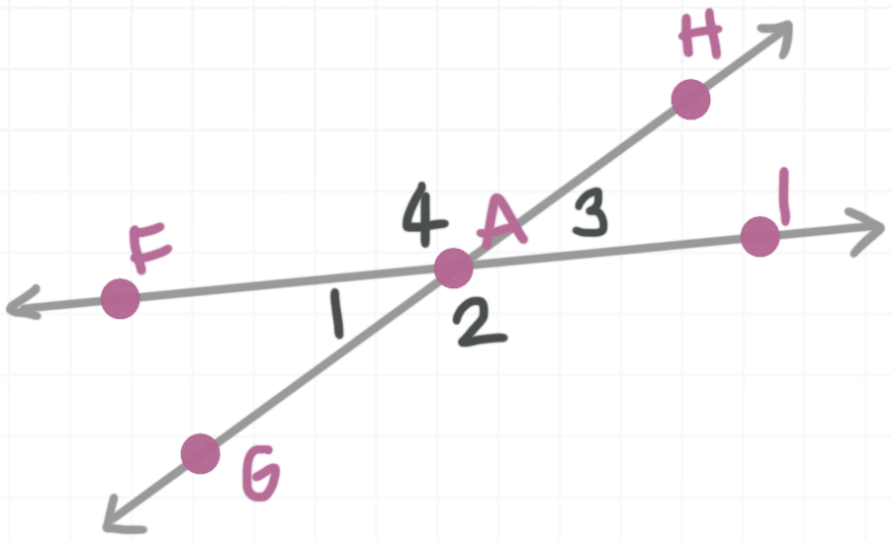
■ 1. Determine whether $\angle ABC$ is obtuse, acute, or right. Then find its supplement.



■ 2. $m\angle 1 = 35$. Find $m\angle 2$, $m\angle 3$, and $m\angle 4$.



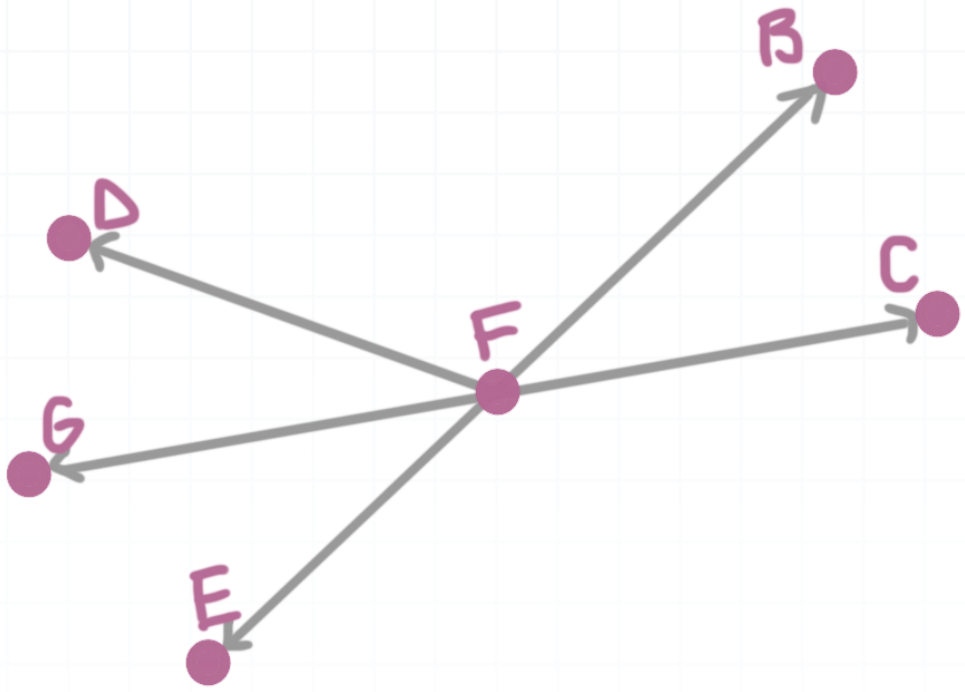
■ 3. Find x, y, and z if $m\angle 1 = 3x - 2$, $m\angle 2 = 2y$, $m\angle 3 = 2x + 8$, and $m\angle 4 = 4z$.



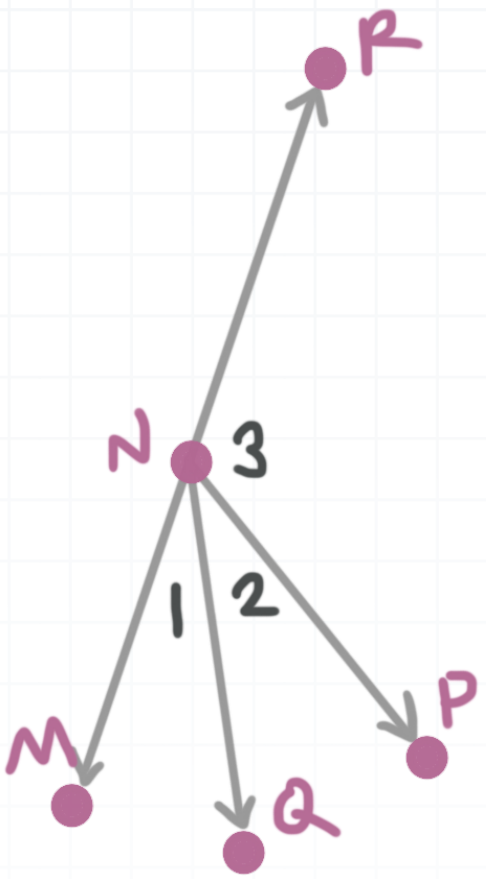
4. $\angle 5$ and $\angle 6$ are complementary angles. $m\angle 5 = 3x - 6$ and $m\angle 6 = 2x - 14$. Find the measures of $\angle 5$ and $\angle 6$.

ADJACENT AND NONADJACENT ANGLES

1. Name the angle adjacent to $\angle EFG$.

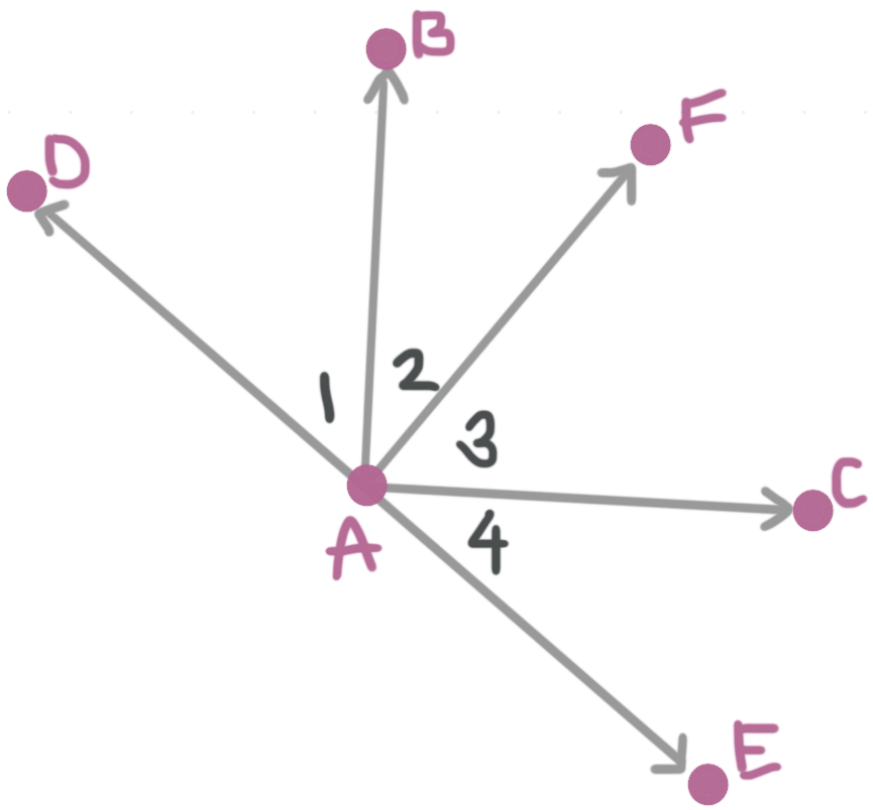


2. $m\angle 1 = 3x - 10$, $m\angle 2 = 2x - 20$, and $m\angle MNP = 60$. Find the value of x and $m\angle 1$, $m\angle 2$, and $m\angle 3$, given that $\overline{NR}$ and $\overline{NM}$ are opposite rays.



3. $m\angle 2 = 42$, $\angle 3 \cong \angle 4$, $\angle FAE$ is a right angle, and $\angle DAE$ is a straight angle.

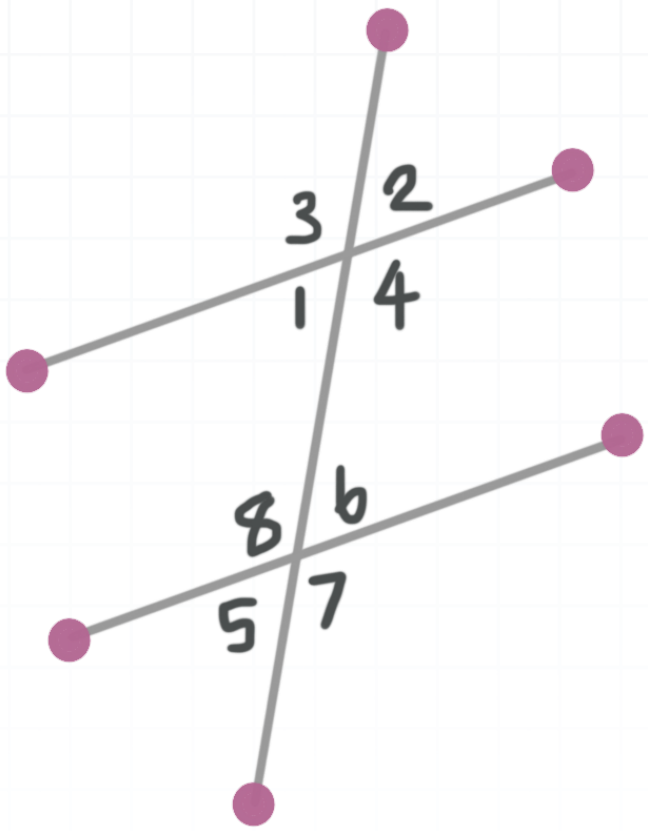
Find $m\angle 1$, $m\angle 3$, and $m\angle 4$.



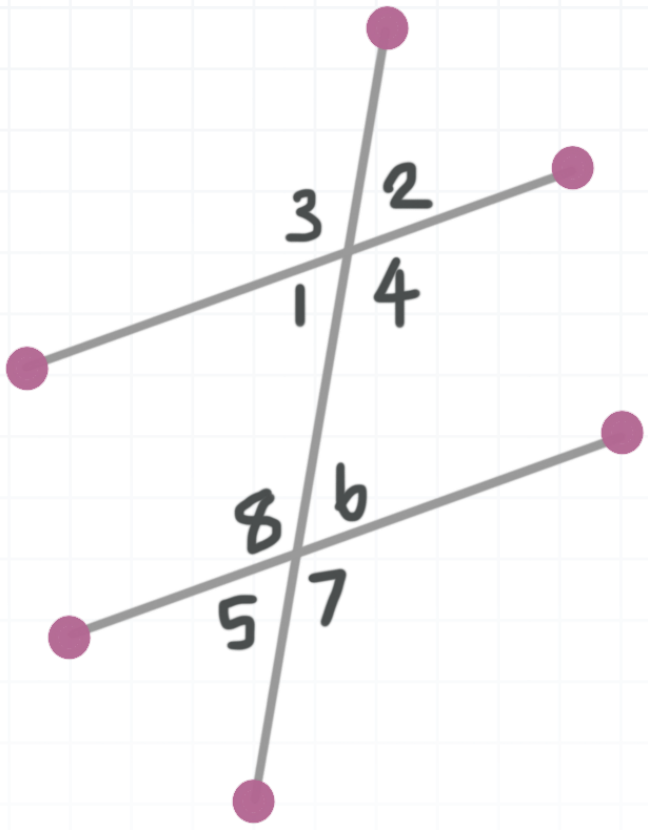
4. $\angle JVC$ and $\angle EVC$ are adjacent and complementary. Further, suppose $m\angle JVC = 2m\angle EVC$. Sketch a diagram of this situation and find the measure of each angle.

ANGLES AND TRANSVERSALS

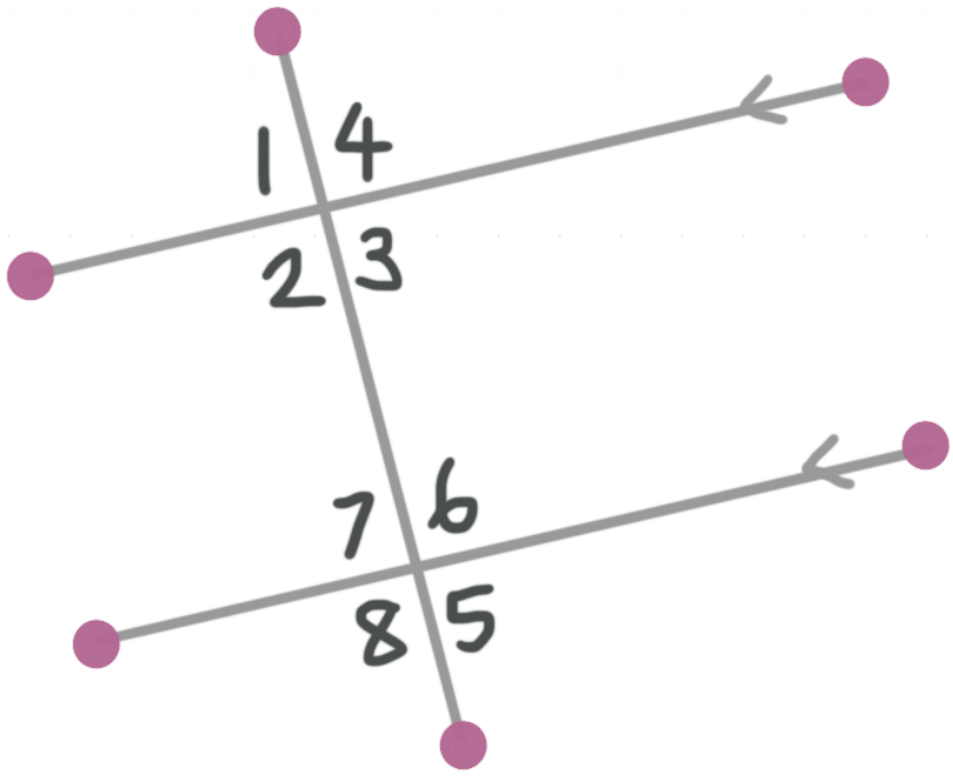
1. Name a pair of corresponding angles.



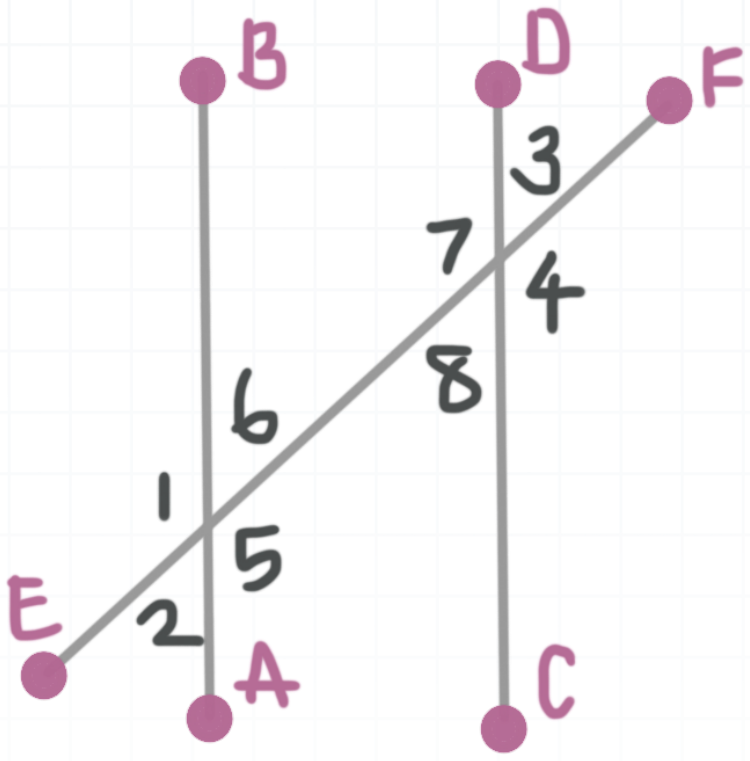
2. Find $m\angle 2$, $m\angle 6$, and $m\angle 5$ if $m\angle 3 = 105$.



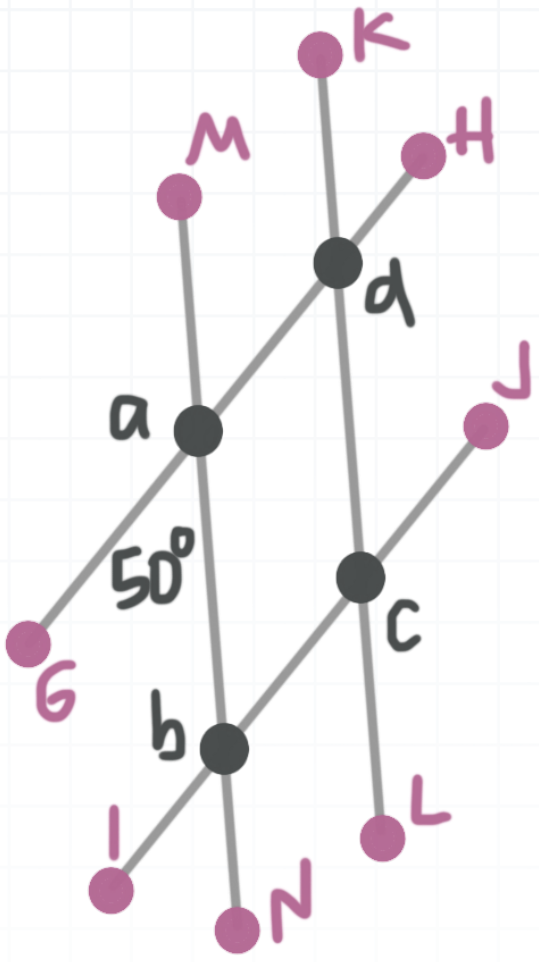
3. Find x and $m\angle 3$ if $m\angle 2 = 5x + 2$ and $m\angle 7 = 3x + 14$.



■ 4. Find the values of x and y if $\overline{AB}$ and $\overline{DC}$ are parallel lines, and if $m\angle 1 = 2x + y$, $m\angle 2 = 28$, and $m\angle 3 = x + 10$.



■ 5. $\overline{MN}$ and $\overline{KL}$ are parallel. $\overline{GH}$ and $\overline{IJ}$ are parallel. Find the values of a, b, c, and d.

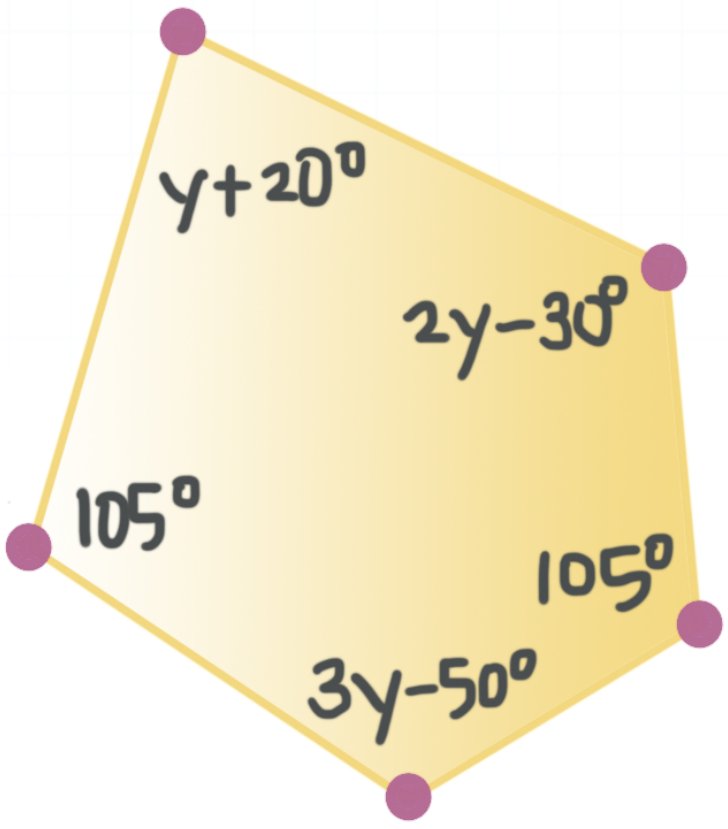


INTERIOR ANGLES OF POLYGONS

- 1. Find the sum of the interior angles of a hexagon.

- 2. Find the measure of each interior angle of a regular 15-gon.

- 3. Find the value of y. Then determine whether this a regular polygon.



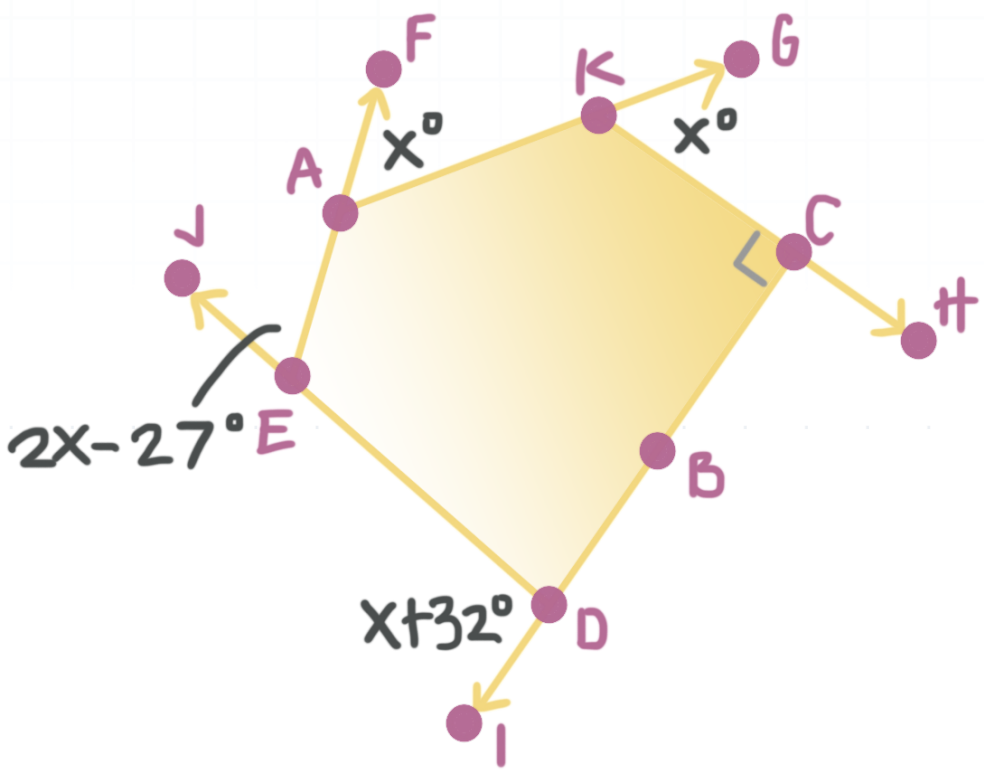
- 4. Each interior angle measure of a regular polygon is $160°$. Find the number of sides of this polygon.

EXTERIOR ANGLES OF POLYGONS

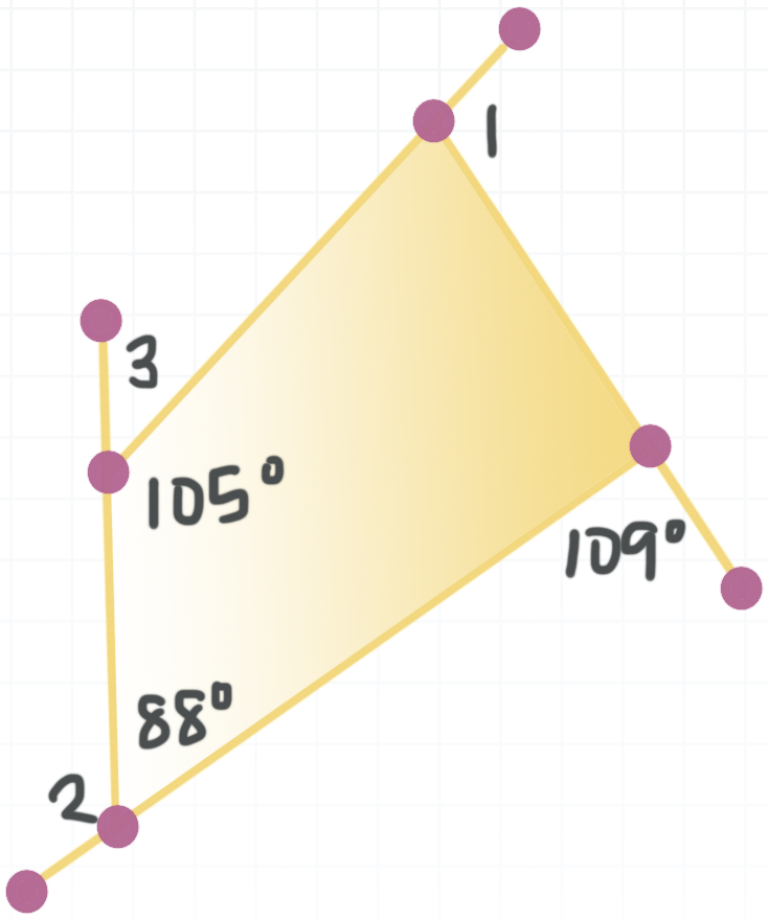
■ 1. Find the sum of the exterior angles of a decagon.

■ 2. Each exterior angle of a regular polygon has measure of $30°$. Find the number of sides of this polygon.

■ 3. Find the value of x.

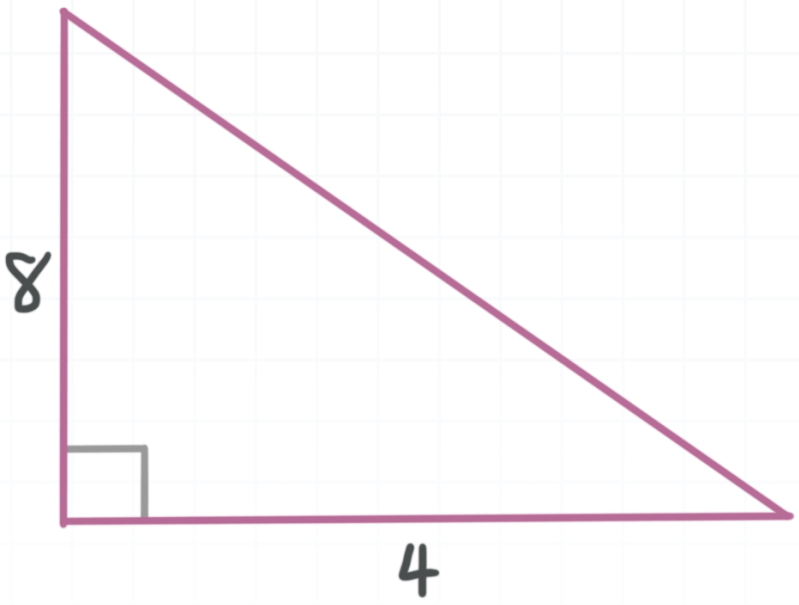


■ 4. Find $m\angle 1$, $m\angle 2$, and $m\angle 3$ based on the figure.

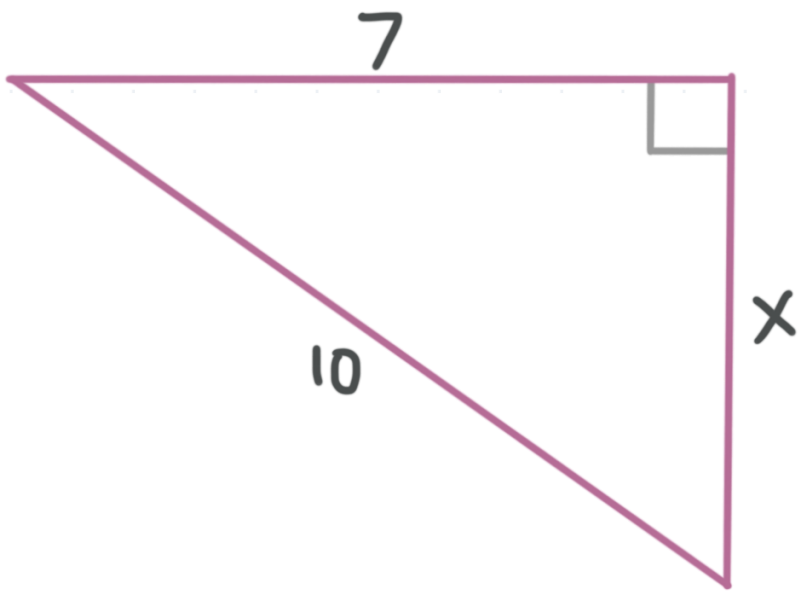


PYTHAGOREAN THEOREM

■ 1. Find the exact length of the hypotenuse.

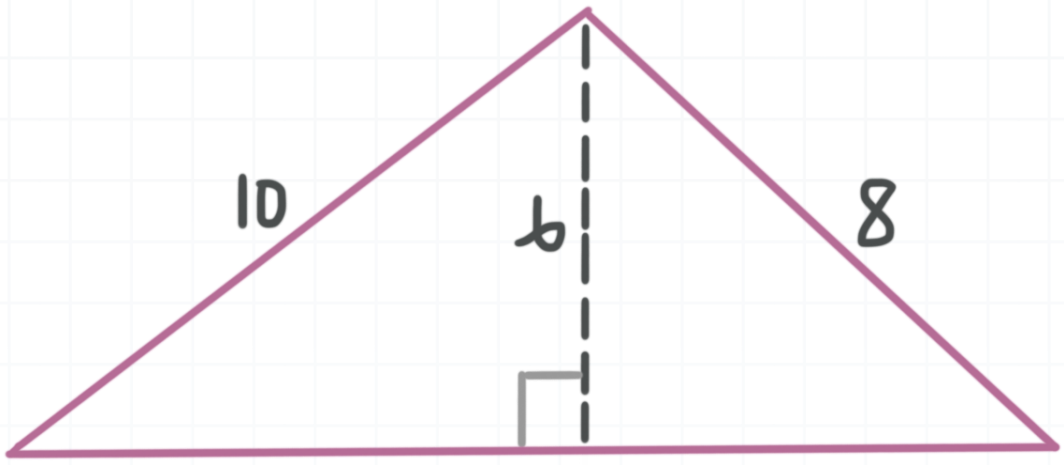


■ 2. Find the exact length of the missing leg.



■ 3. Find the length of the diagonal of a rectangle with length 14 and width 8.

4. Find the perimeter of the triangle to the nearest tenth.



PYTHAGOREAN INEQUALITIES

■ 1. The side lengths of a triangle are 10, 14, and 15. Determine whether the triangle is obtuse, acute, or right.

■ 2. The side lengths of a triangle are 7, 18, and 12. Determine whether this triangle is obtuse, acute, or right.

■ 3. A triangle's two shortest sides have lengths 8 and 6. Let x be the length of the third side. Give a compound inequality that represents all possible lengths of the third side, ensuring that the triangle is acute.

■ 4. The side lengths of a triangle in ascending order are x, $x + 2$, and 10. Find the value of x such that this is a right triangle.

EQUATION OF A CIRCLE

■ 1. A circle has a radius of 4 and center at $(-2,5)$. Write the equation for this circle.

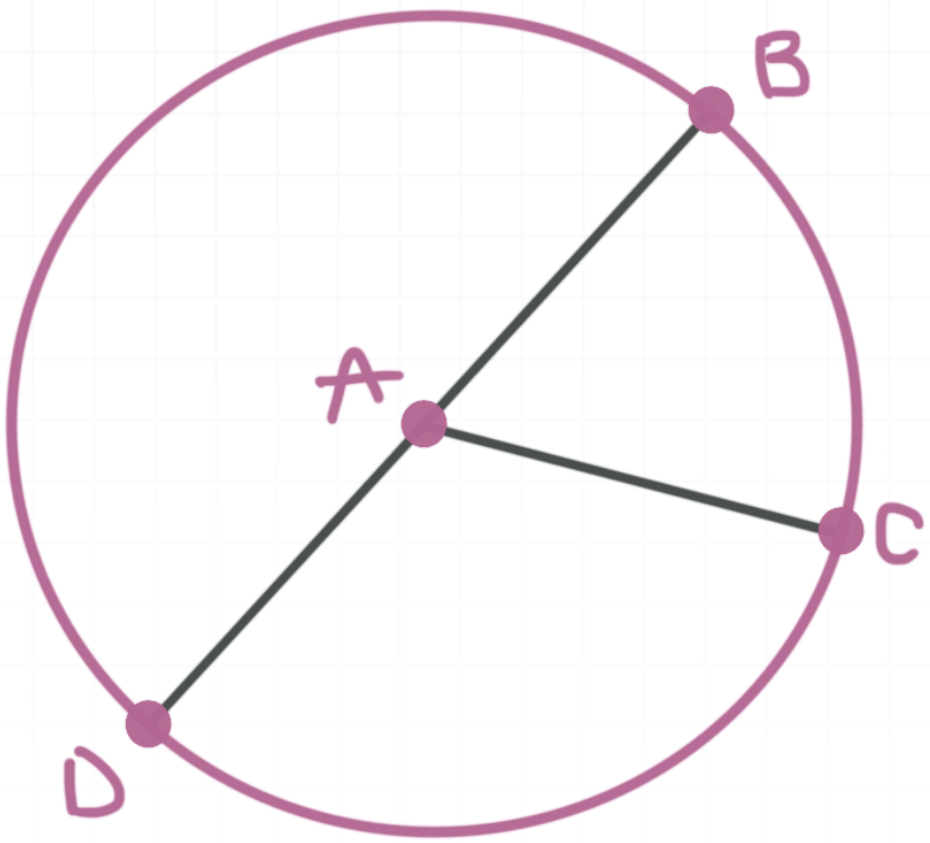
■ 2. Find the center and diameter of the circle given by $(x-3)^2+(y+2)^2=9$.

■ 3. A circle has a diameter with endpoints at $(-3,-1)$ and $(3,7)$. Find the equation of the circle.

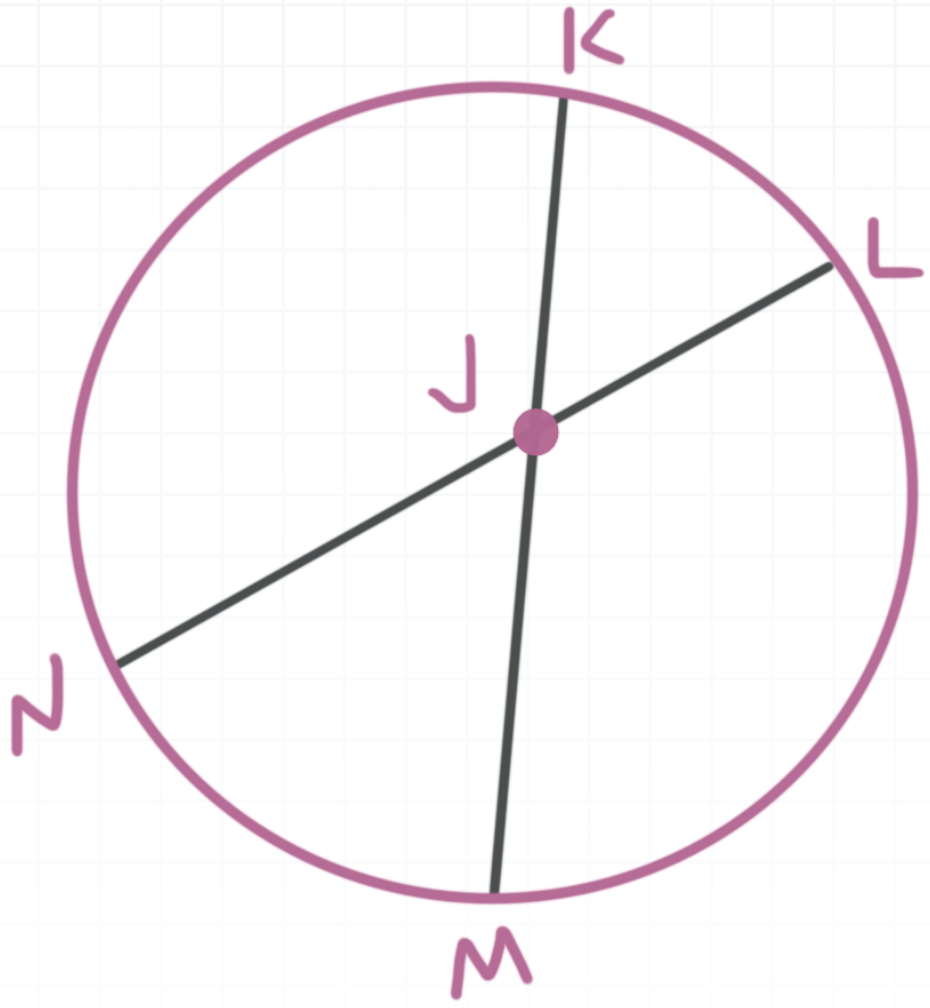
■ 4. A cellphone tower services a 17 mile radius. A rest stop on the highway is 6 miles east and 8 miles north of the tower. If you continue to travel due east from the rest stop, for how many more miles will you be in range of the tower?

DEGREE MEASURE OF AN ARC

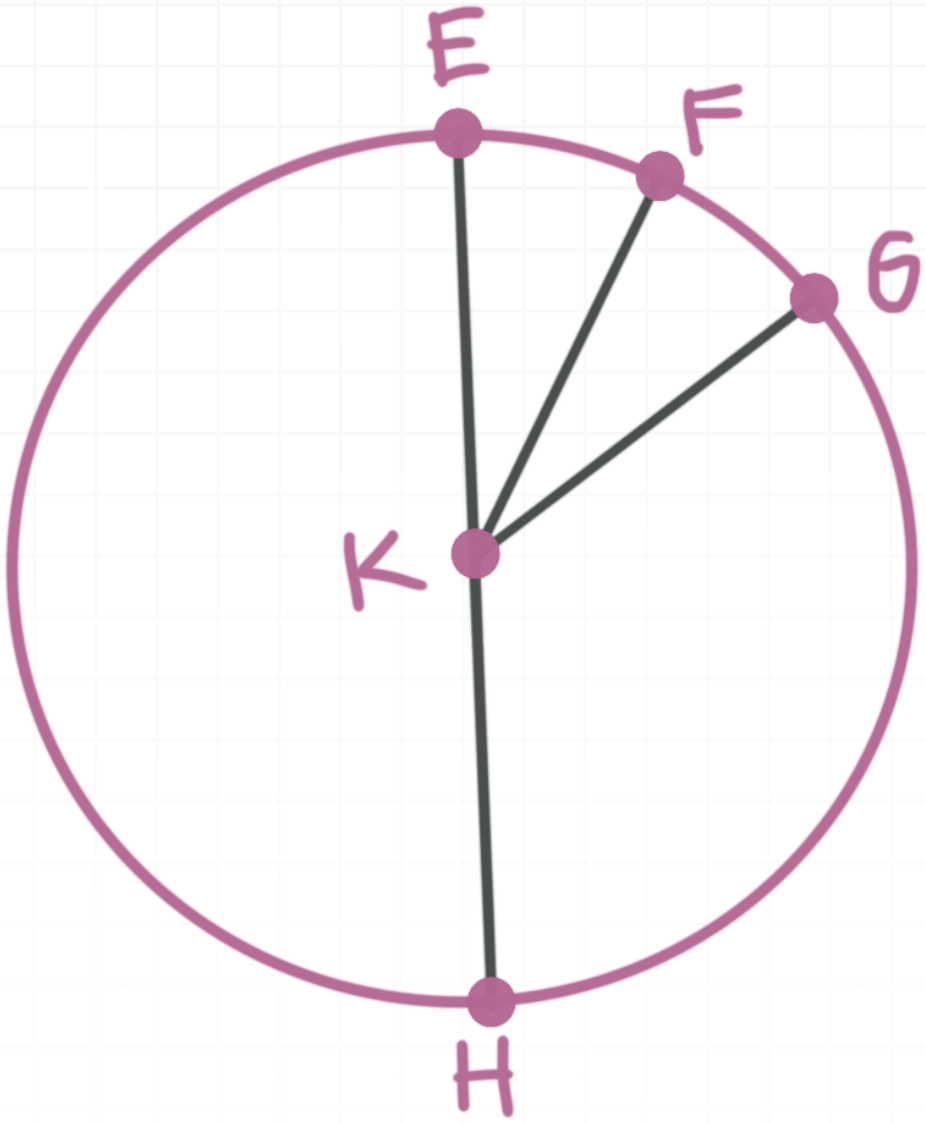
1. In $\odot A$, $m\angle BAC = 65°$ and $\overline{BD}$ is a diameter. Find the measure of arc DC.



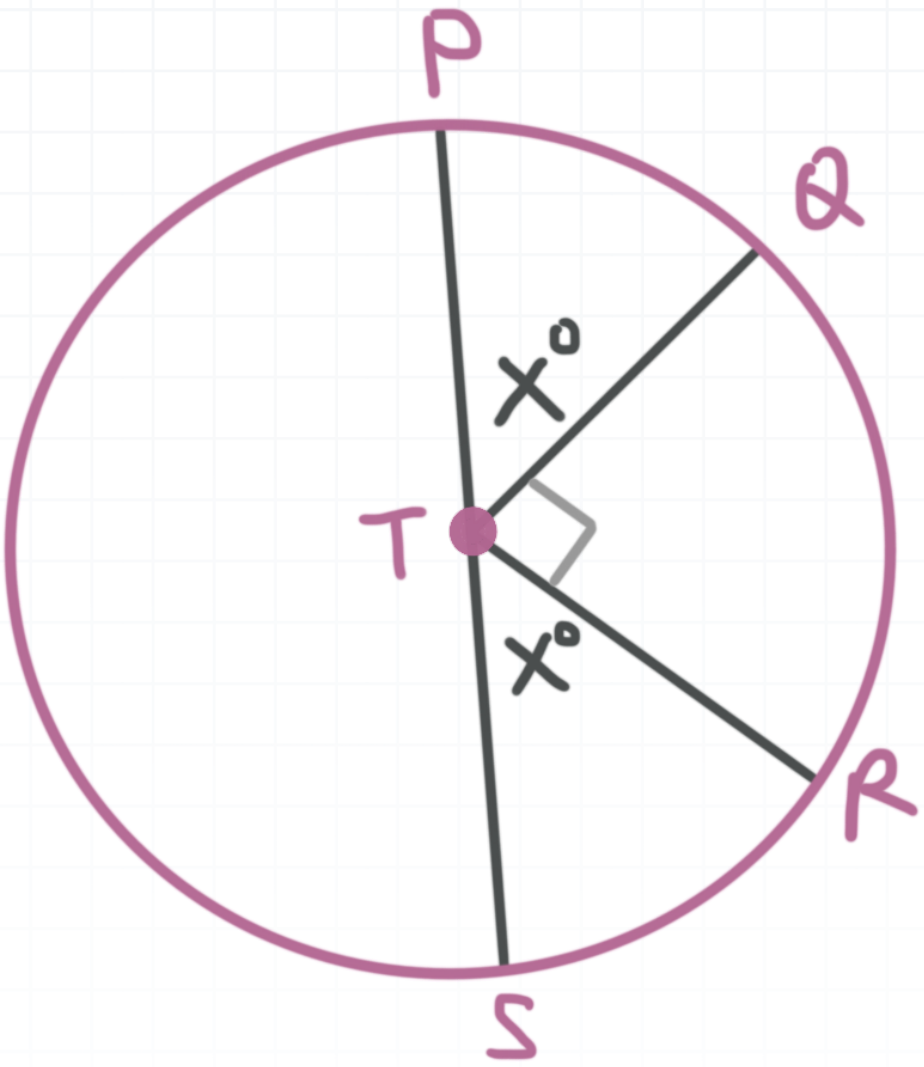
2. In $\odot J$, $m\angle KJL = 54°$ and $\overline{KM}$ and $\overline{LN}$ are diameters. Find the measure of arc MN.



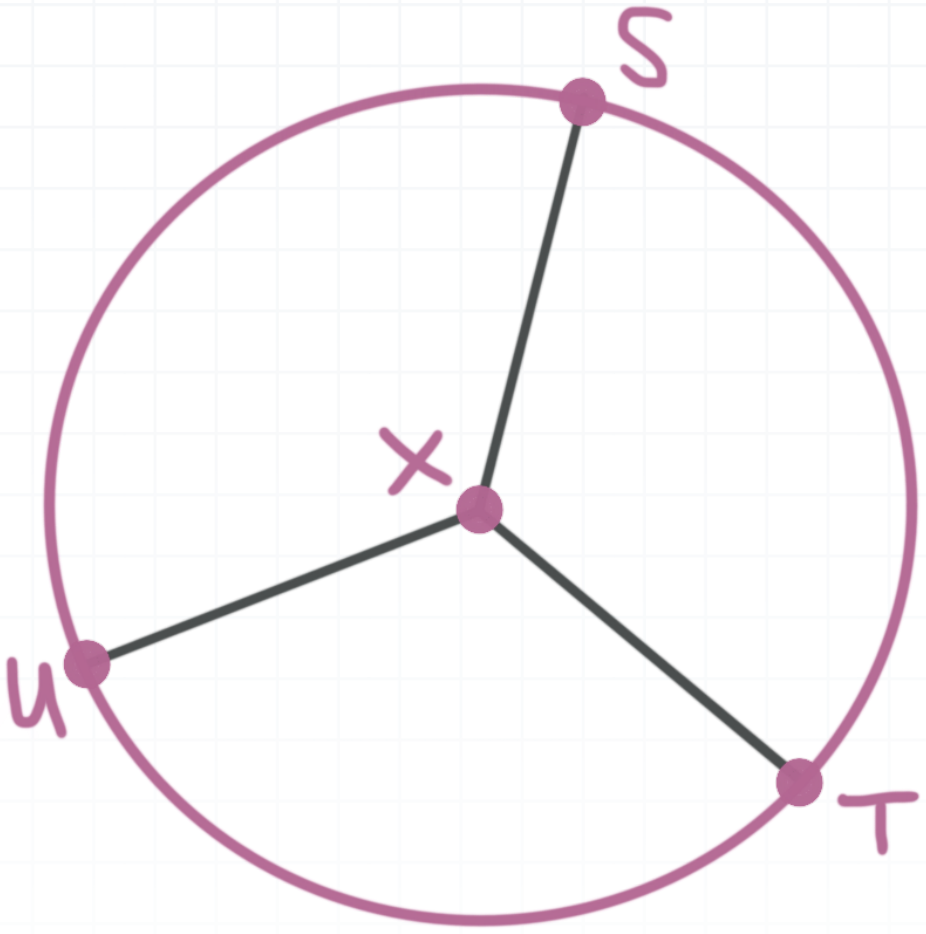
■ 3. In $\odot K$, $m\angle EKG = 70°$, $\overline{EH}$ is a diameter, and $\overline{KF}$ bisects $\angle EKG$. Find the measure of arc FEH.



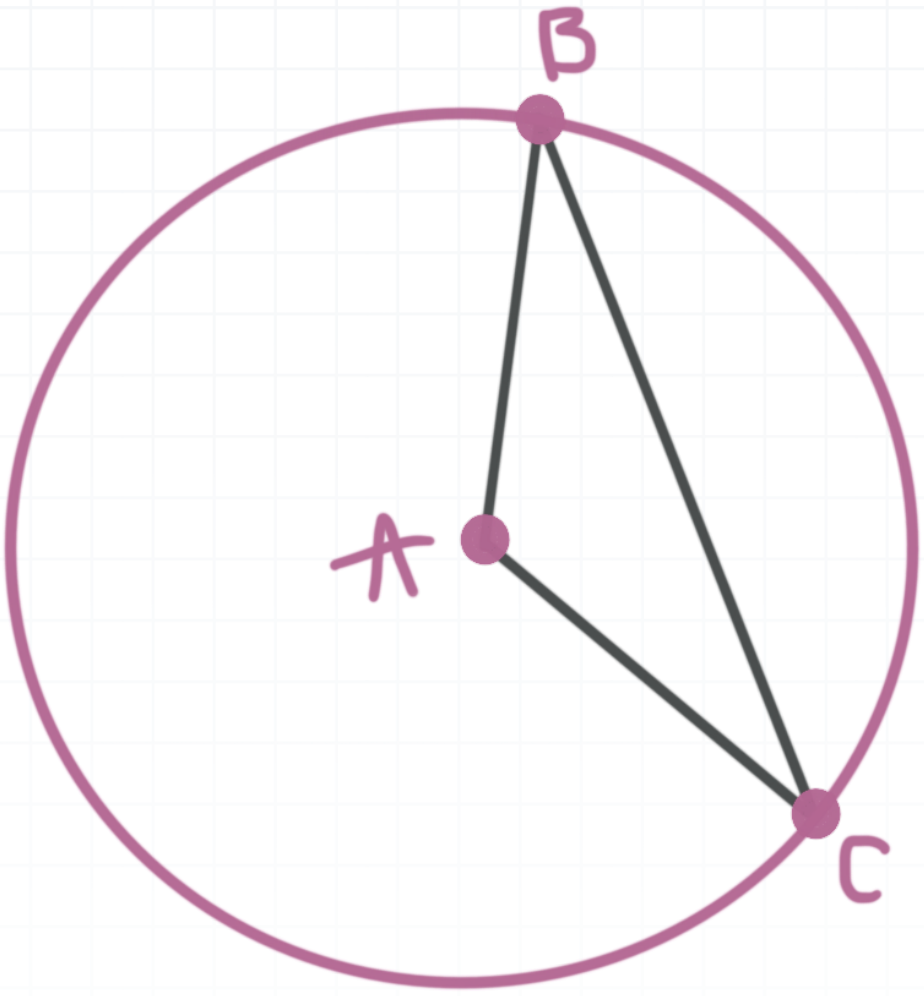
4. Find the measure of arc PR, if $\overline{PS}$ is the diameter of $\odot T$.



■ 5. In $\odot X$, $\angle UXS \cong \angle SXT \cong \angle UXT$. Find the measure of arc STU.

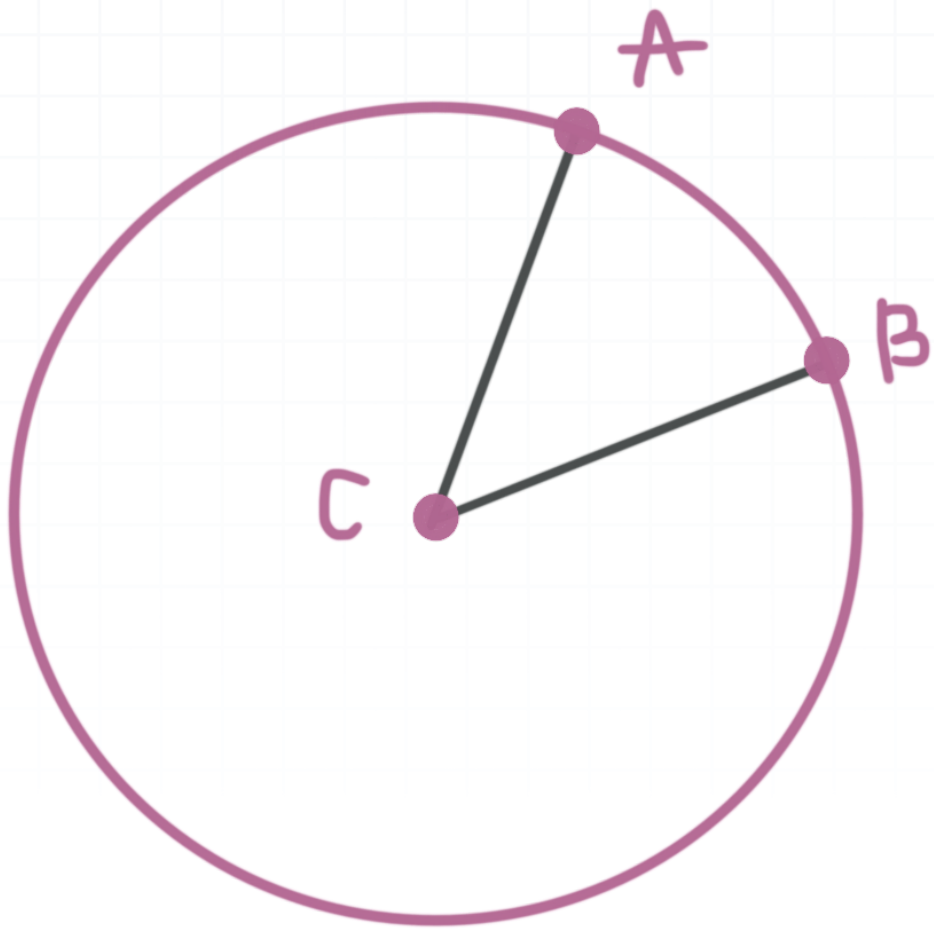


6. In $\odot A$, $m\angle ABC = 15°$. Find the measure of arc BC.

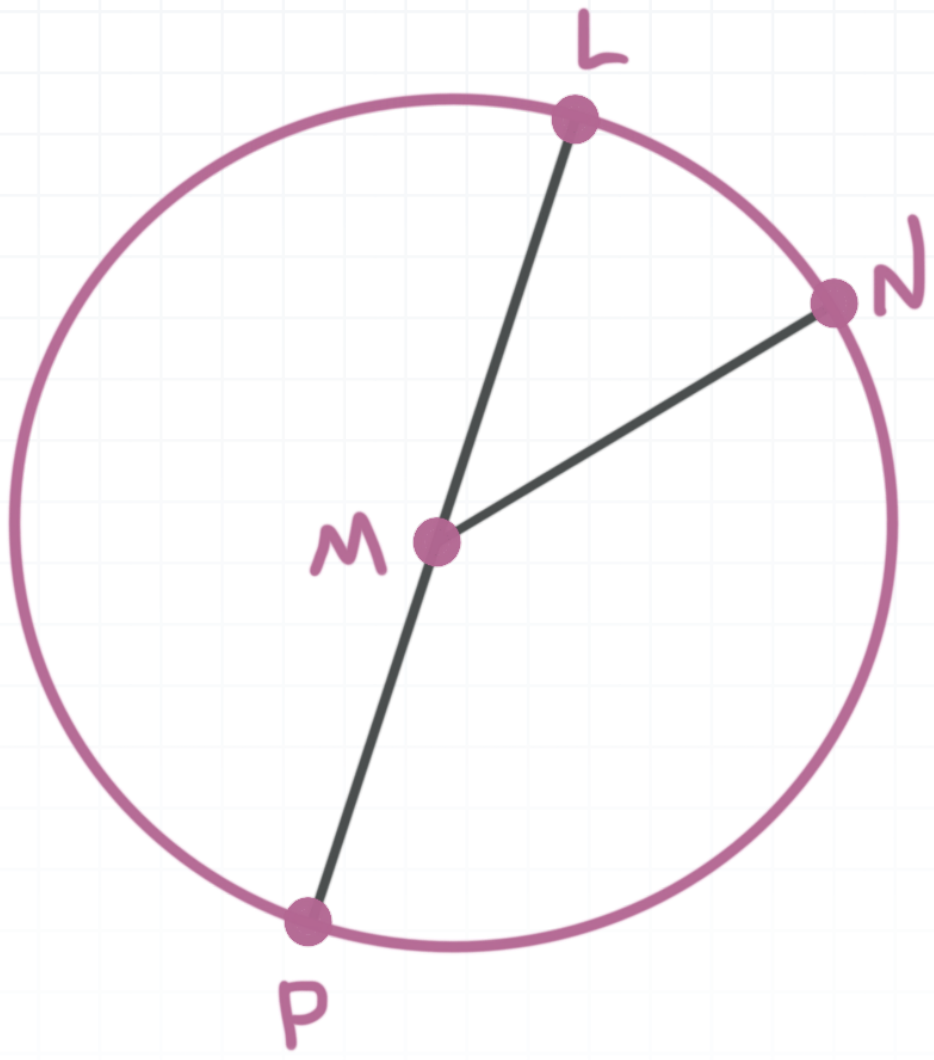


ARC LENGTH

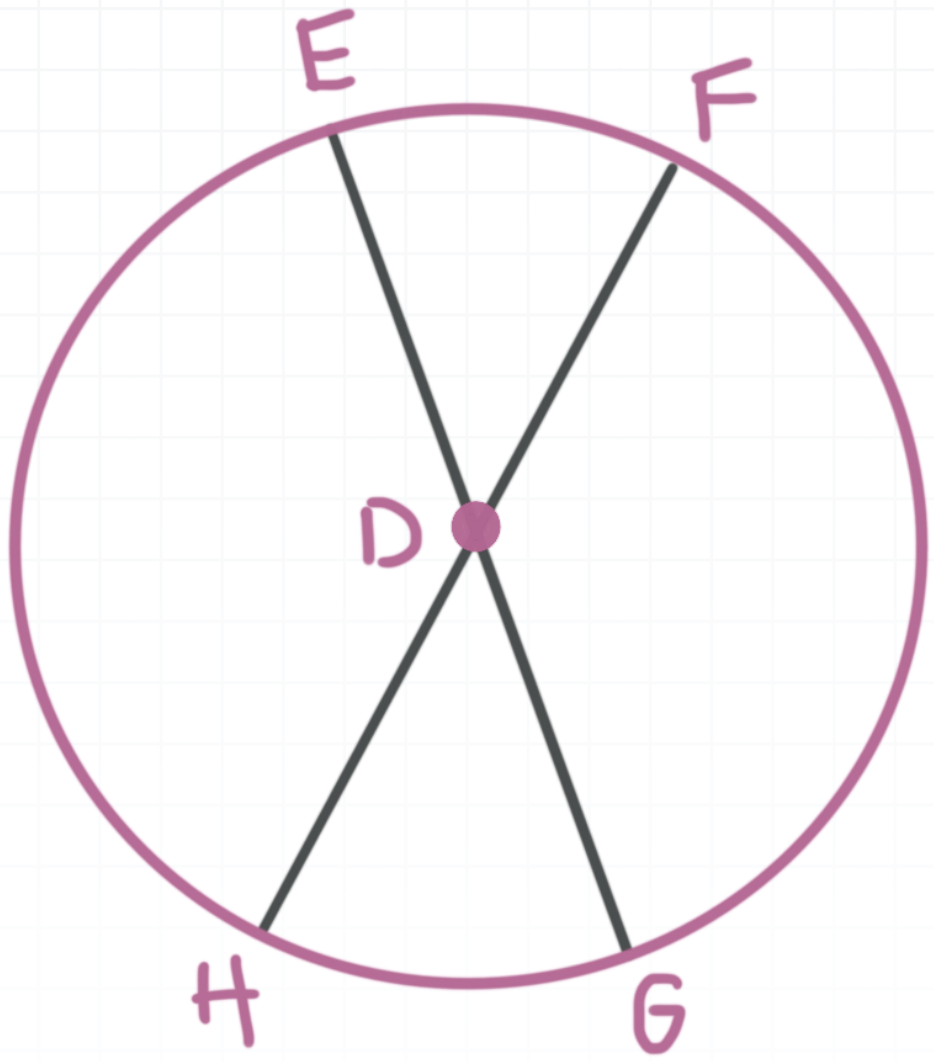
■ 1. In $\odot C$, $m\angle ACB = 50°$. Find the length of arc AB if $CA = 14$. Round your answer to the nearest hundredth.



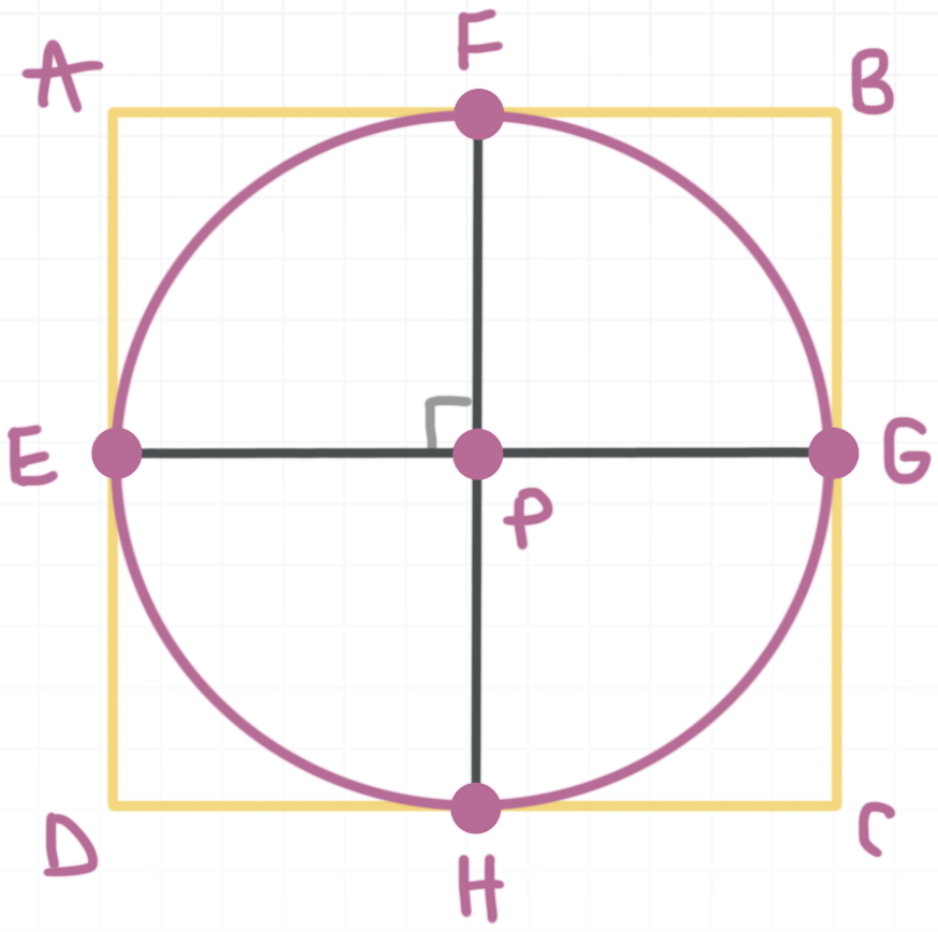
■ 2. In $\odot M$, $m\angle LMN = 60°$ and $\overline{LP}$ is a diameter. Find the length of arc LPN if $LP = 24$. Round your answer to the nearest hundredth.



■ 3. $\overline{EG}$ and $\overline{FH}$ are diameters of $\odot D$. Find the length of arc HG if $m\angle EDF = 45°$ and $ED = 16$. Write the exact value.

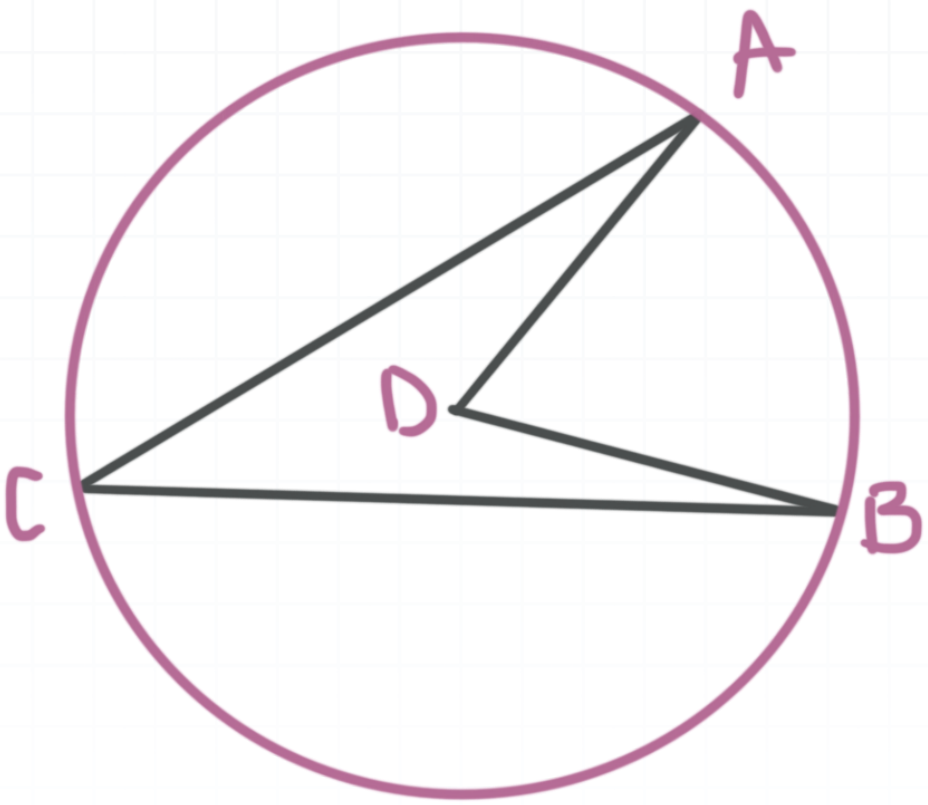


■ 4. The area of square $ABCD$ is 144 cm^2 and circle P is inscribed in the square. $\overline{EG}$ and $\overline{FH}$ are perpendicular to one another, and both are diameters of $\odot P$. E, F, G, and H are midpoints of each side of the square. Find the length of arc EF, rounded to the nearest hundredth.

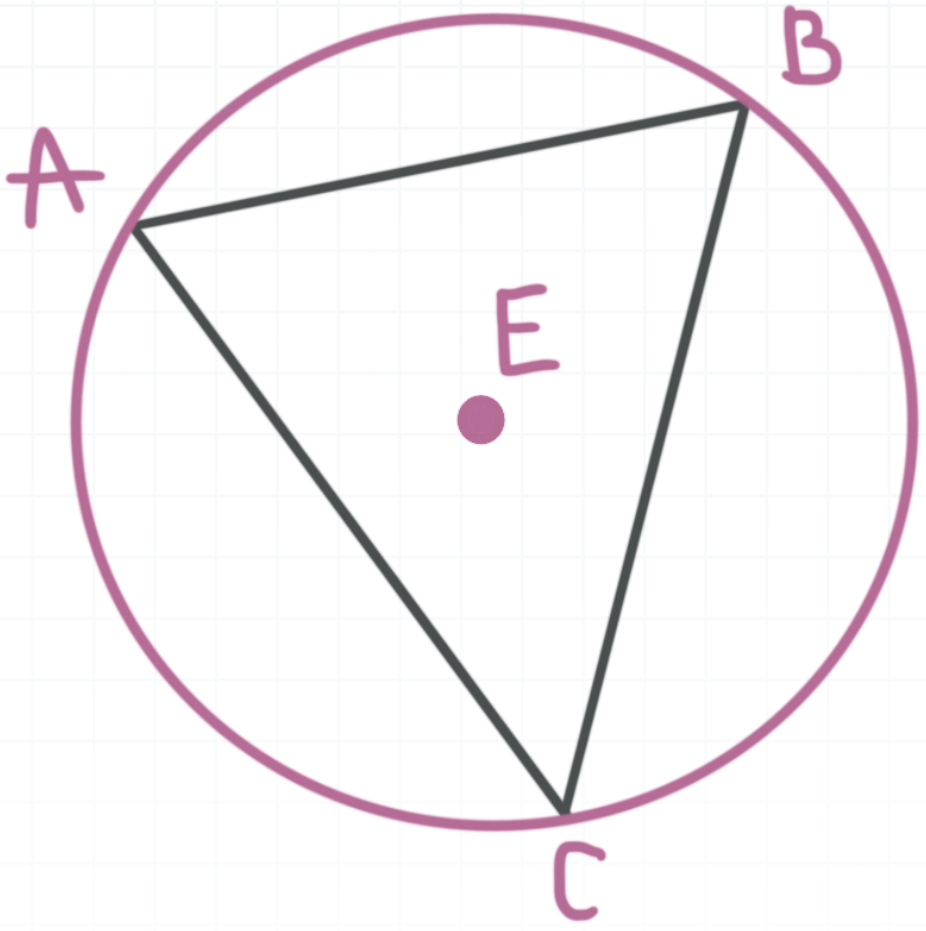


INSCRIBED ANGLES OF CIRCLES

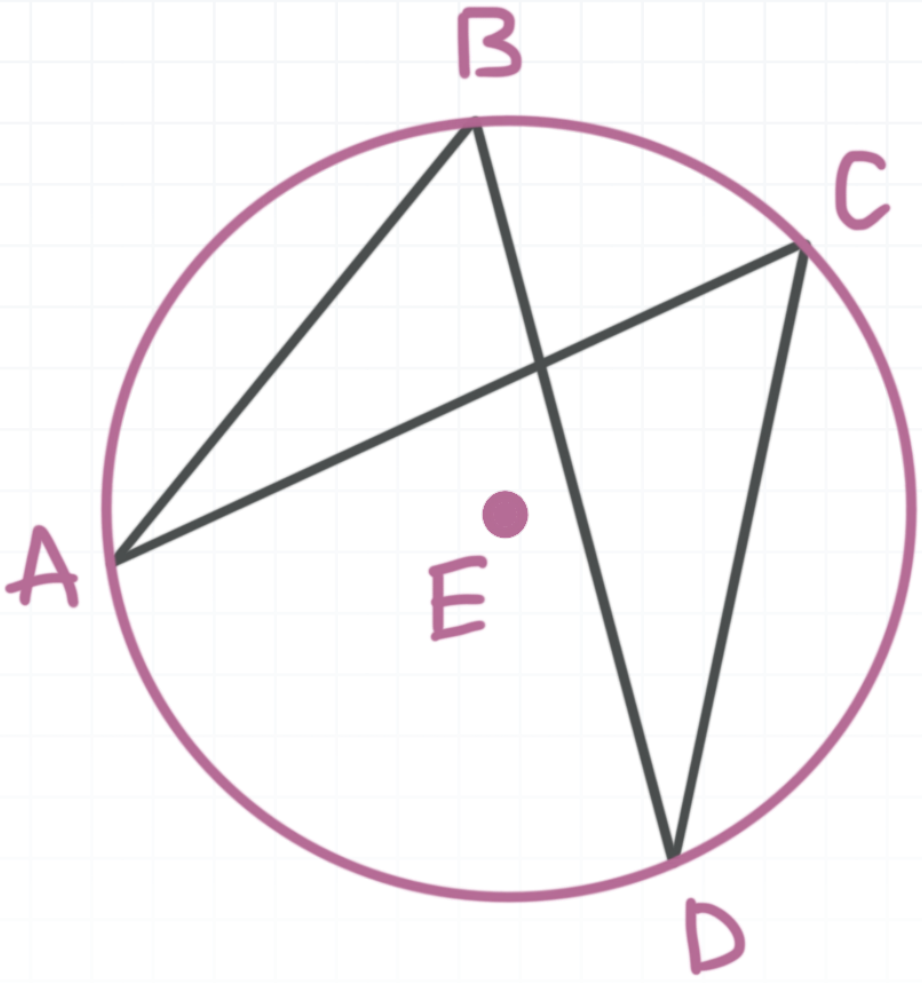
■ 1. In $\odot D$, $m\angle ADB = 88°$. Find $m\angle ACB$.



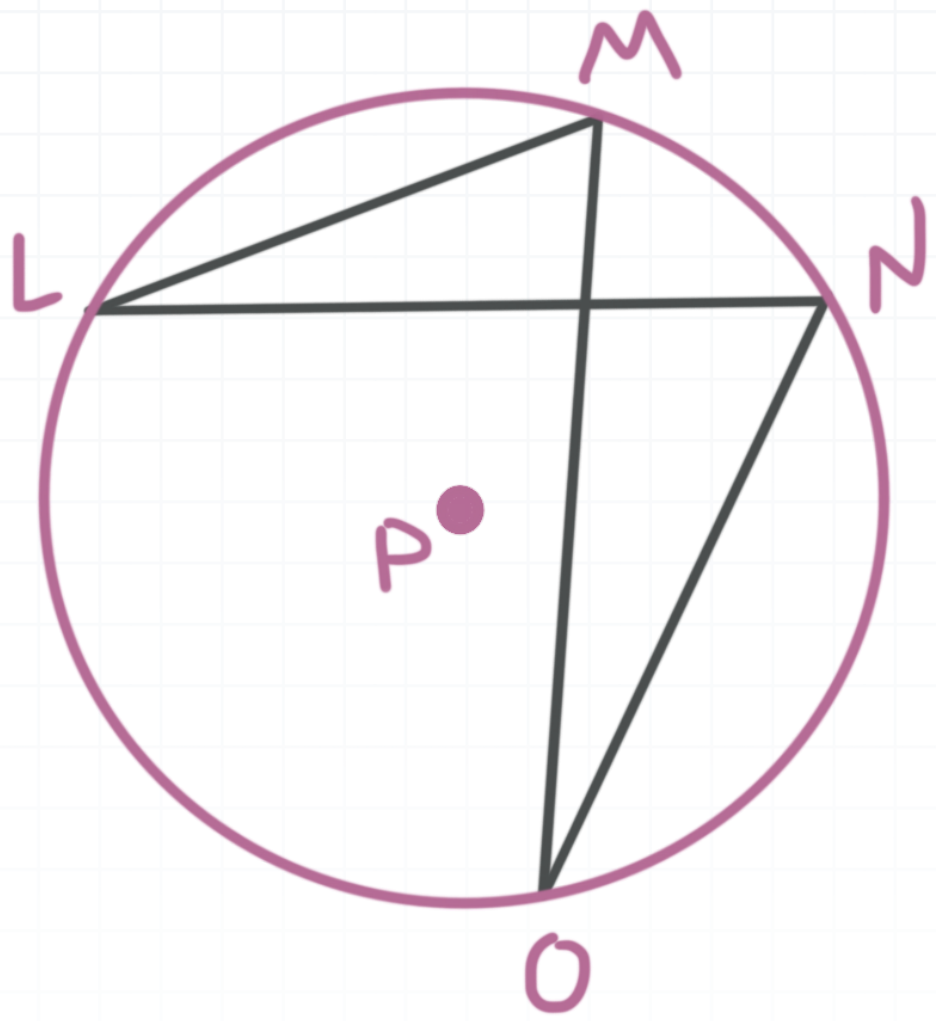
■ 2. In $\odot E$, $\overline{AC} \cong \overline{CB}$ and $m\angle ABC = 55°$. Find the measure of arc AB.



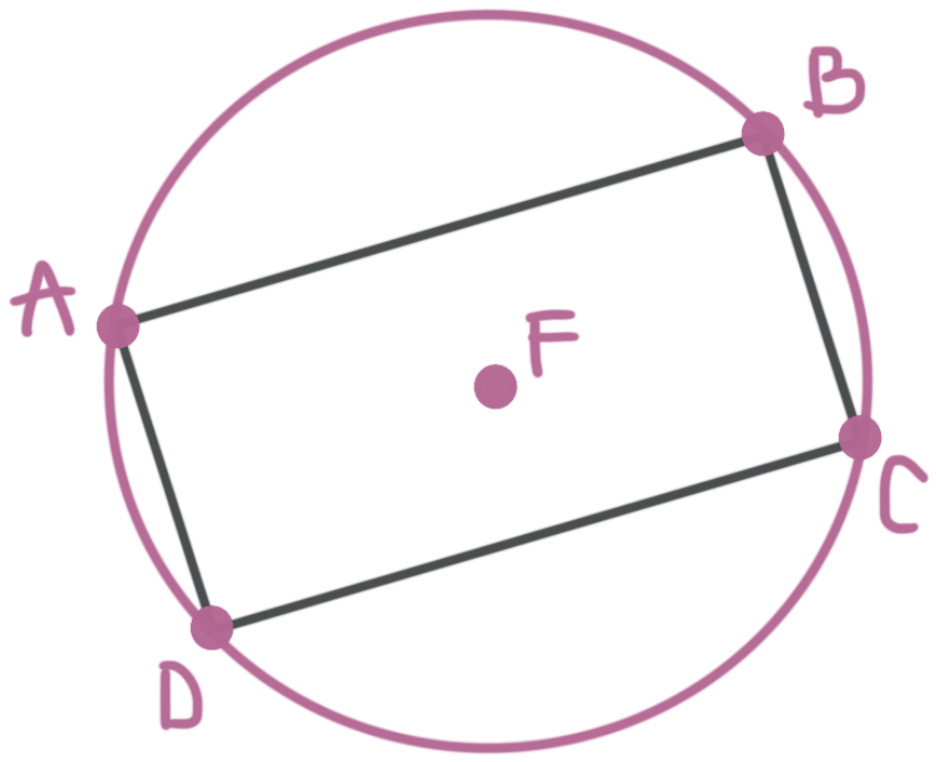
■ 3. In $\odot E$ the measure of arc AB is $100°$, the measure of arc BC is $40°$, and the measure of CD is $110°$. Find $m\angle ABD$.



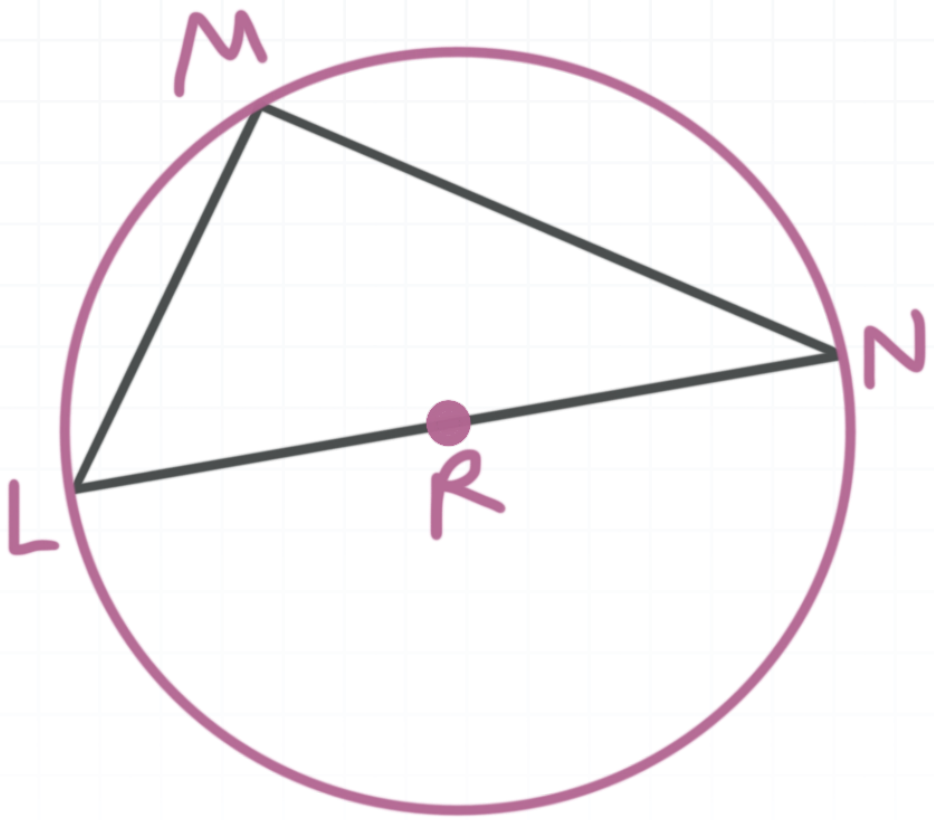
4. In $\odot P$, $m\angle LMO = 2x - 18$ and the measure of arc $LO = 88°$. Find x.



■ 5. Rectangle $ABCD$ is inscribed in $\odot F$ and the measure of arc DAC is $230°$. Find the measure of arc AB.

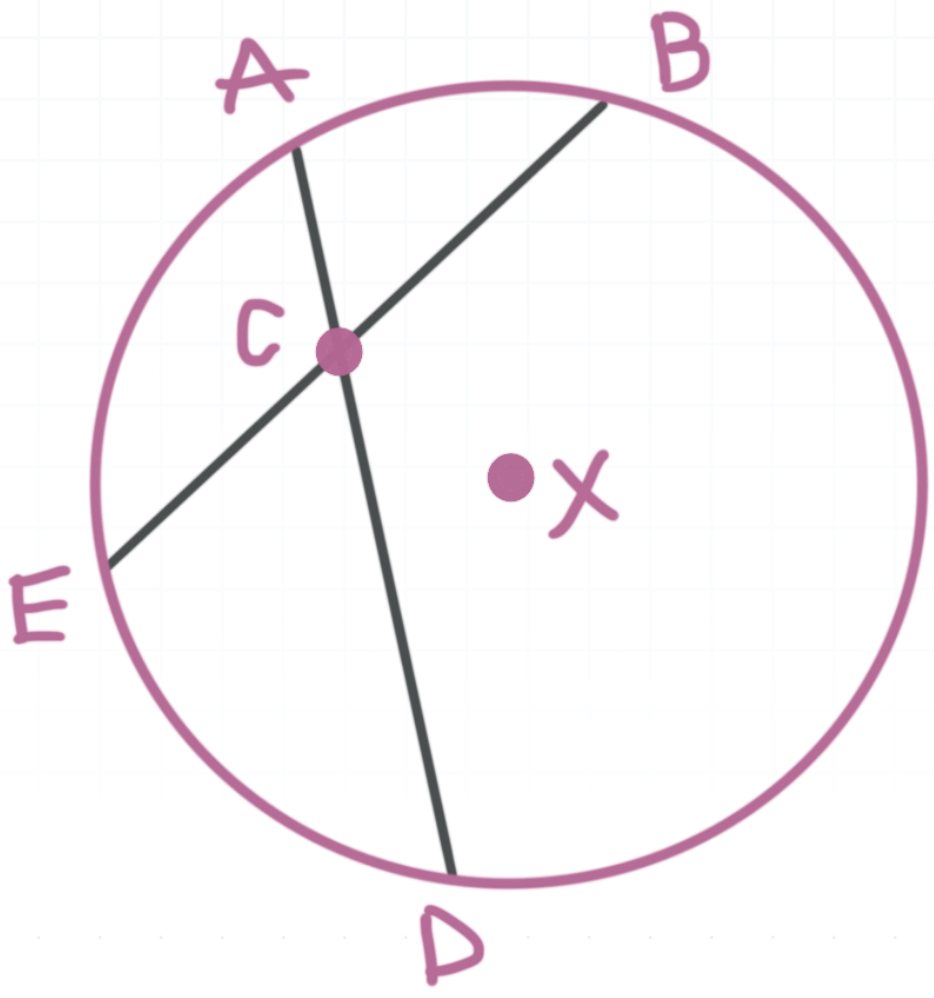


■ 6. In $\odot R$, $\overline{LN}$ is a diameter, $m\angle MLN = 4x + 20$, and $m\angle LNM = 5x - 38$. Find the measure of arc LM.

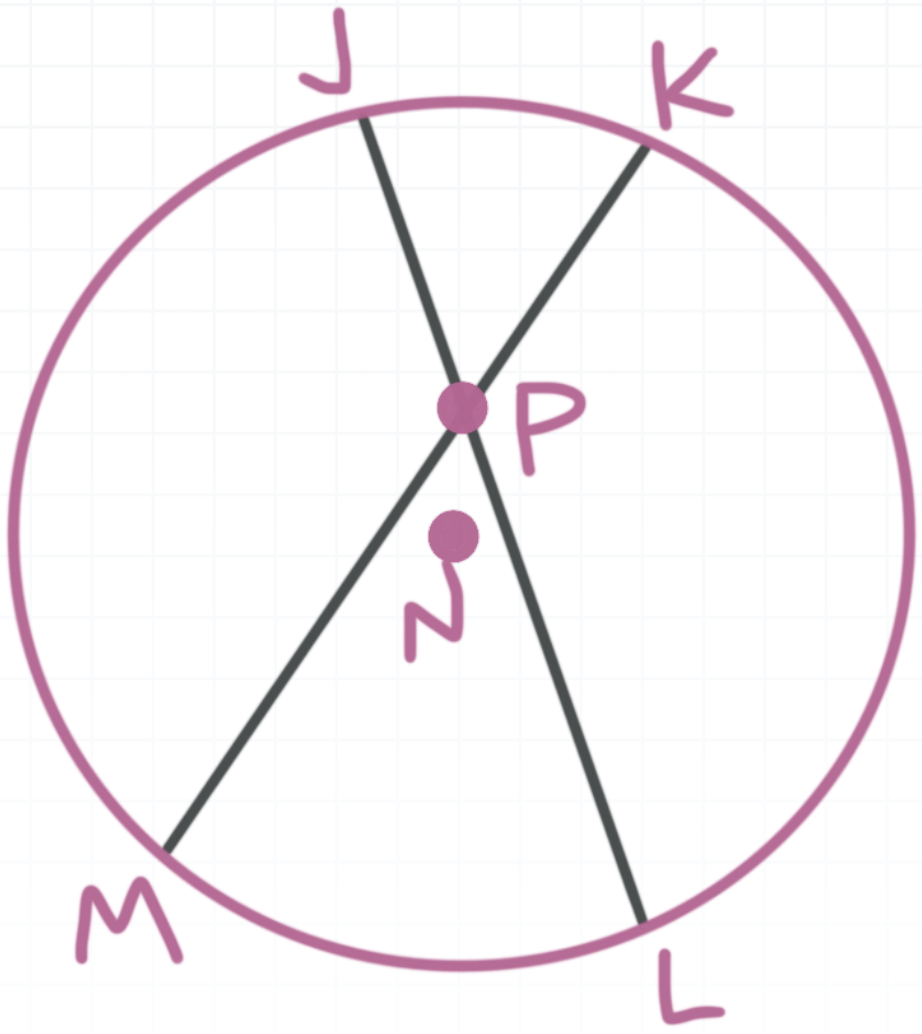


VERTEX ON, INSIDE AND OUTSIDE THE CIRCLE

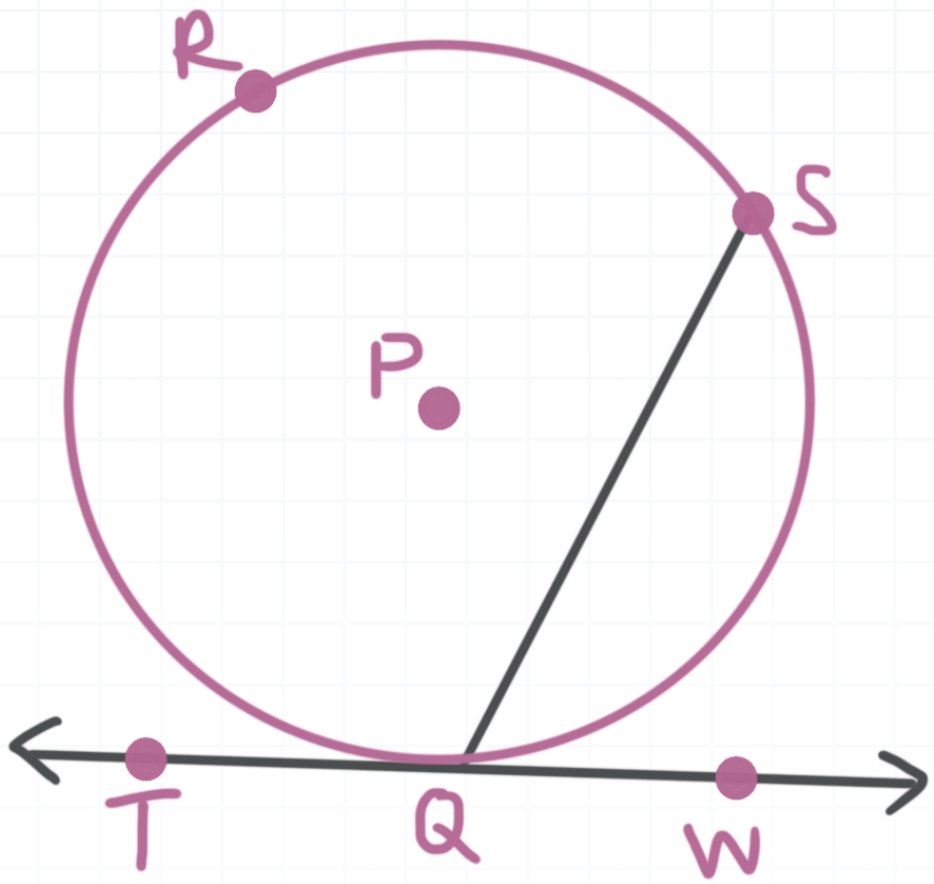
■ 1. $\overline{AD}$ and $\overline{EB}$ are chords of $\odot X$. The measure of arc AB is $35°$ and the measure of arc ED is $85°$. Find $m\angle ECD$.



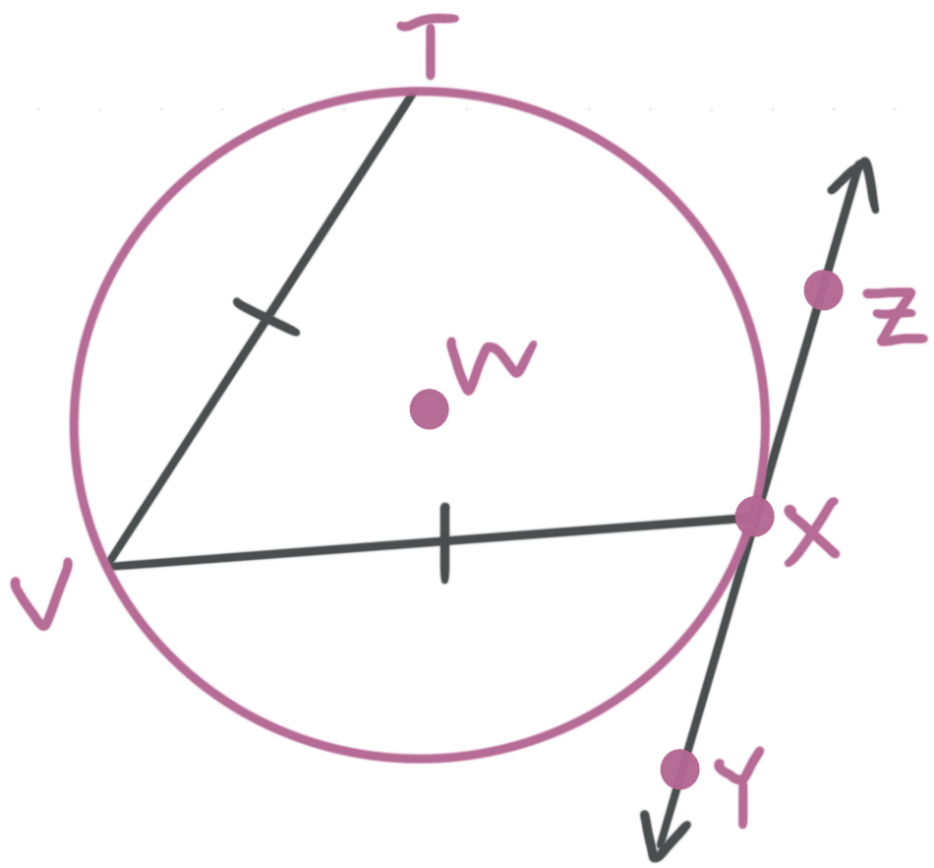
■ 2. $\overline{JL}$ and $\overline{KM}$ are chords of $\odot N$. The measure of arc JK is $25°$ and $m\angle JPK = 40°$. Find the measure of arc ML.



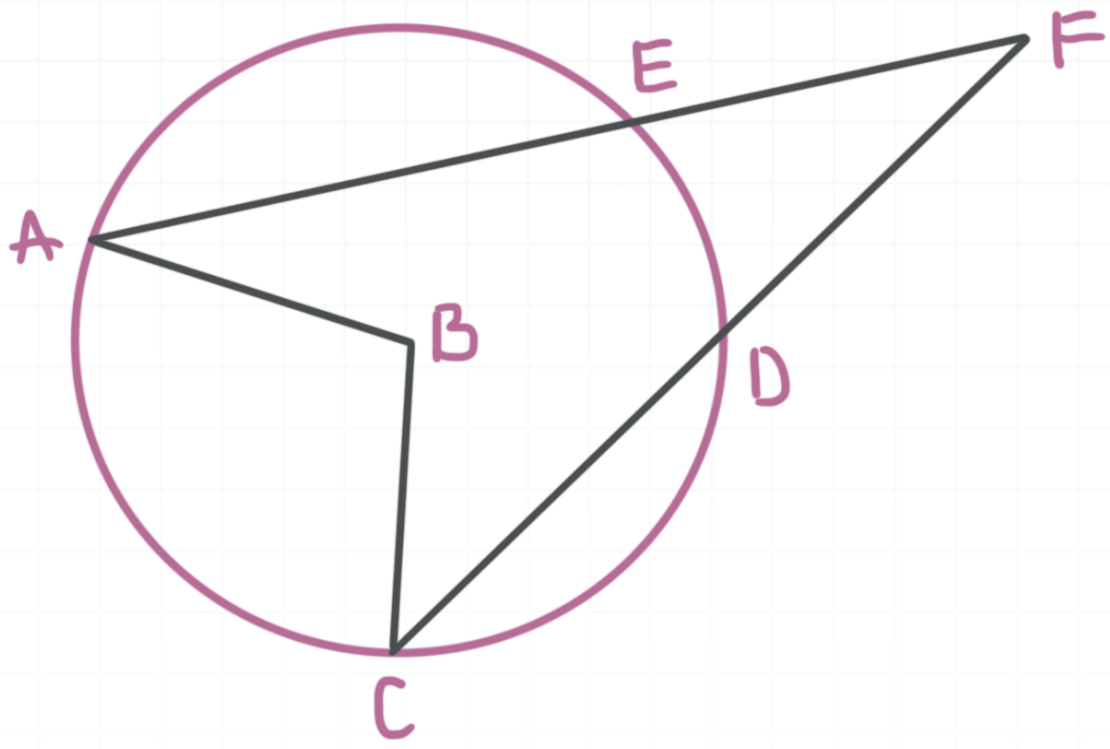
■ 3. $\overline{SQ}$ is a chord and $\overline{TW}$ is a tangent line of $\odot P$. The measure of arc SRQ is $194°$. Find $m\angle SQW$.



4. $\overline{TV}$ and $\overline{VX}$ are congruent chords, and $\overline{ZY}$ is a tangent line of $\odot W$. If $m\angle TVX = 48°$, find $m\angle VXY$.

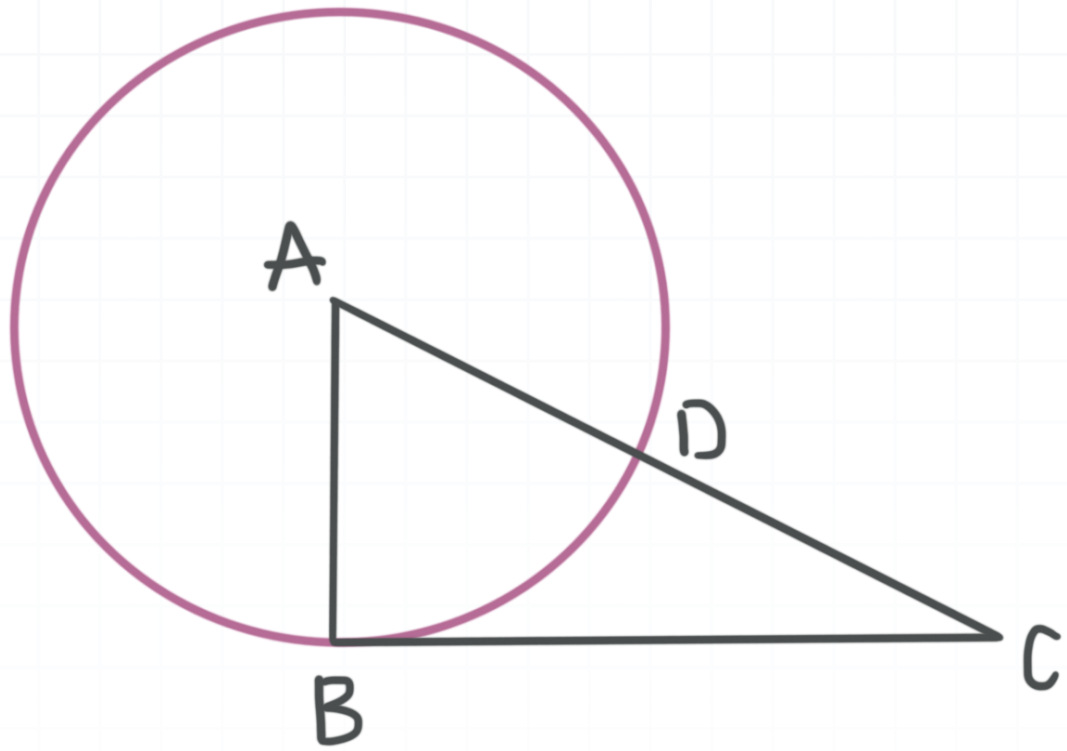


5. arc $AC = 98°$ and arc $ED = 54°$ in $\odot B$. Find $m\angle AFC$.

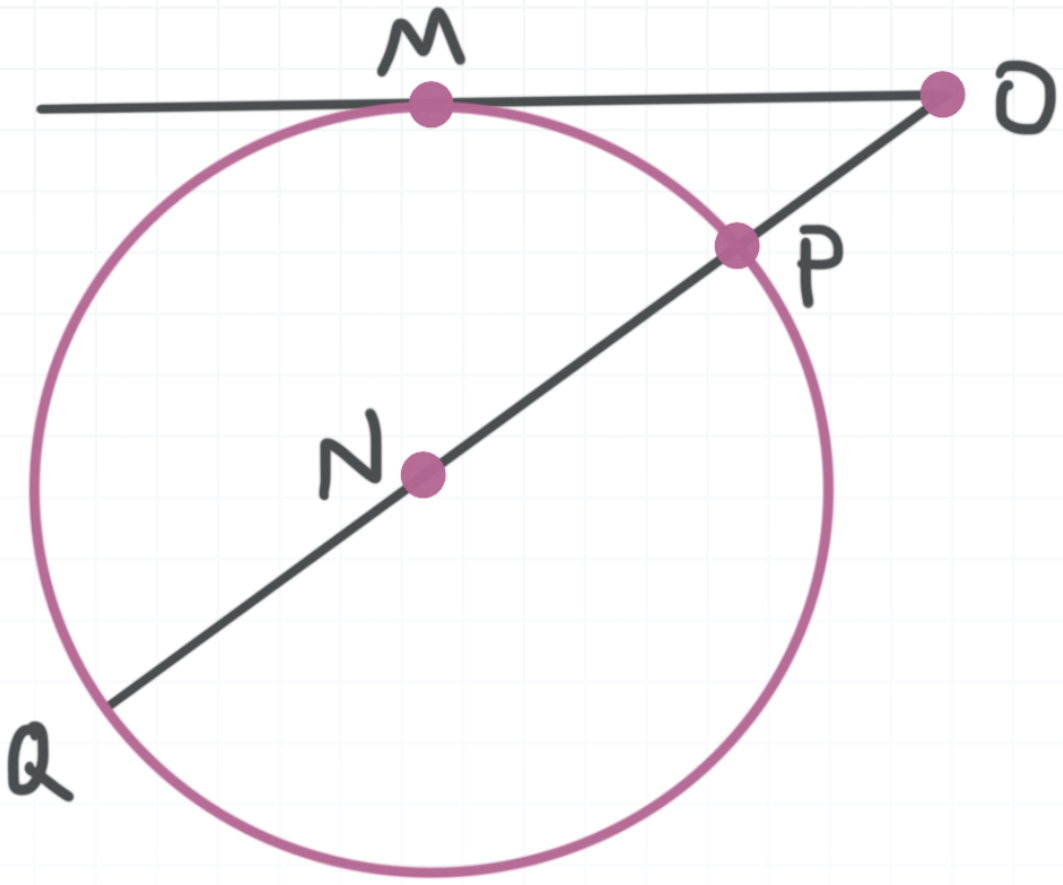


TANGENT LINES OF CIRCLES

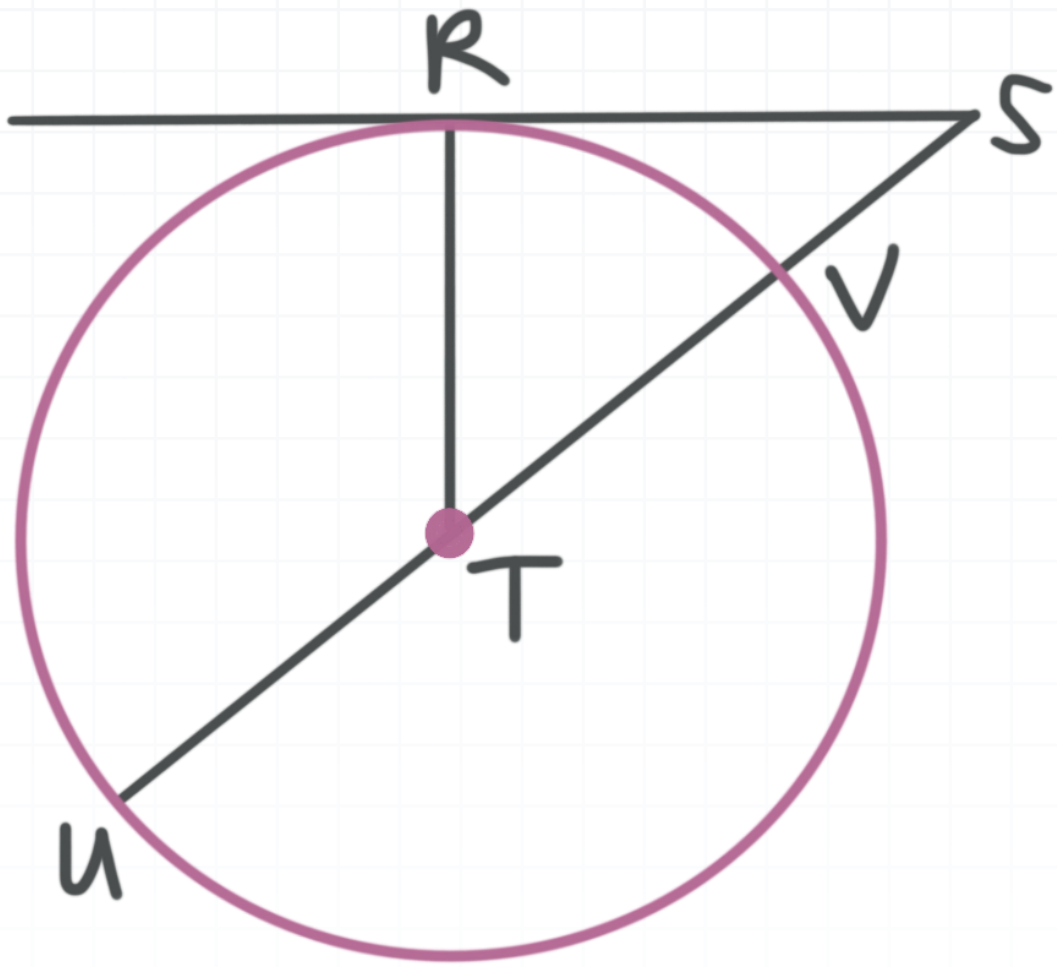
■ 1. $\odot A$ has radius AB and tangent line $\overline{BC}$. If $AB = 6$ and $BC = 8$, find DC.



■ 2. $\overline{MO}$ is a tangent line of $\odot N$. If $MO = 12$ and $PO = 8$, find the length of the radius.

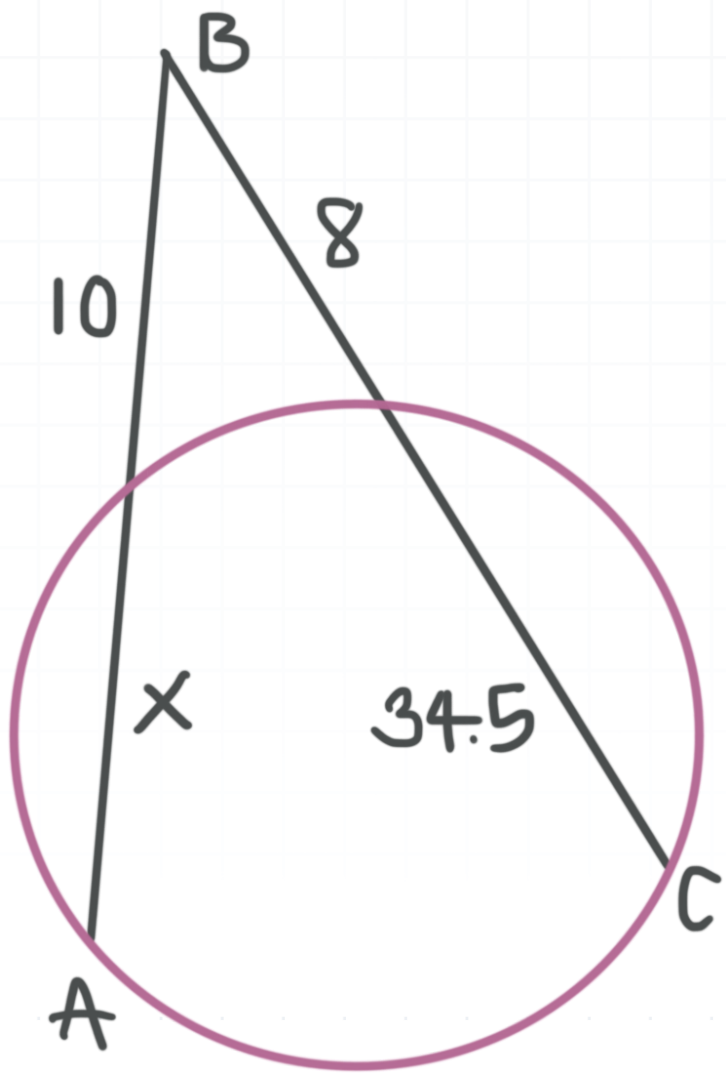


3. In $\odot T$, $\overline{RS}$ is a tangent line and the diameter $\overline{UV}$ has length of 6. Find VS if $RS = 4$.

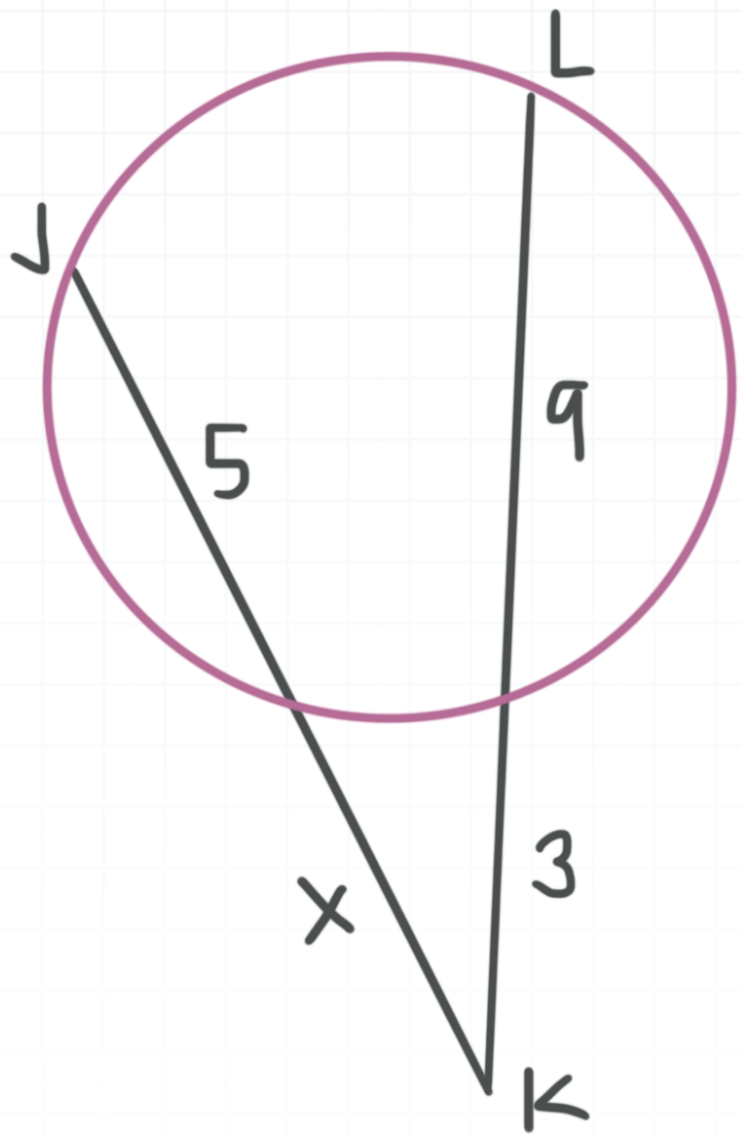


INTERSECTING TANGENTS AND SECANTS

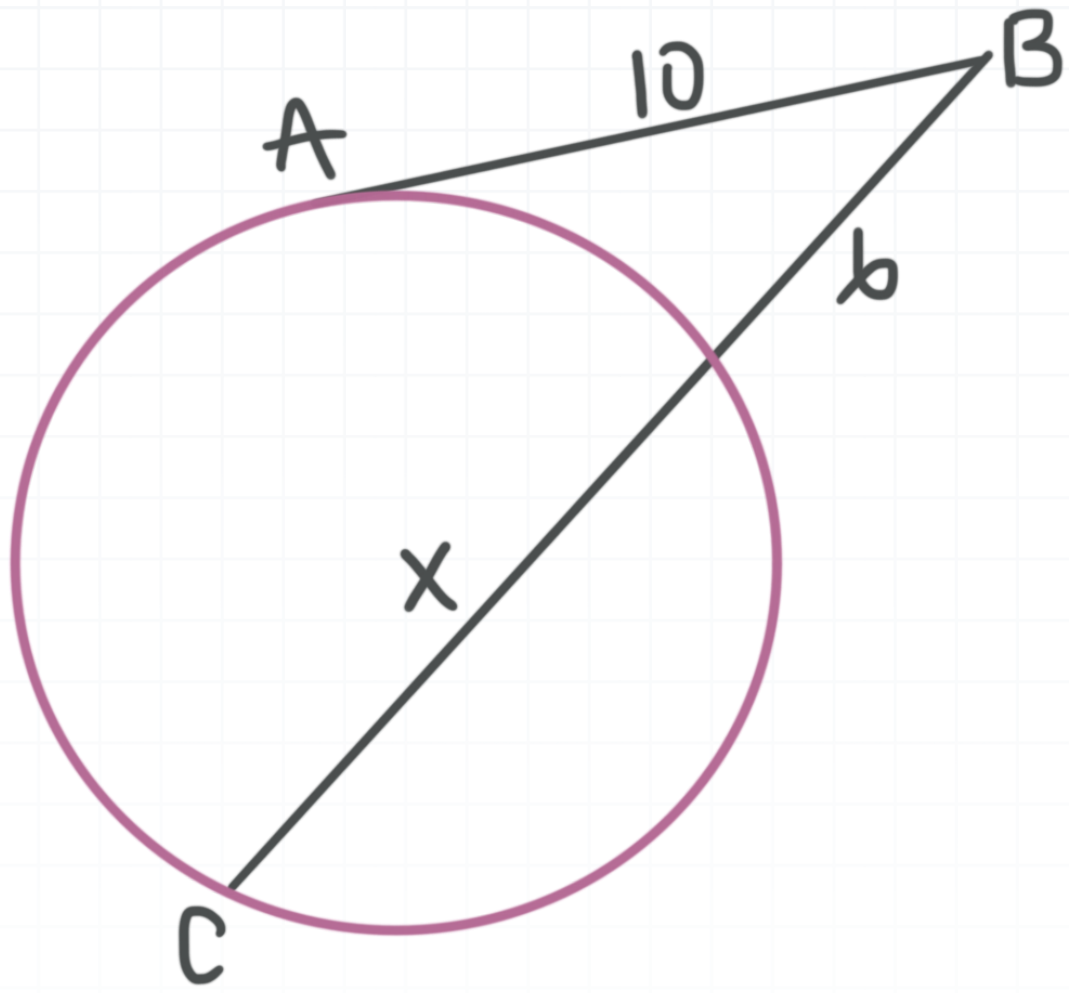
■ 1. $\overline{AB}$ and $\overline{CB}$ are secants and intersect at B. Find the value of x.



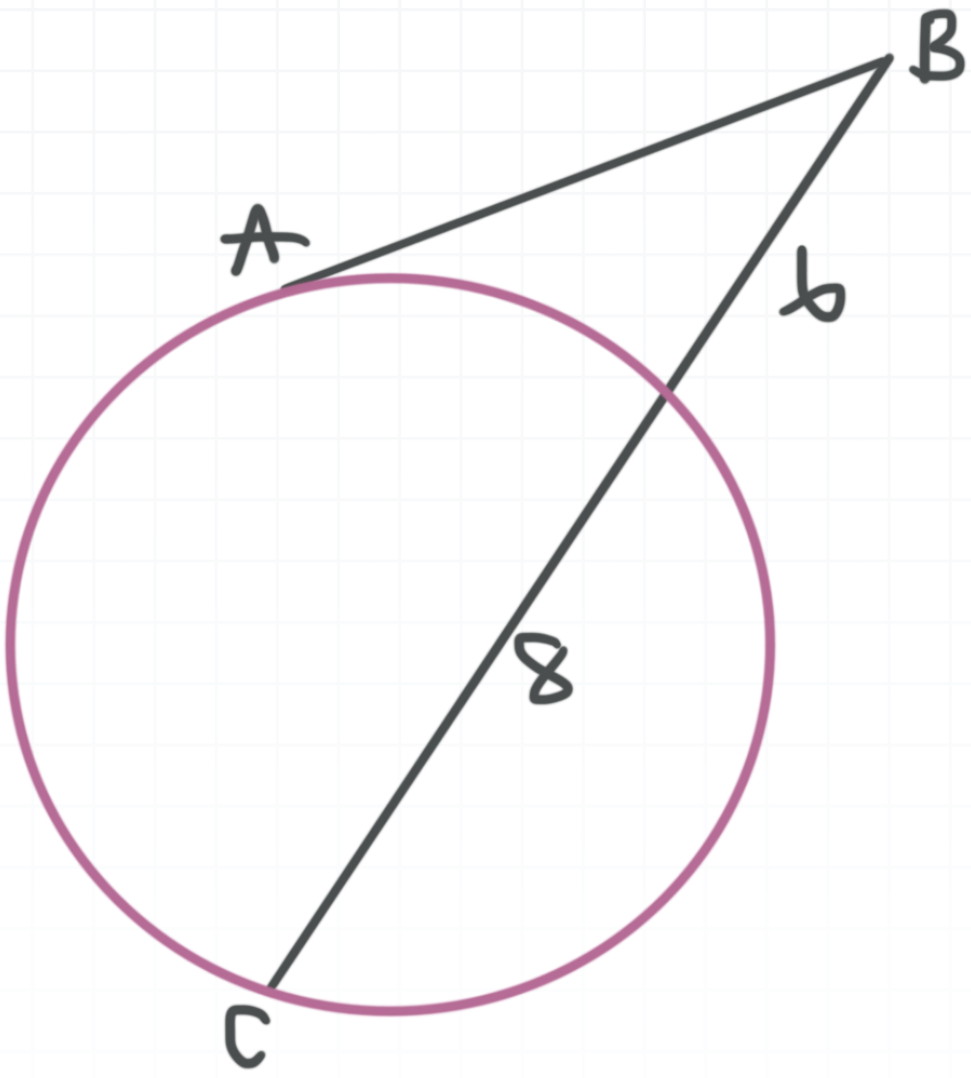
■ 2. $\overline{JK}$ and $\overline{LK}$ are secants and intersect at K. Find the value of x.



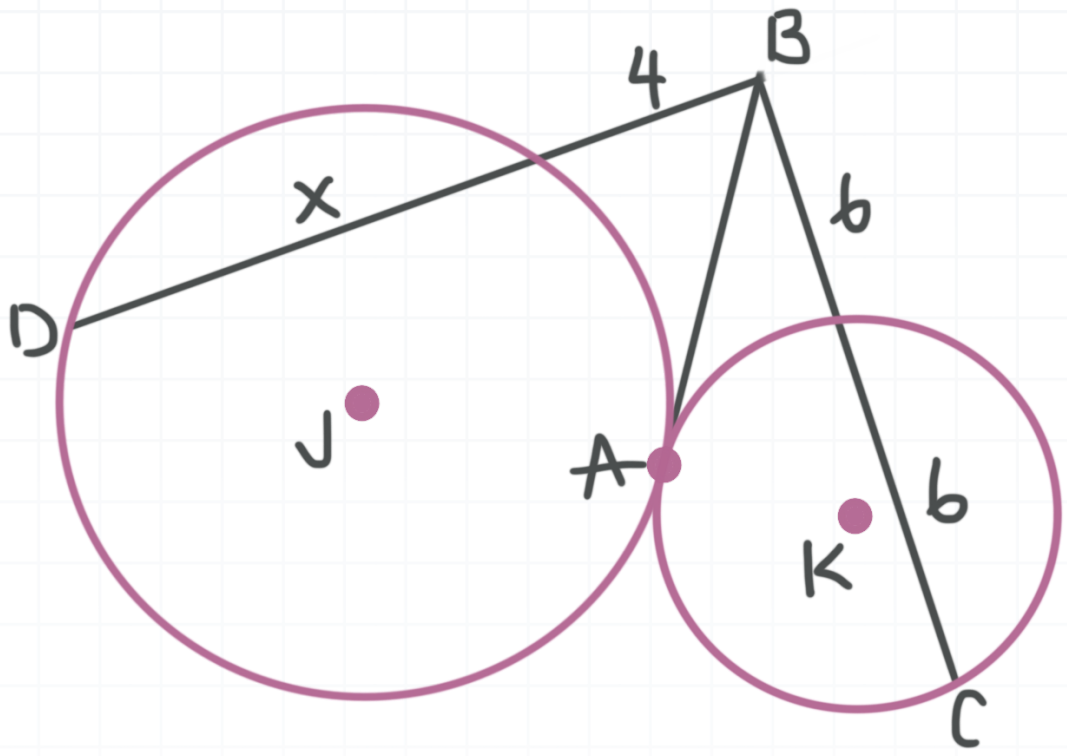
3. $\overline{AB}$ is a tangent line and $\overline{BC}$ is a secant of the circle. Find the value of x.



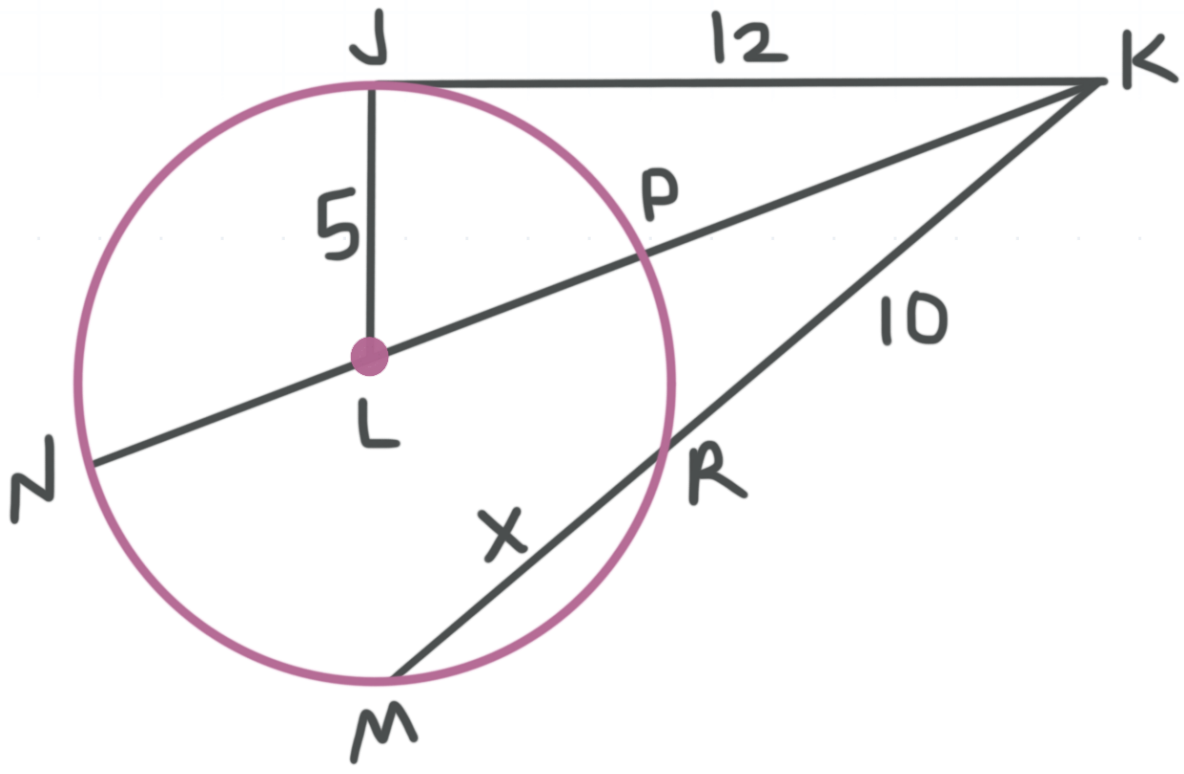
■ 4. $\overline{AB}$ is a tangent line and $\overline{CB}$ is a secant of the circle. Find the length of AB.



■ 5. $\overline{DB}$ is a secant of $\odot J$ and $\overline{CB}$ is a secant of $\odot K$. $\overline{AB}$ is a tangent for both circles. Find x.

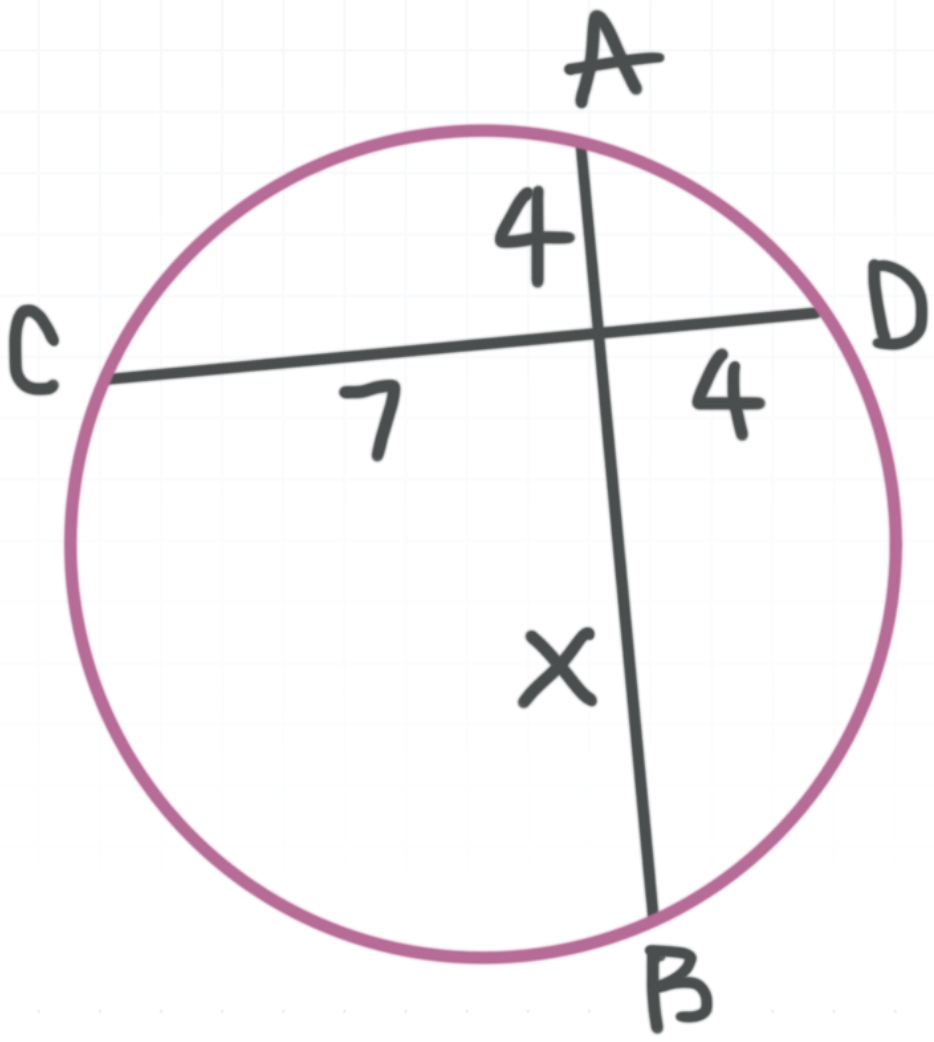


■ 6. $\overline{JK}$ is a tangent line, $\overline{KN}$ and $\overline{KM}$ are secants, and $\overline{LJ}$ and $\overline{LP}$ are radii of $\odot L$. Find x.

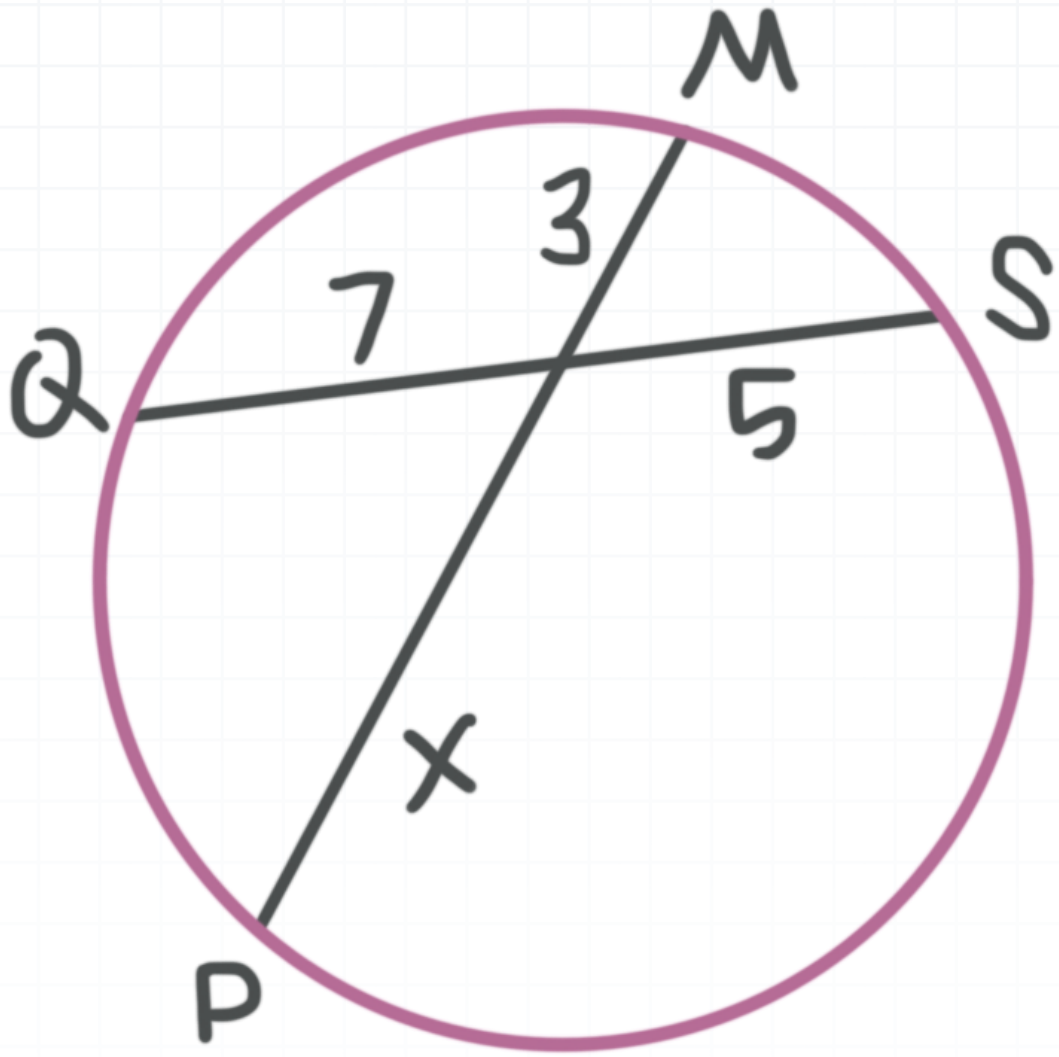


INTERSECTING CHORDS

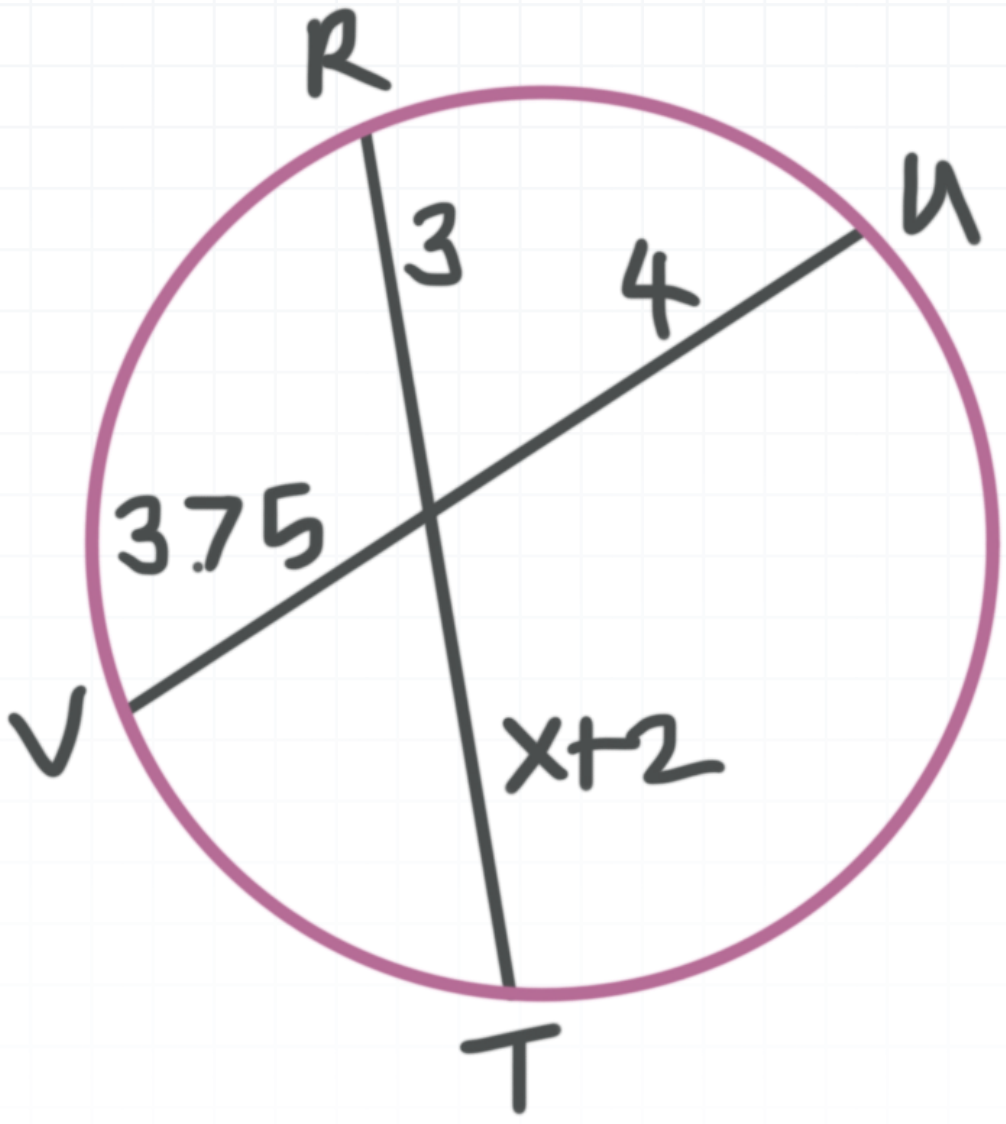
1. $\overline{AB}$ and $\overline{CD}$ are intersecting chords of the circle. Find x.



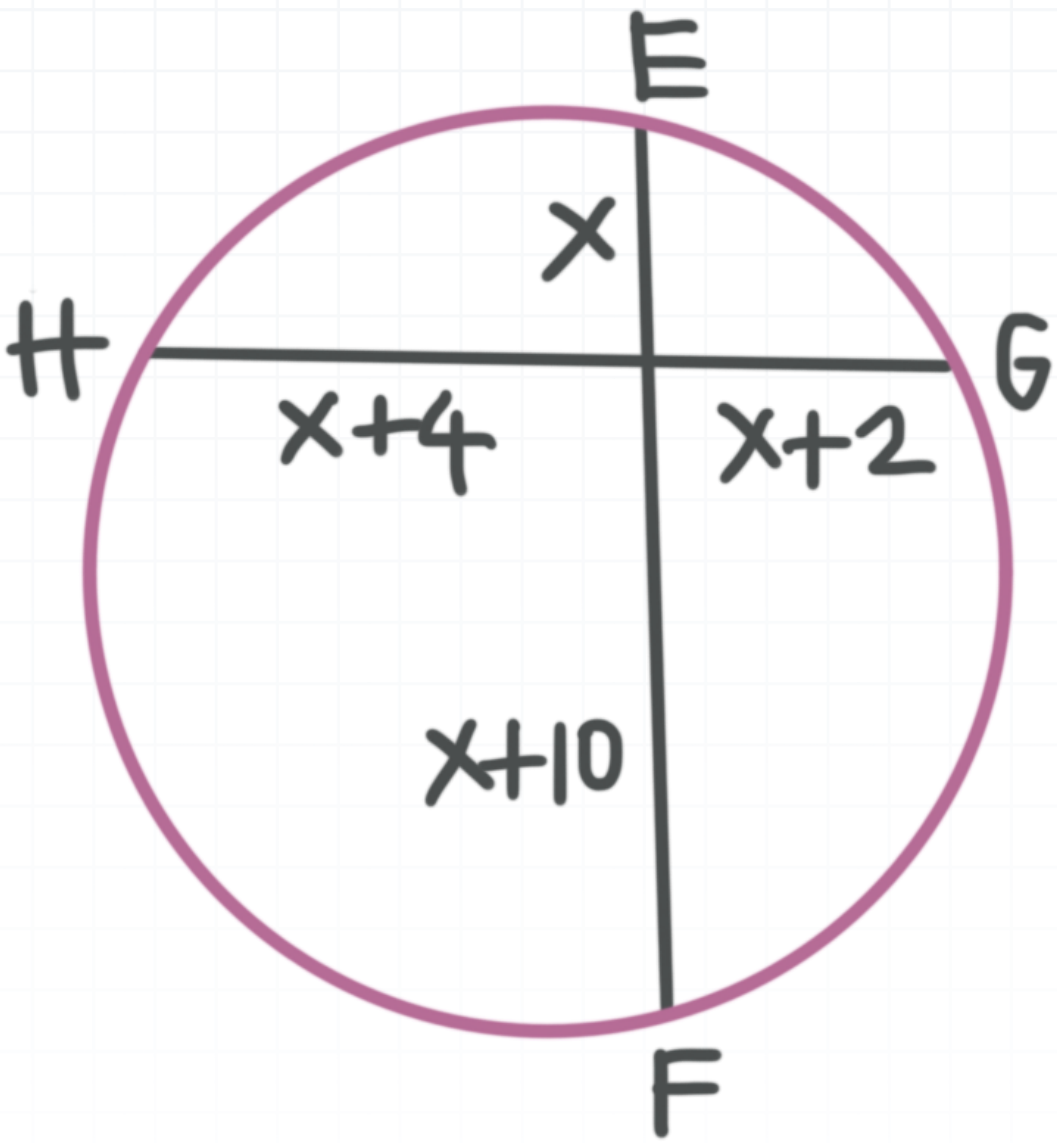
2. $\overline{MP}$ and $\overline{QS}$ are intersecting chords of the circle. Find x.



3. $\overline{RT}$ and $\overline{UV}$ are intersecting chords of the circle. Find x.



4. $\overline{EF}$ and $\overline{HG}$ are intersecting chords of the circle. Find x.

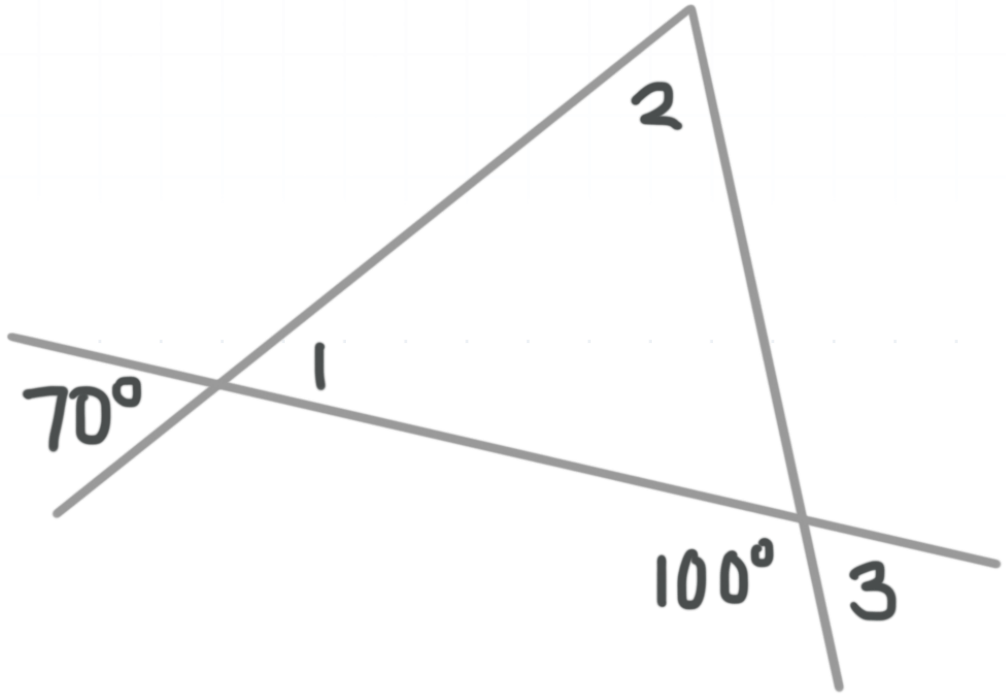


INTERIOR ANGLES OF TRIANGLES

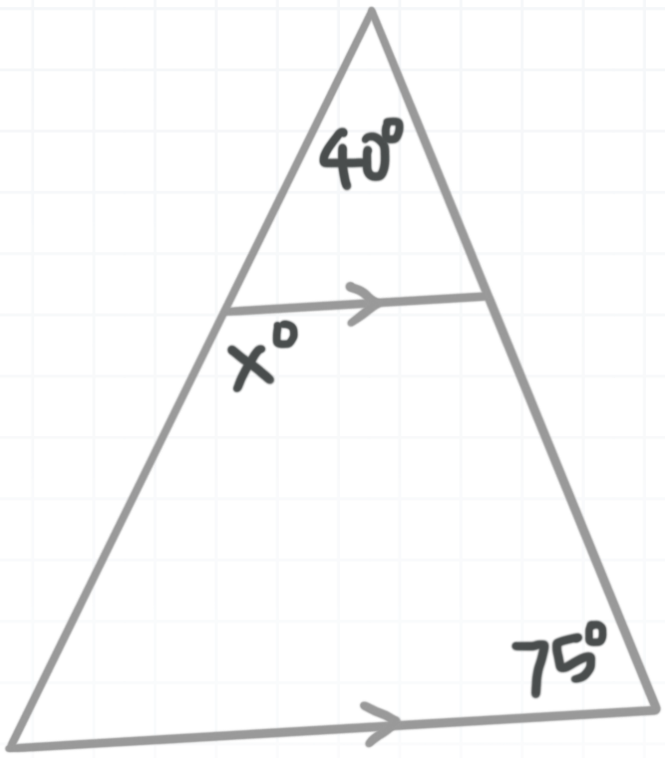
■ 1. $\triangle LMN$ is a right, isosceles triangle where $\angle M$ is the vertex angle. Find $m\angle L$, $m\angle M$, and $m\angle N$.

■ 2. $\triangle ABC$ has $m\angle A = 3x + 5$, $m\angle B = 10x + 5$, and $m\angle C = 4x$. Find the value of x and determine whether this is an obtuse, acute, or right triangle.

■ 3. Find $m\angle 1$, $m\angle 2$, and $m\angle 3$ from the figure.

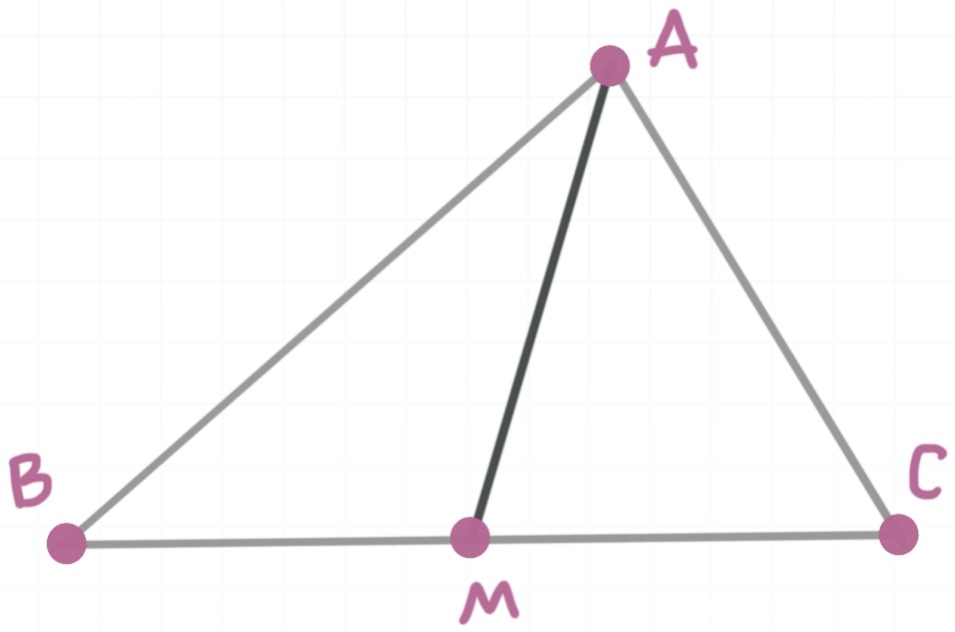


■ 4. Find the value of x from the figure.

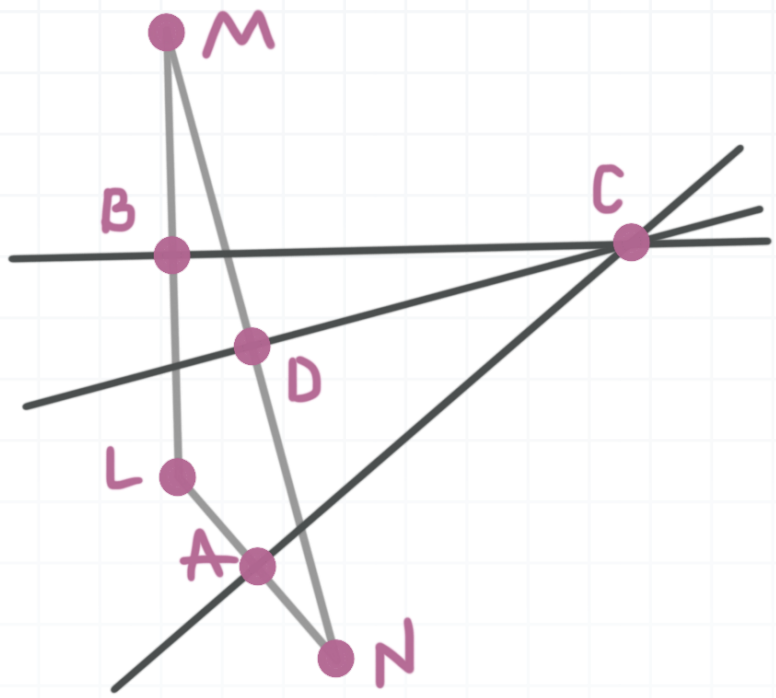


PERPENDICULAR AND ANGLE BISECTORS

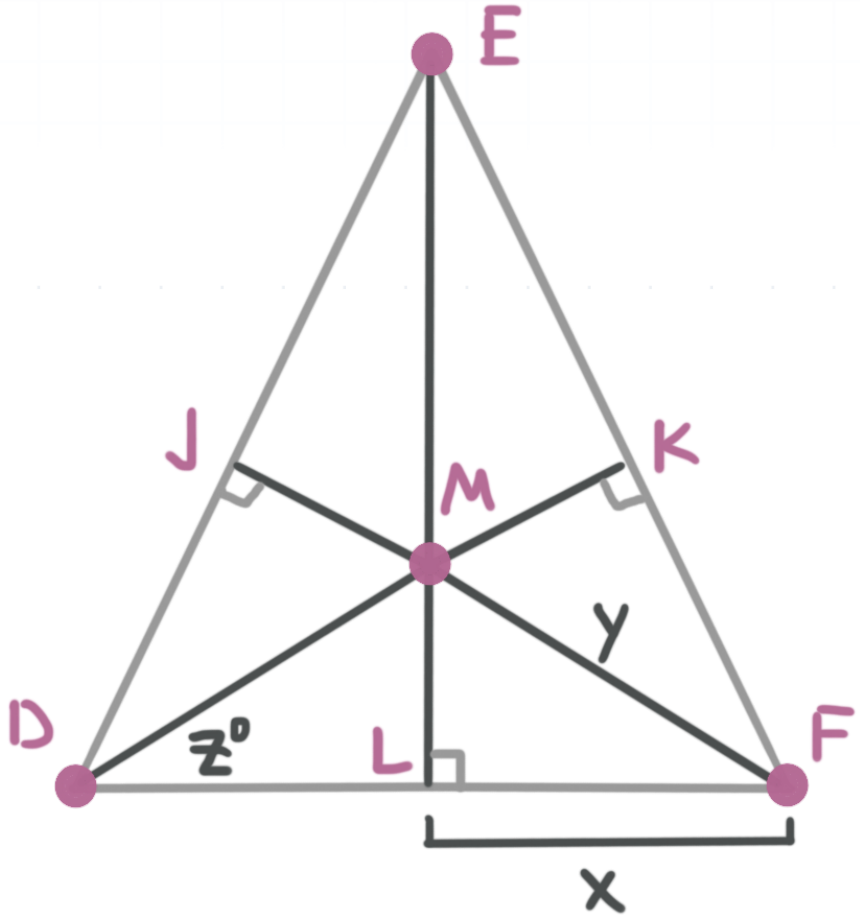
■ 1. $\overline{AM}$ is an angle bisector of $\triangle ABC$. $m\angle BMA = 108$ and $m\angle MBA = 40$. Find x if $m\angle CAM = 2x + 12$.



■ 2. $\overline{AC}$, $\overline{DC}$, and $\overline{BC}$ are perpendicular bisectors of $\triangle NLM$. Give the special name for C and find the length of ND if $NM = 14x - 22$ and $DM = 3x + 1$.



■ 3. Find the values of x, y, and z, given M is an incenter, $MK = 6$, $FK = 8$, and $m\angle EDF = 80$.

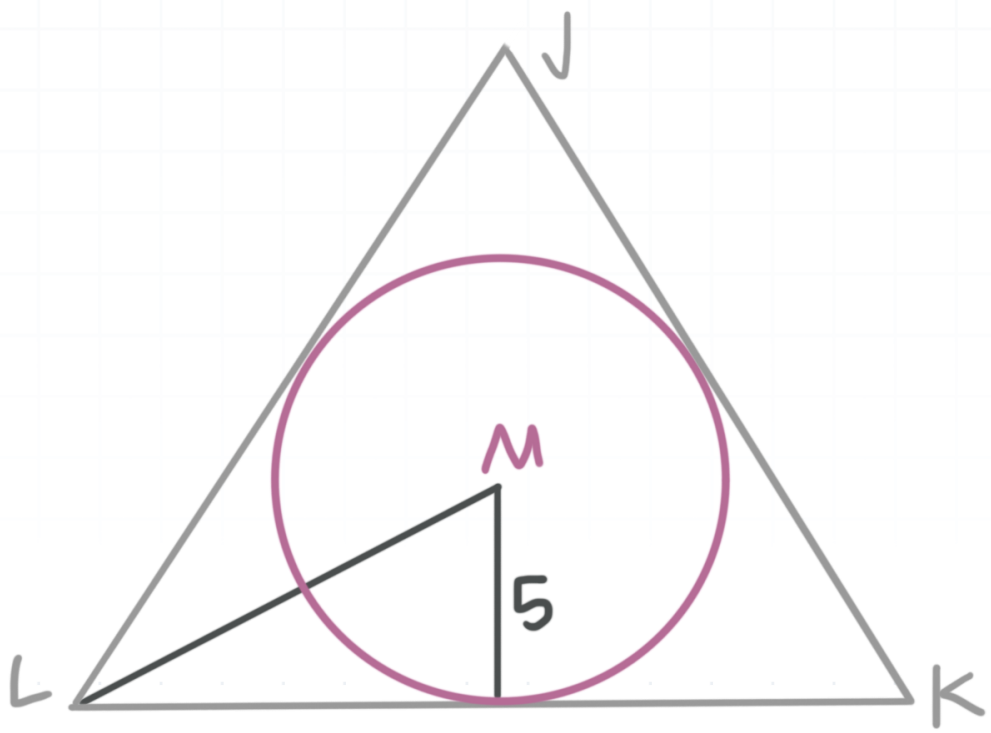


4. $\triangle ABC$ has coordinates $A(-3,1)$, $B(3,3)$, and $C(2,-2)$. Write the equation for the perpendicular bisector of $\overline{AB}$.

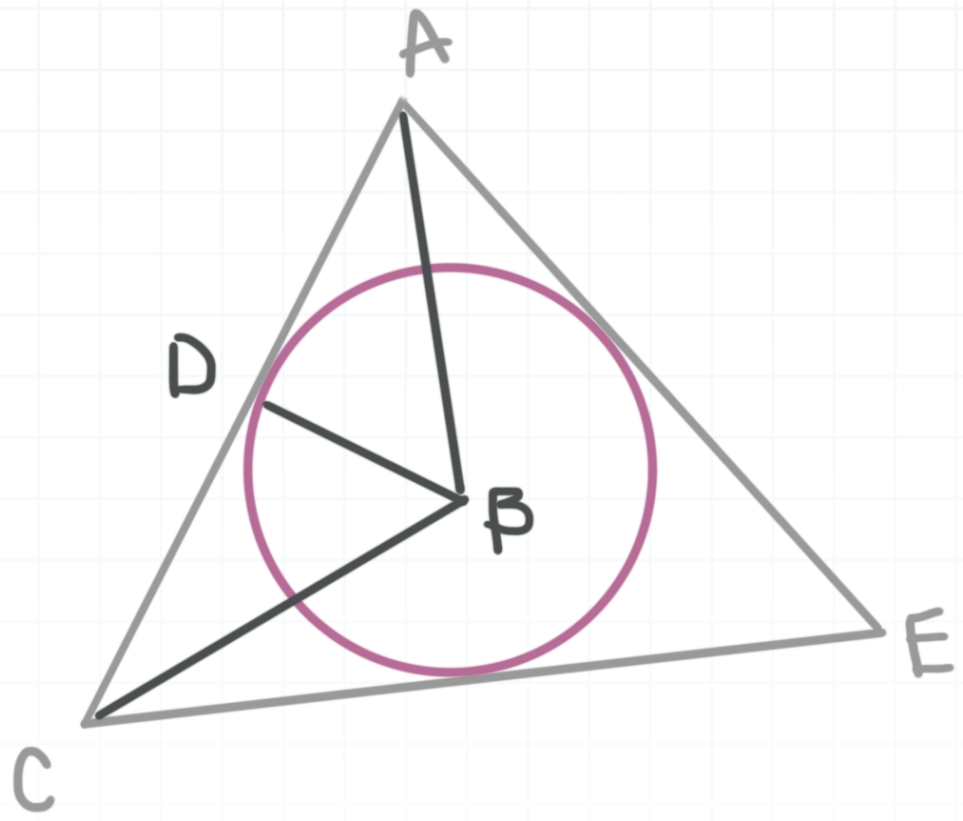
CIRCUMSCRIBED AND INSCRIBED CIRCLES OF A TRIANGLE

■ 1. Equilateral triangle ABC is inscribed in $\odot D$. Find $m\angle ADC$.

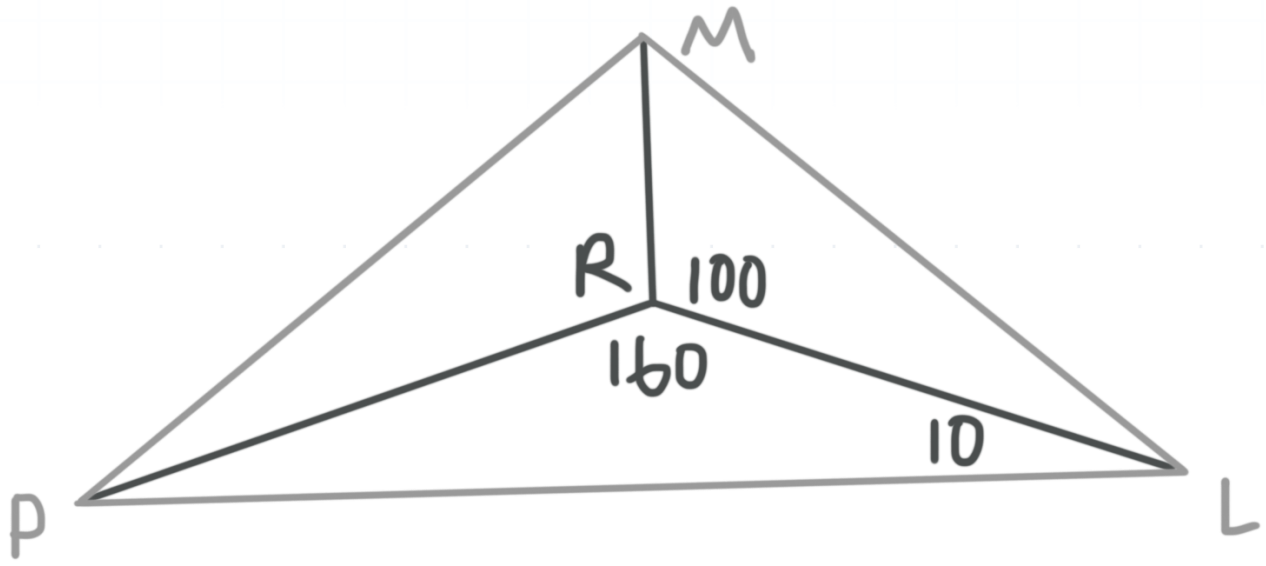
■ 2. $\triangle JKL$ is equilateral and is circumscribed about $\odot M$. The radius of $\odot M$ is 5. Find the perimeter of $\triangle JKL$.



■ 3. If $\triangle ACE$ is an equilateral triangle, if $\odot B$ is inscribed in $\triangle ACE$, and if $\overline{AB} = 12$, find the length of the radius of $\odot B$. Hint: any triangle with three interior angles $30°$, $60°$, and $90°$ have a side length ratio of x, $\sqrt{3}x$, and $2x$, respectively.



4. R is the incenter of $\triangle PML$. Find $m\angle PMR$.

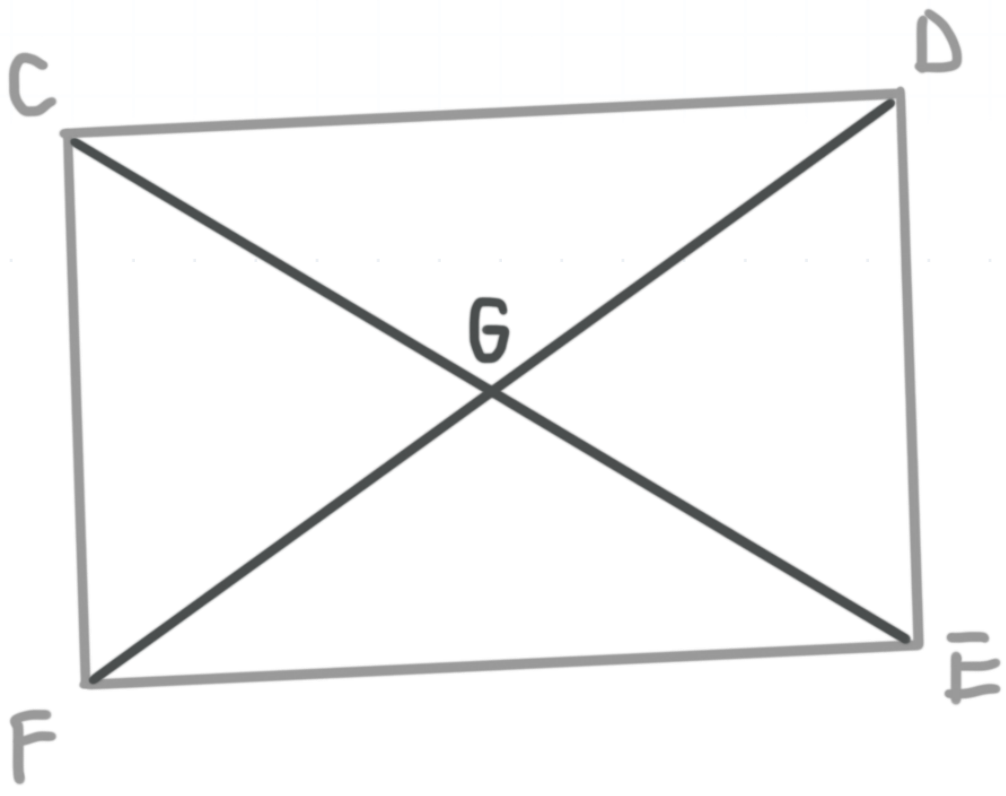


MEASURES OF QUADRILATERALS

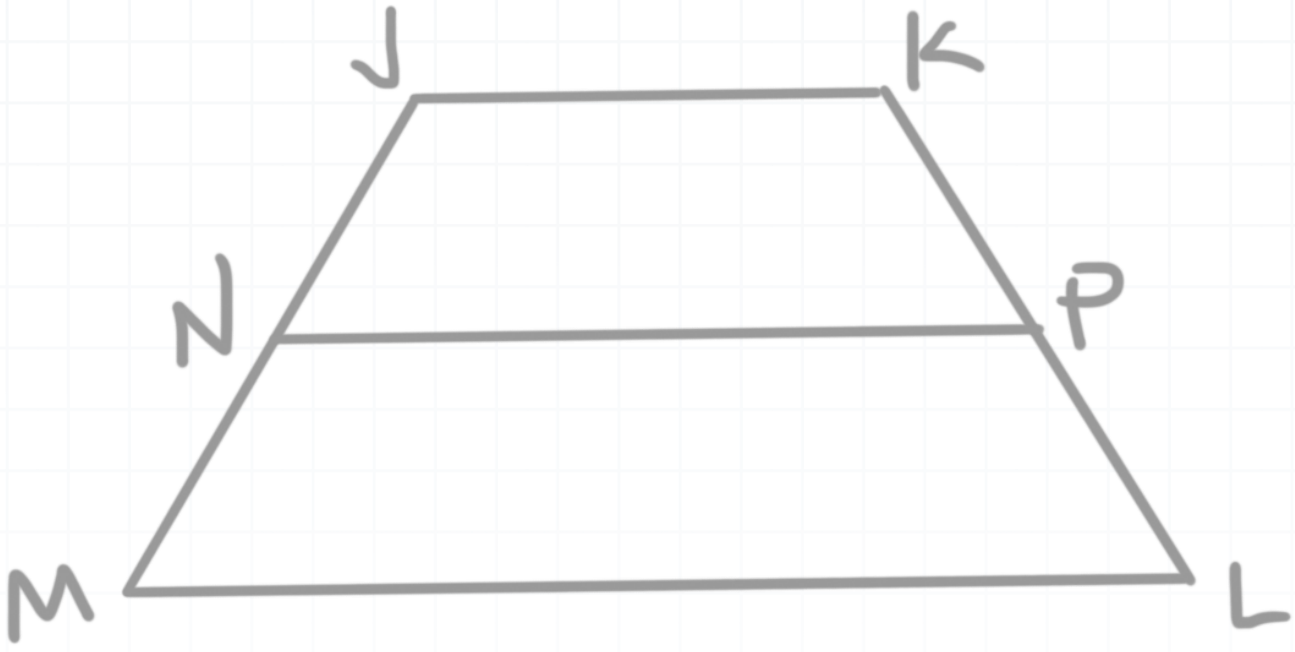
■ 1. A rectangle has a width of 6 inches and diagonal with length 10 inches. Find the perimeter of the rectangle.

■ 2. Classify quadrilateral $ABCD$ with vertices at $A(1, -3)$, $B(5,0)$, $C(10,0)$, and $D(6, -3)$.

■ 3. $CDEF$ is a rectangle with diagonals intersecting at G. $CG = 2x + 1$, $DG = x + 4$, $FG = 4y - 1$, and $EG = y + 5$. Find FD.



4. $JKLM$ is an isosceles trapezoid with median $\overline{NP}$. $MJ = 14$, $m\angle MLP = 72$, $NP = 16$, and $ML = 20$. Find KP, $m\angle MJK$, and JK.



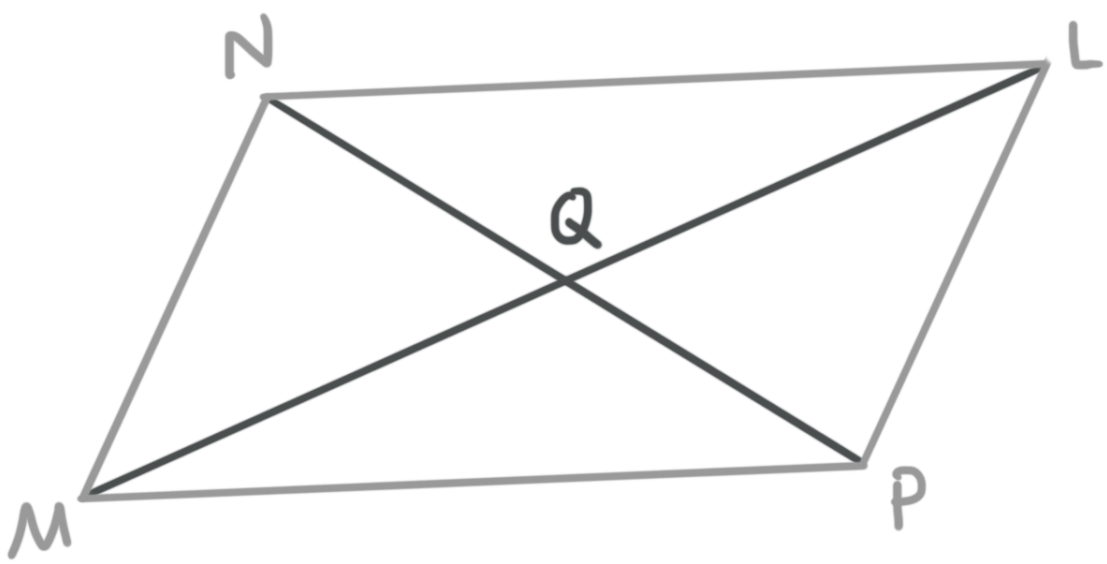
MEASURES OF PARALLELOGRAMS

■ 1. $ABCD$ is a parallelogram with $m\angle A = 2x + 10$, $m\angle B = y - 5$, and $\angle C = 100$. Find the values of x and y.

■ 2. $EFGH$ is a rhombus with $FH = 24$ and $GE = 10$. Find the perimeter of $EFGH$.

■ 3. $JKLM$ has vertices $J(-3,2)$, $K(3,0)$, $L(3, -6)$, and $M(-3, -4)$. Determine whether $JKLM$ is a parallelogram by checking if it has two sets of opposite sides that are congruent.

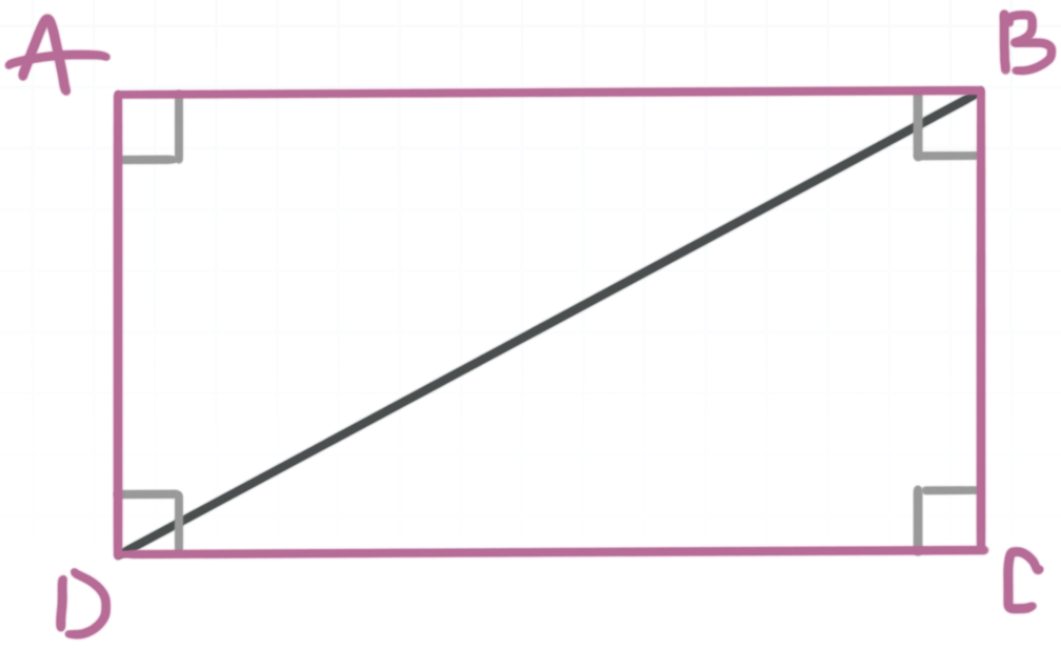
■ 4. $NLPM$ is a parallelogram with diagonals intersecting at point Q. $m\angle MNP = 85$, $m\angle MQP = 115$, and $m\angle MNL = 135$. Find $m\angle PML$.



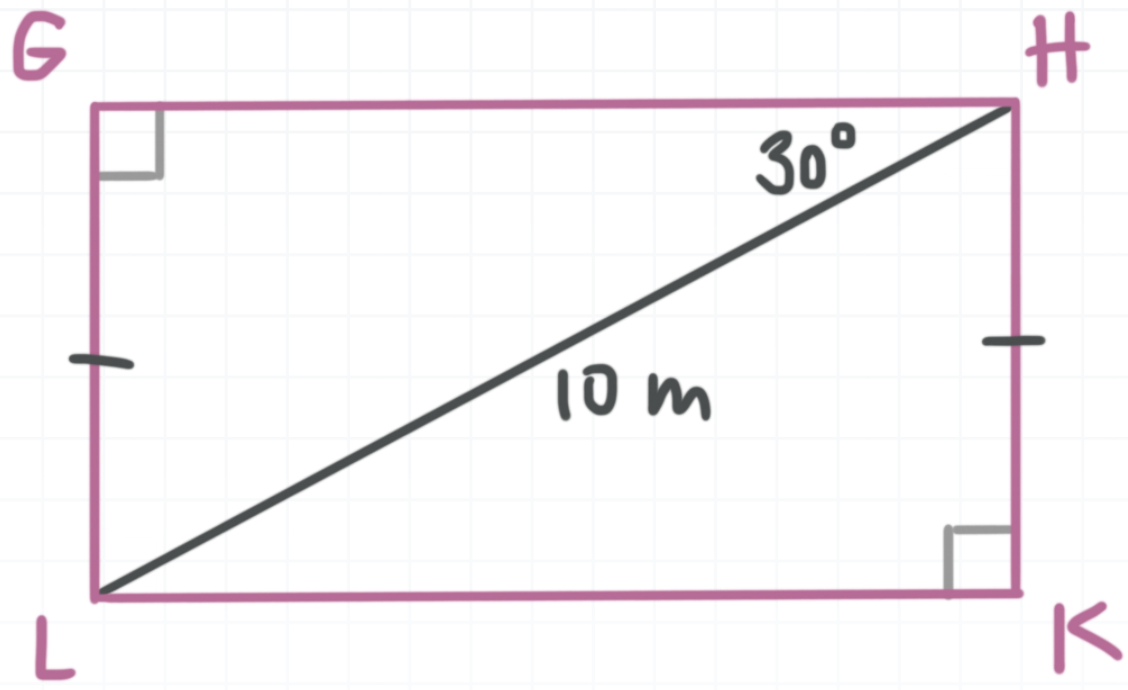
AREA OF A RECTANGLE

■ 1. The base of a rectangle is 8 feet. Find its height if the area of the rectangle is 80 ft^2.

■ 2. In rectangle $ABCD$, $BD = 13$ and $AB = 12$. Find the area of this rectangle.



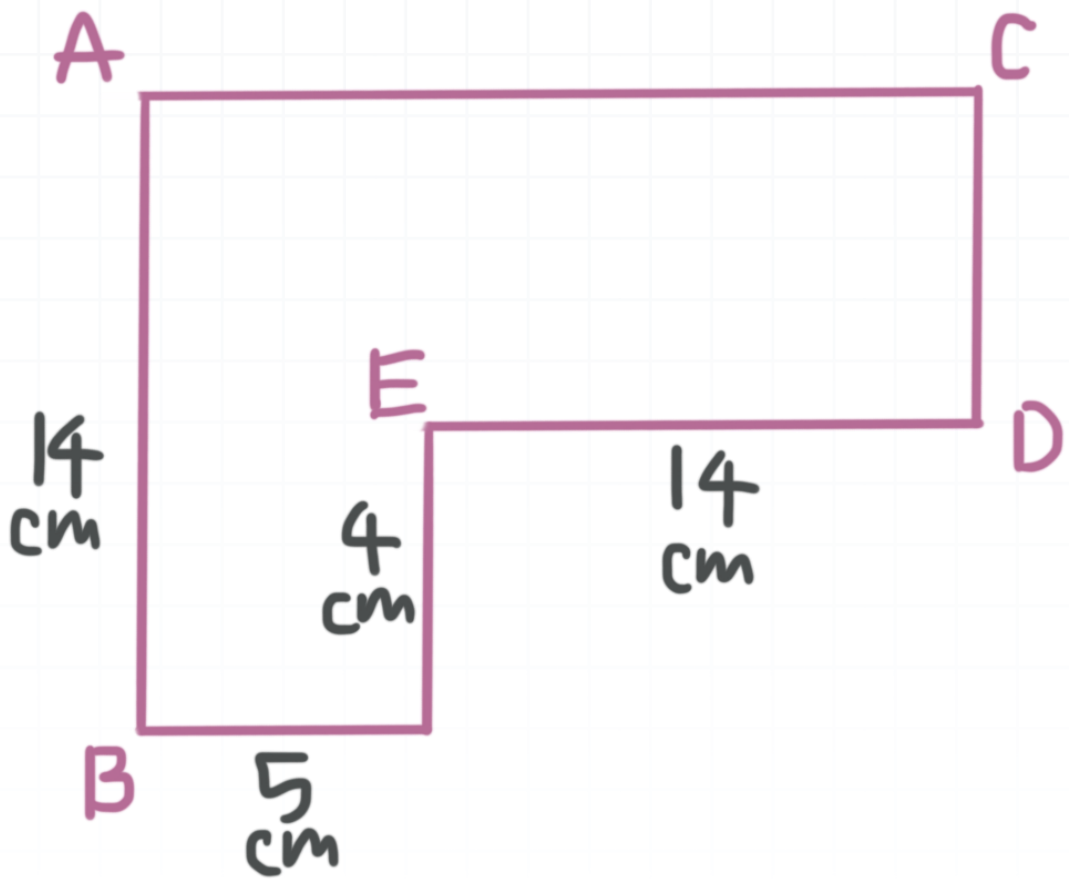
■ 3. In rectangle $GHKL$, $LH = 10$ and $m\angle GHL = 30$. Find the exact area of the rectangle.



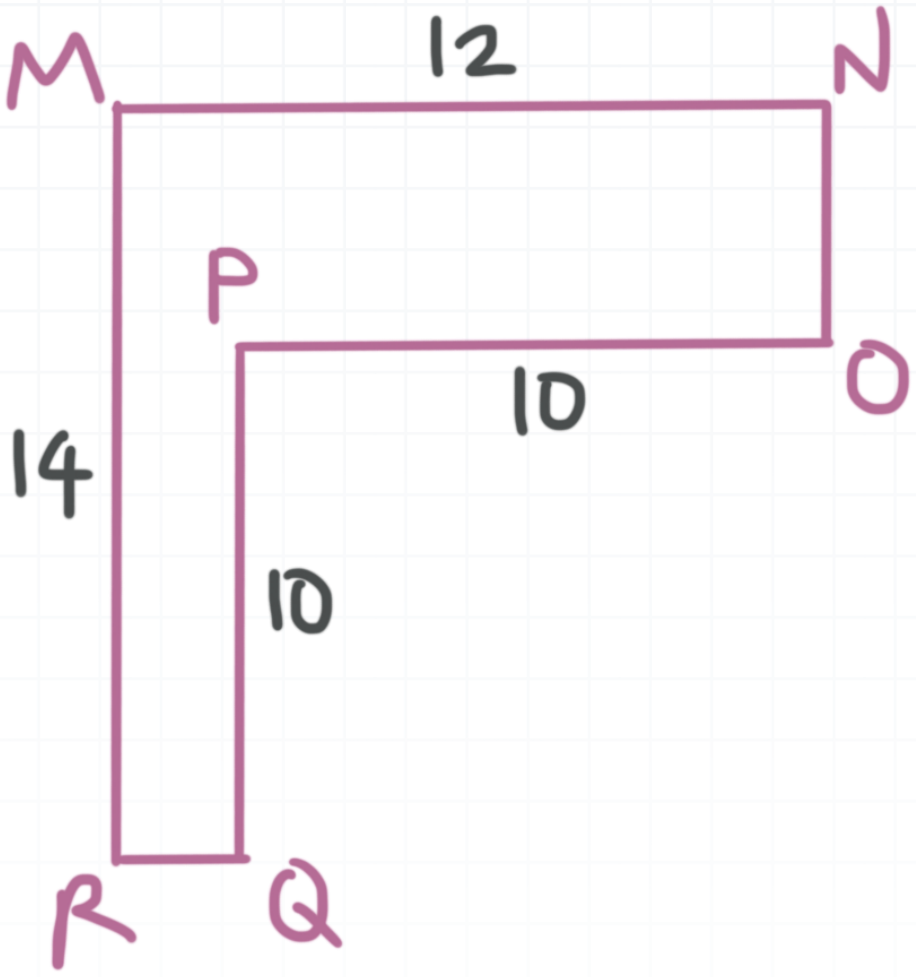
■ 4. The area of a small square flower garden is 49 ft^2. Suppose we wish to make the garden bigger by adding 6 feet to one of the sides. How much more square footage is available in this new rectangular garden?

AREA OF A RECTANGLE USING SUMS AND DIFFERENCES

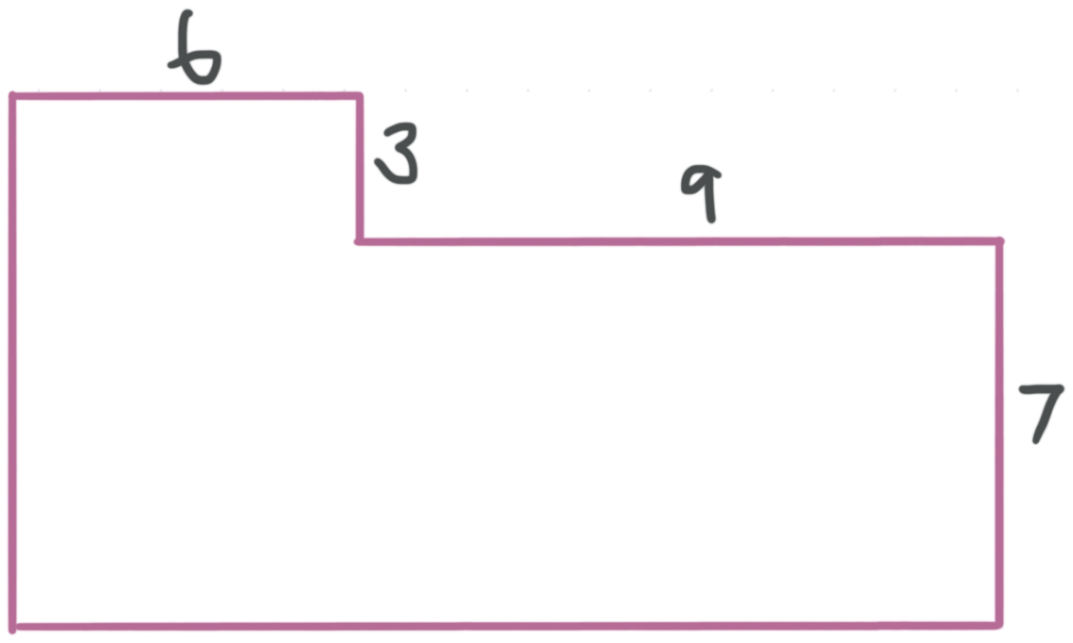
1. Find the area of the figure.



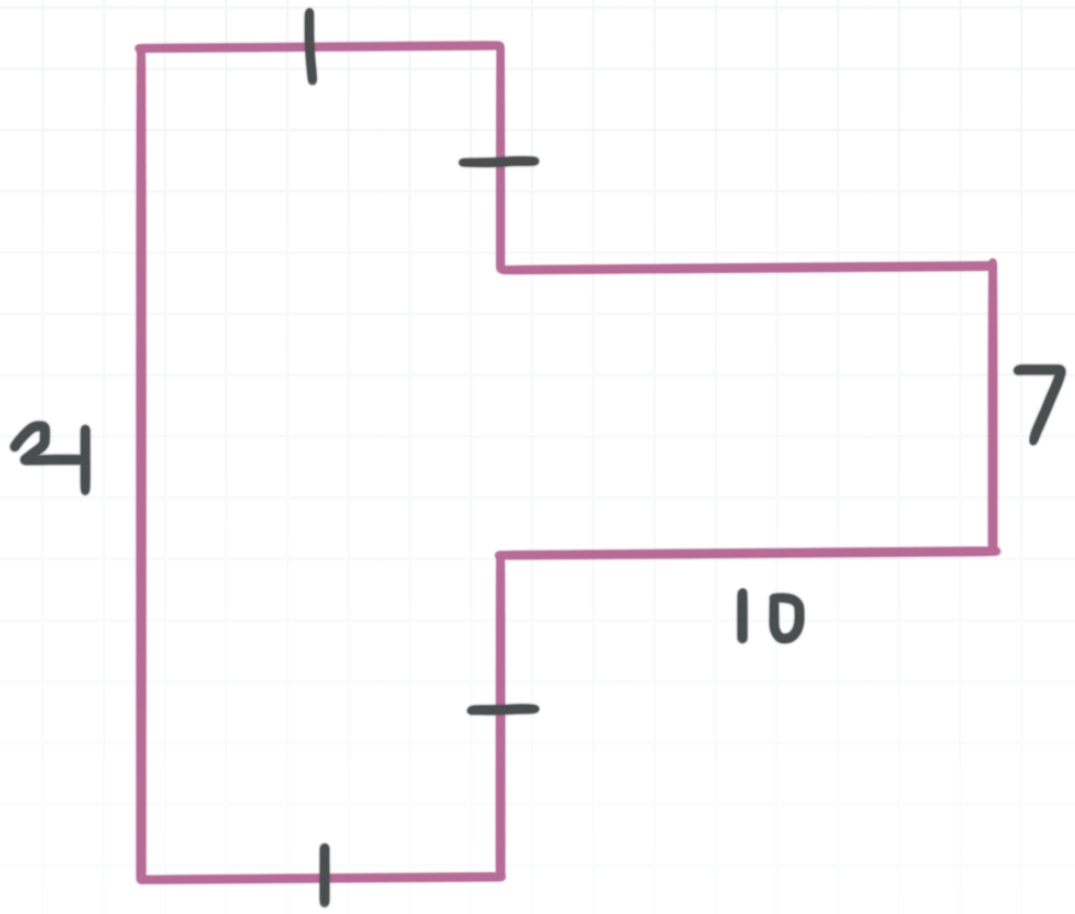
2. Find the area of the figure.



■ 3. Find the area of the figure.



■ 4. Find the area of the figure.



PERIMETER OF A RECTANGLE

■ 1. A rectangle has a base of 10 meters. The height is 4 meters greater than the base. Find the perimeter of this rectangle.

■ 2. The area of a rectangle is 40 ft^2. Find the perimeter of this rectangle if the length of the rectangle is 3 feet longer than the width.

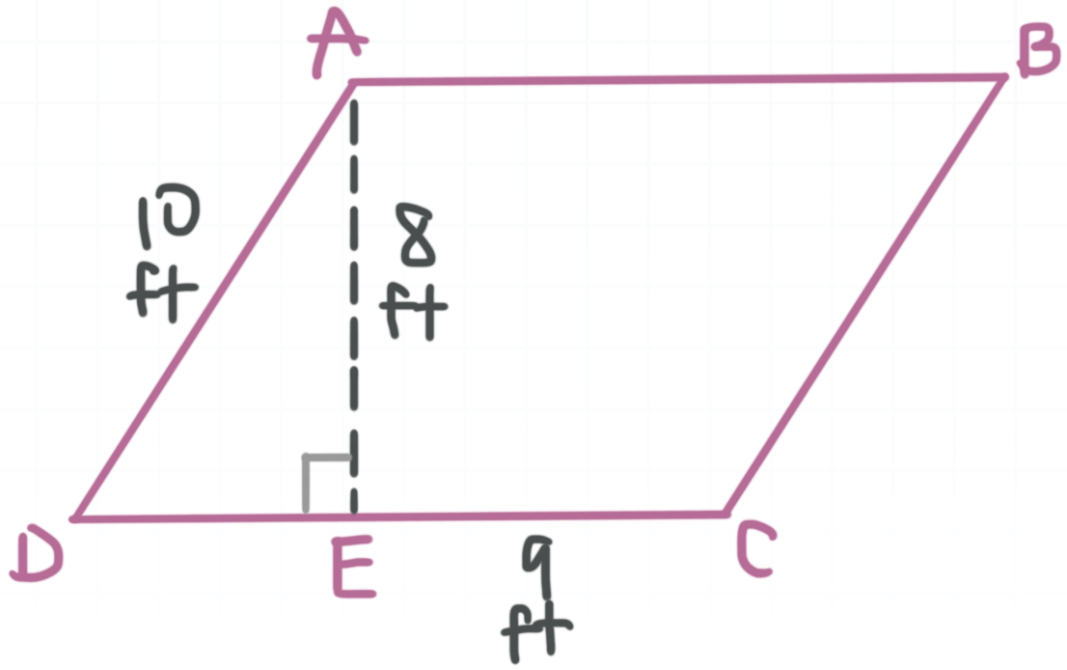
■ 3. Find the perimeter of a rectangle with vertices at $A(-3,0)$, $B(0,4)$, $C(4,1)$, and $D(1,-3)$.

■ 4. Find the value of x if the base of the rectangle has length $x+4$, the height of the rectangle is x, and the perimeter of a rectangle is 20 units.

AREA OF A PARALLELOGRAM

■ 1. Find the area of a parallelogram with $b = 14$ yards and $h = 10$ yards.

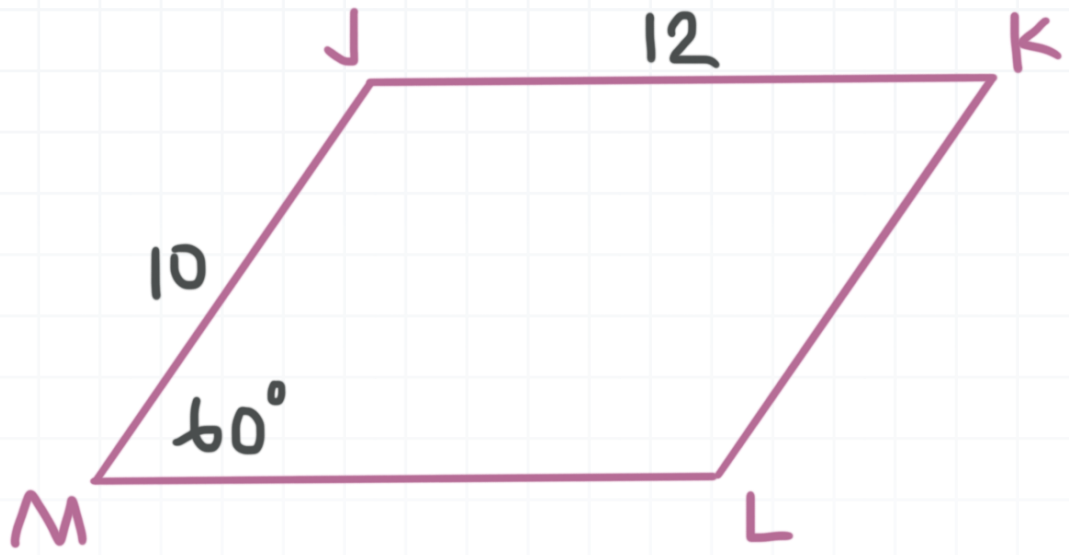
■ 2. Find the area of the parallelogram.



■ 3. Find the area of parallelogram $JKLM$, if $J(0,0)$, $K(1,3)$, $L(-5,3)$, and $M(-6,0)$.

■ 4. A parallelogram has a base that is 3 feet longer than it is tall. The area of the parallelogram is 88 square feet. Find the height of the parallelogram.

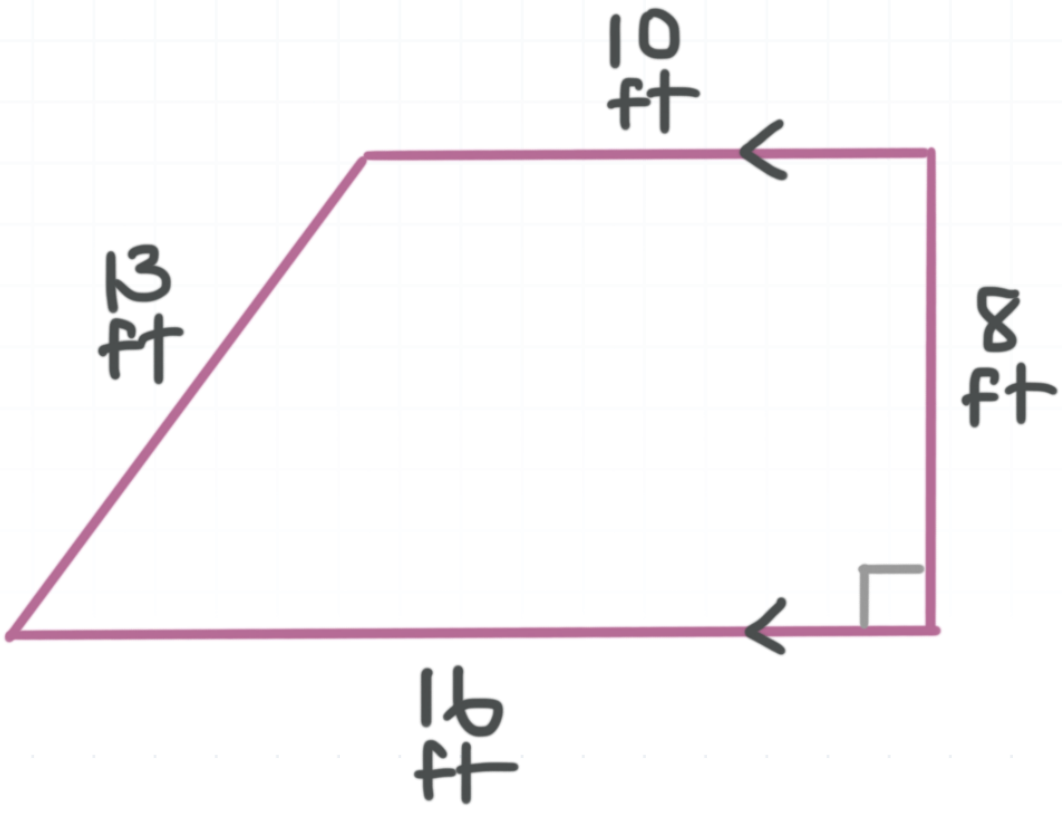
■ 5. Find the exact area of the parallelogram.



AREA OF A TRAPEZOID

■ 1. Find the area of a trapezoid with base lengths 16 and 18, and height 10.

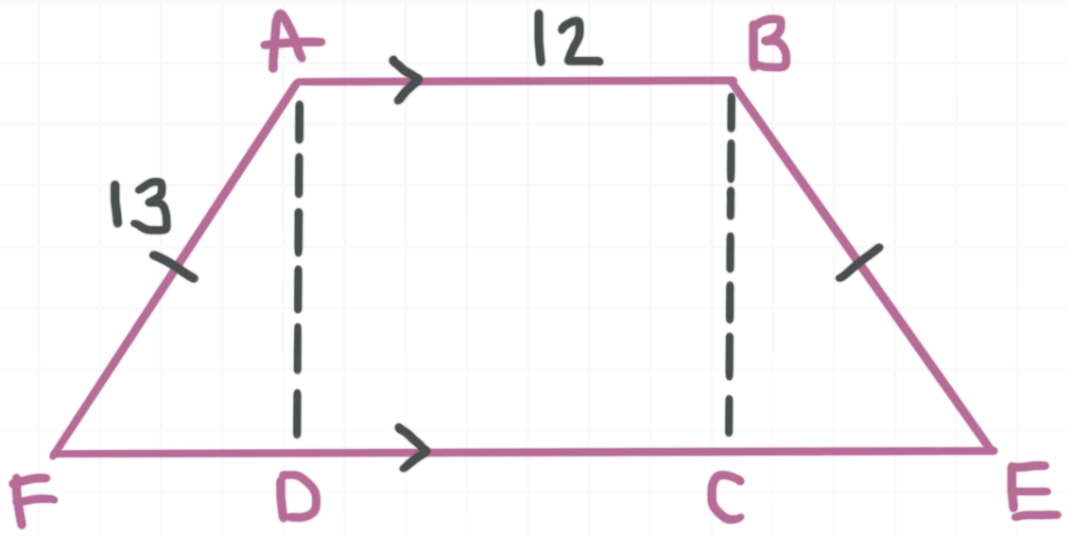
■ 2. Find the area of the trapezoid.



■ 3. Find the exact area of the trapezoid that has congruent 2-meter bases and a height of 4 meters.

■ 4. The area of a trapezoid is 60 m^2. One of the bases has a measure of 7 m and the height of the trapezoid is 10 m. Find the length of the other base.

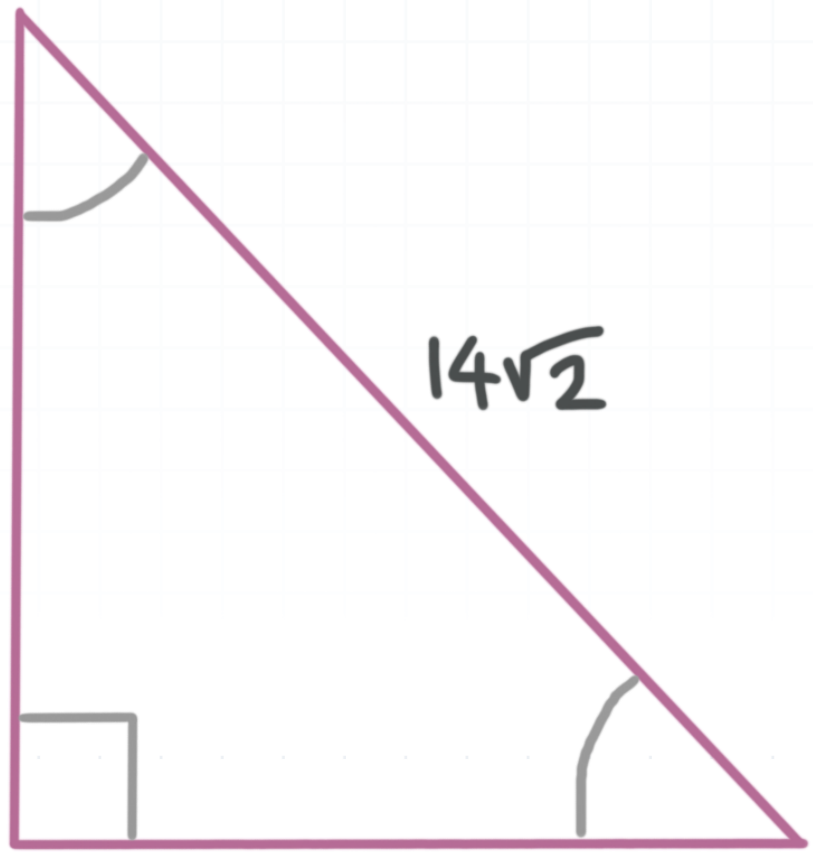
5. Find the area of trapezoid $ABEF$, if $ABCD$ is a square.



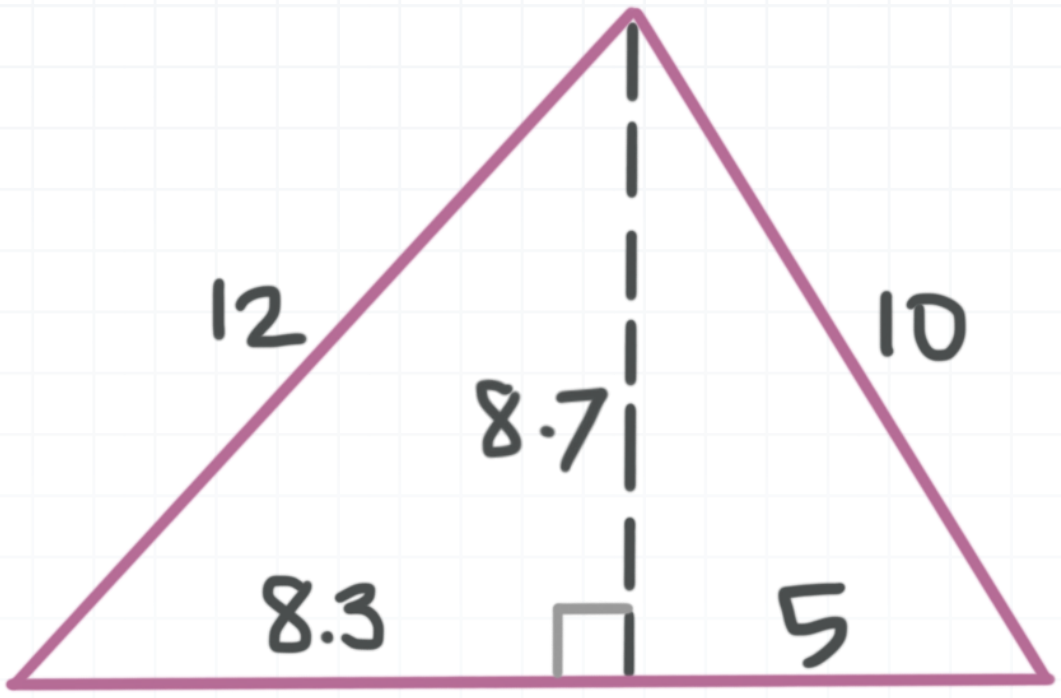
AREA OF A TRIANGLE

1. Find the area of a triangle that has base length 16 and height 14.

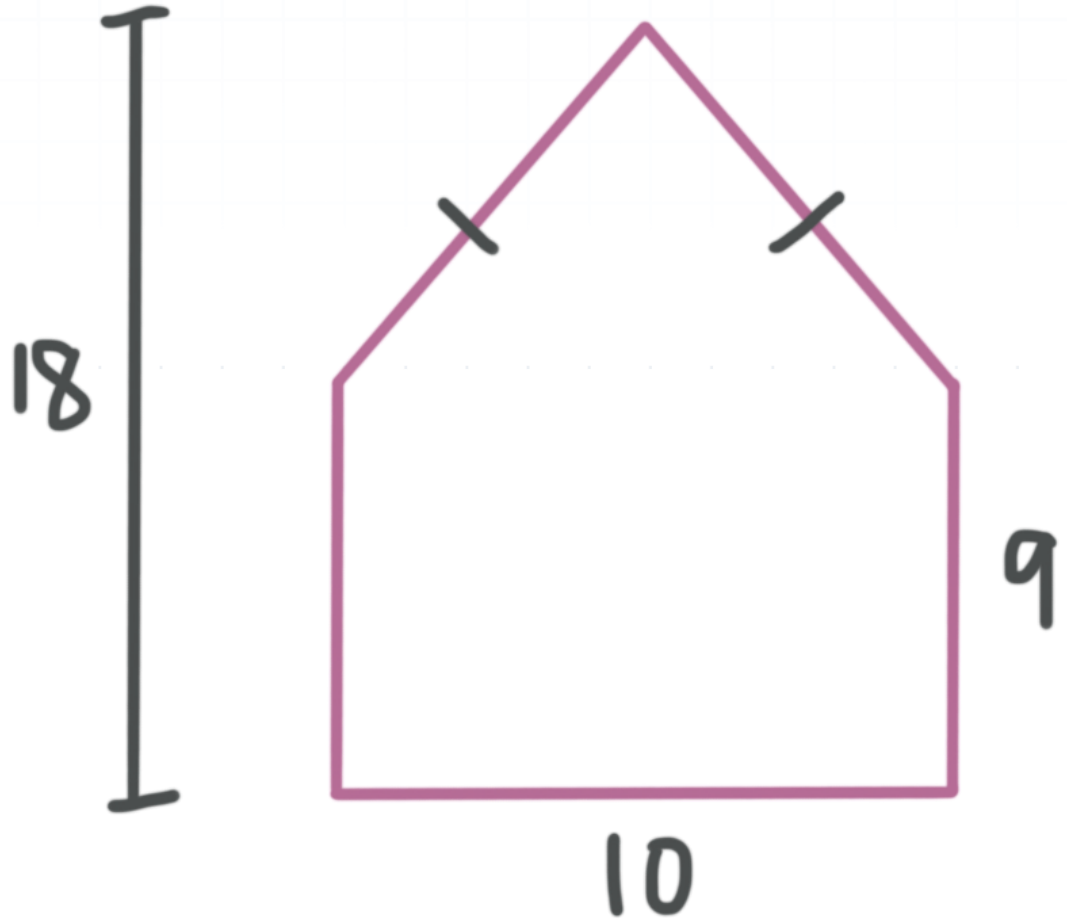
2. Find the area of the triangle.



3. Find the area of the triangle.

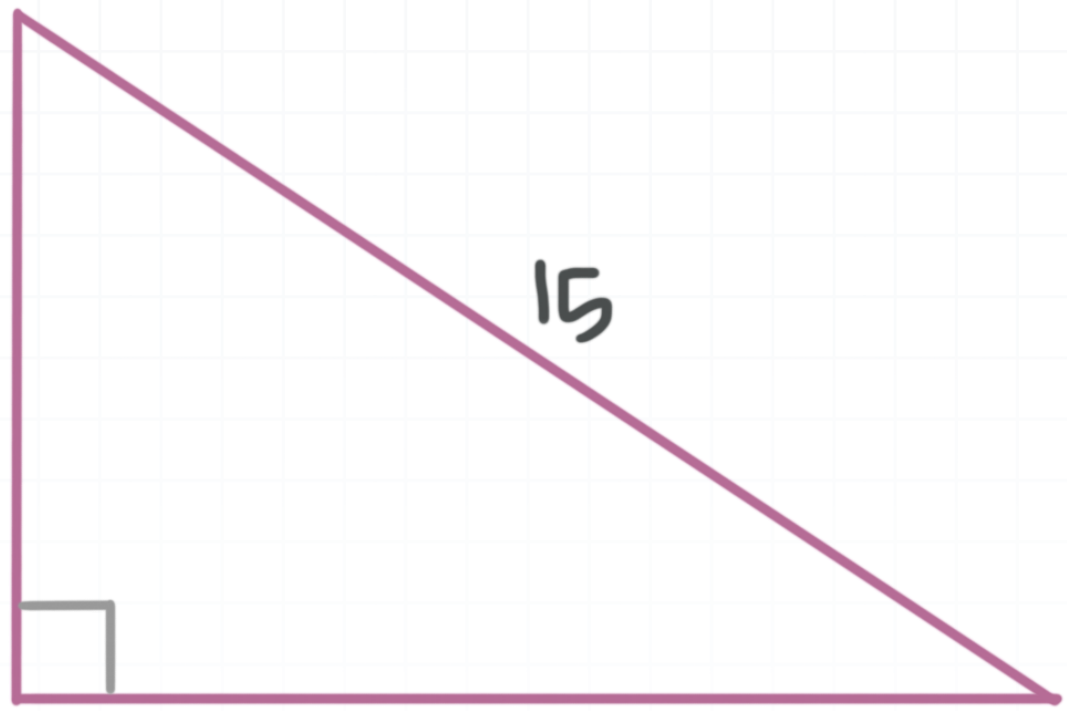


4. Find the area of the figure below.

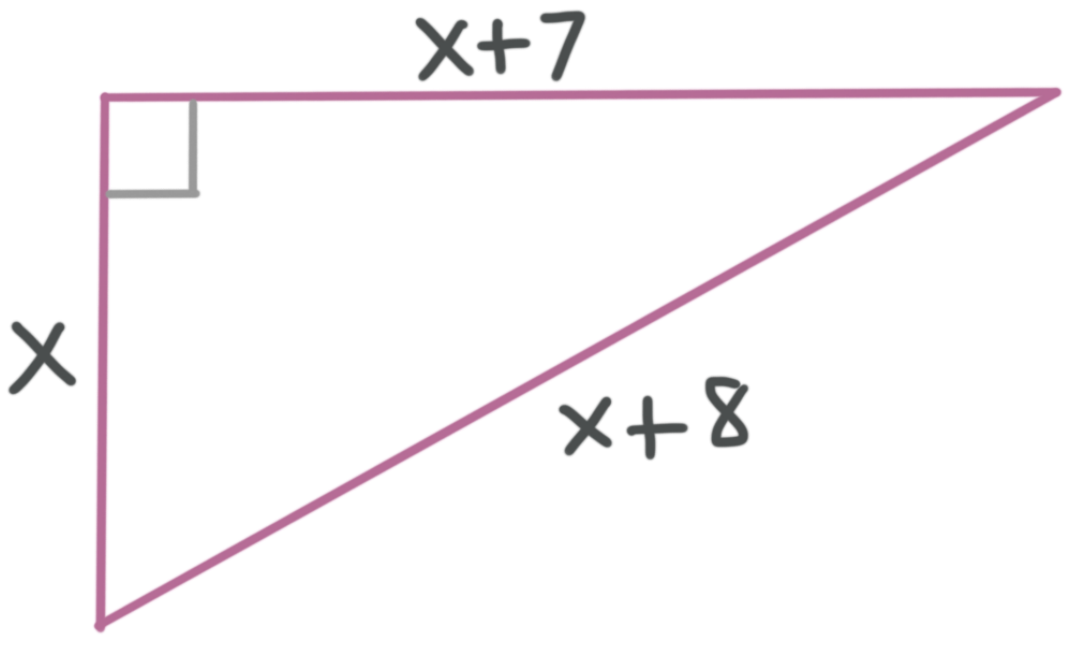


PERIMETER OF A TRIANGLE

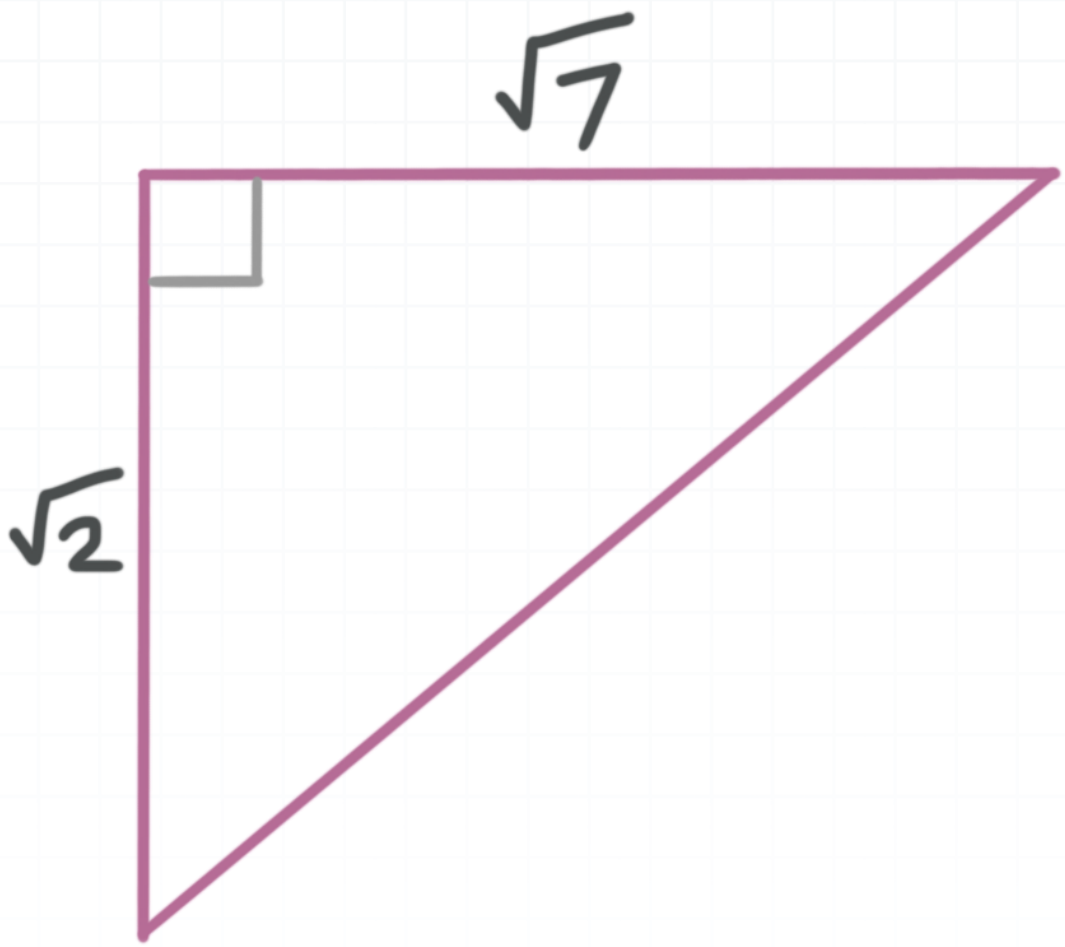
■ 1. Find the perimeter of the triangle.



■ 2. Find the perimeter of the triangle.



■ 3. Find the exact perimeter of the triangle.



■ 4. Find the perimeter of a right, isosceles triangle, to the nearest hundredth, in which one of the legs measures 5 inches.

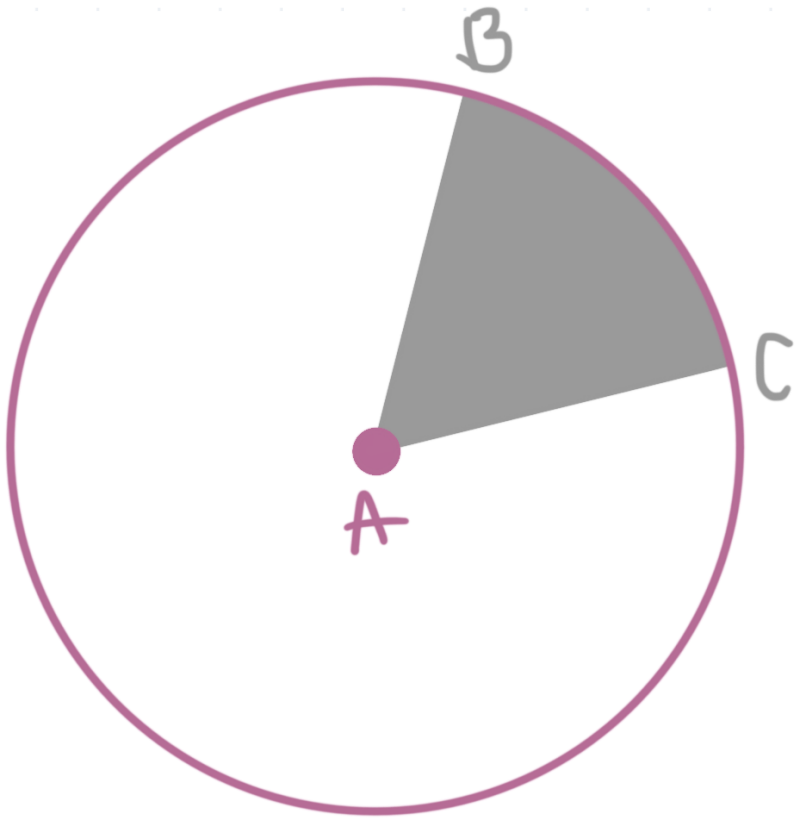
AREA OF A CIRCLE

■ 1. Find the area of a circle to the nearest hundredth with a diameter of 44 inches.

■ 2. The area of a circle is 300 cm^2. Find the length of the radius to the nearest tenth of a centimeter.

■ 3. Find the exact area of a circle with a circumference of 18π.

■ 4. Find the area of the shaded region to the nearest tenth if $m\angle BAC = 60°$ and $AC = 16$ feet.

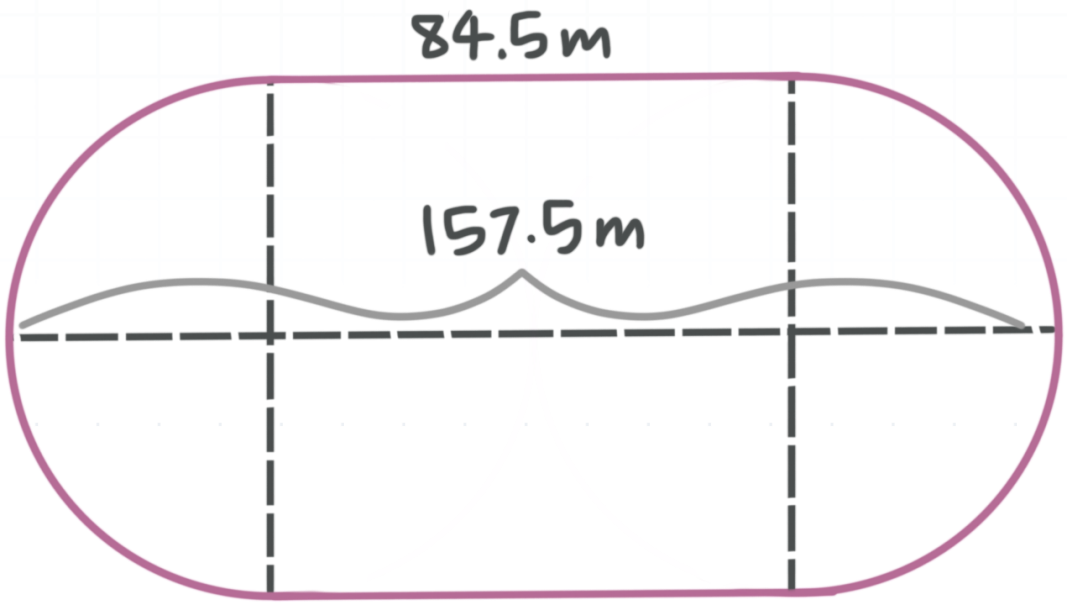


CIRCUMFERENCE OF A CIRCLE

■ 1. To the nearest hundredth, find the circumference of a circle that has a radius of 14 feet.

■ 2. Find the area of a circle with a circumference of 400 ft.

■ 3. To the nearest tenth, find the distance around the following track.

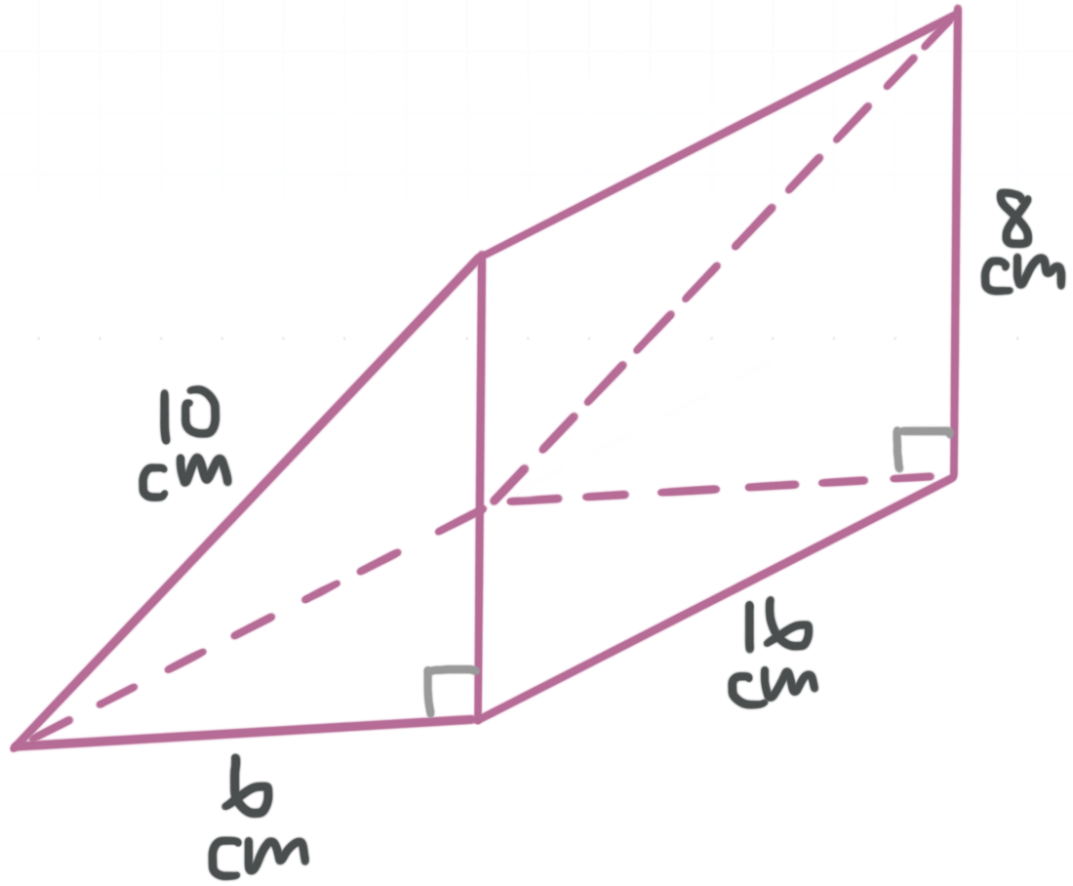


NETS/VOLUME/SURFACE AREA OF PRISMS

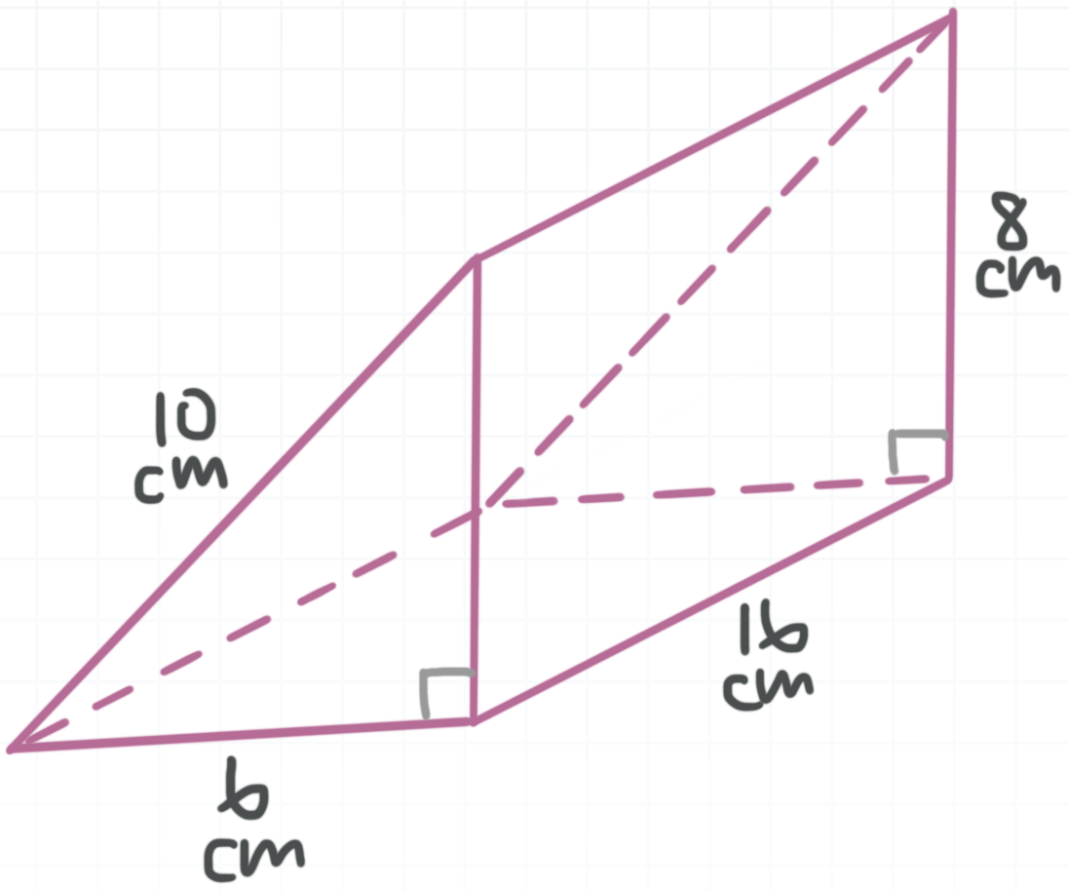
- 1. Find the volume of a rectangular prism with length 14 feet, width 10 feet, and height 5 feet.

- 2. Find the surface area of a rectangular prism with length 14 feet, width 10 feet, and height 5 feet.

- 3. Find the surface area of the triangular prism.



- 4. Find the volume of the triangular prism.



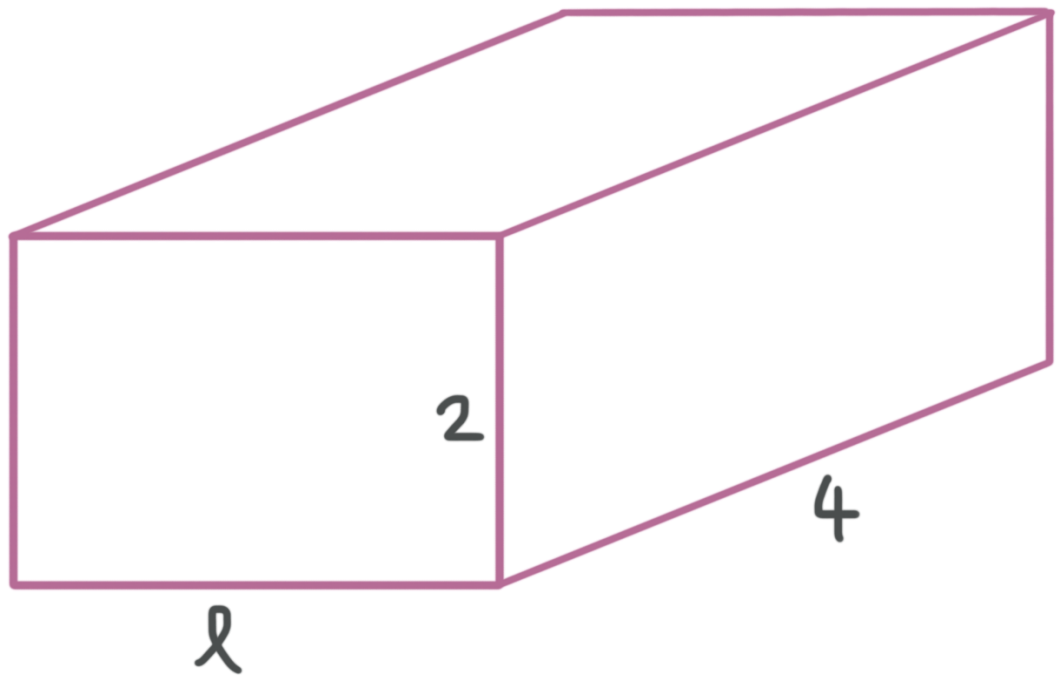
SURFACE AREA TO VOLUME RATIO OF PRISMS

■ 1. A rectangular prism has length, width, and height of 5 inches. Find the ratio of its surface area to its volume.

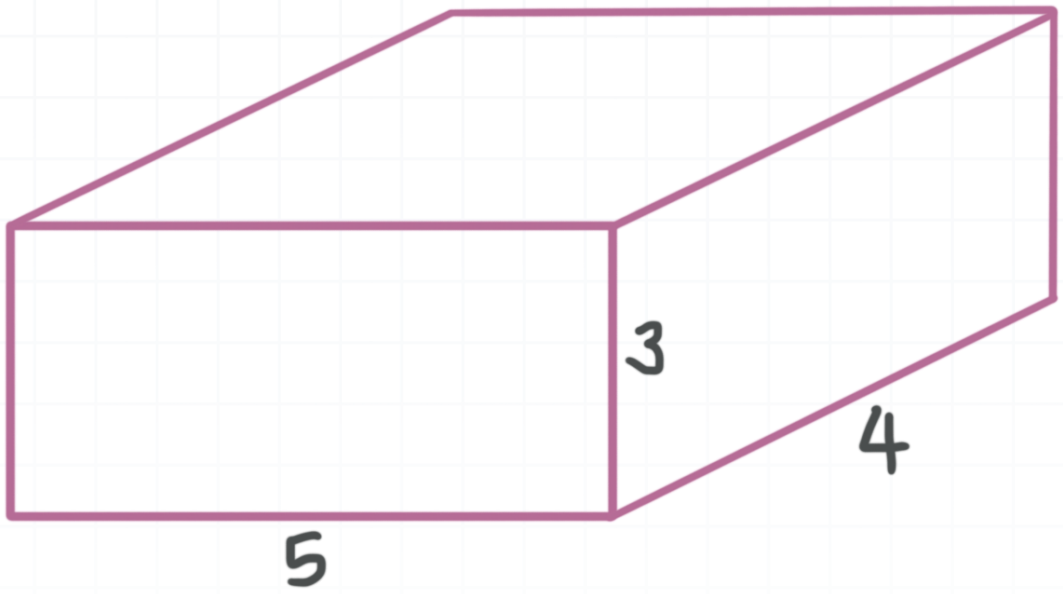
■ 2. A cube has a volume of 216 in^3. Suppose we double the length of each side of the cube. What is the ratio of the smaller cube to the larger cube?

■ 3. In lowest terms, find the ratio of volume to surface area of a cube with side length x.

■ 4. The ratio of the volume to surface area for the following rectangular prism is $1 : 2$. Find the length of the prism.

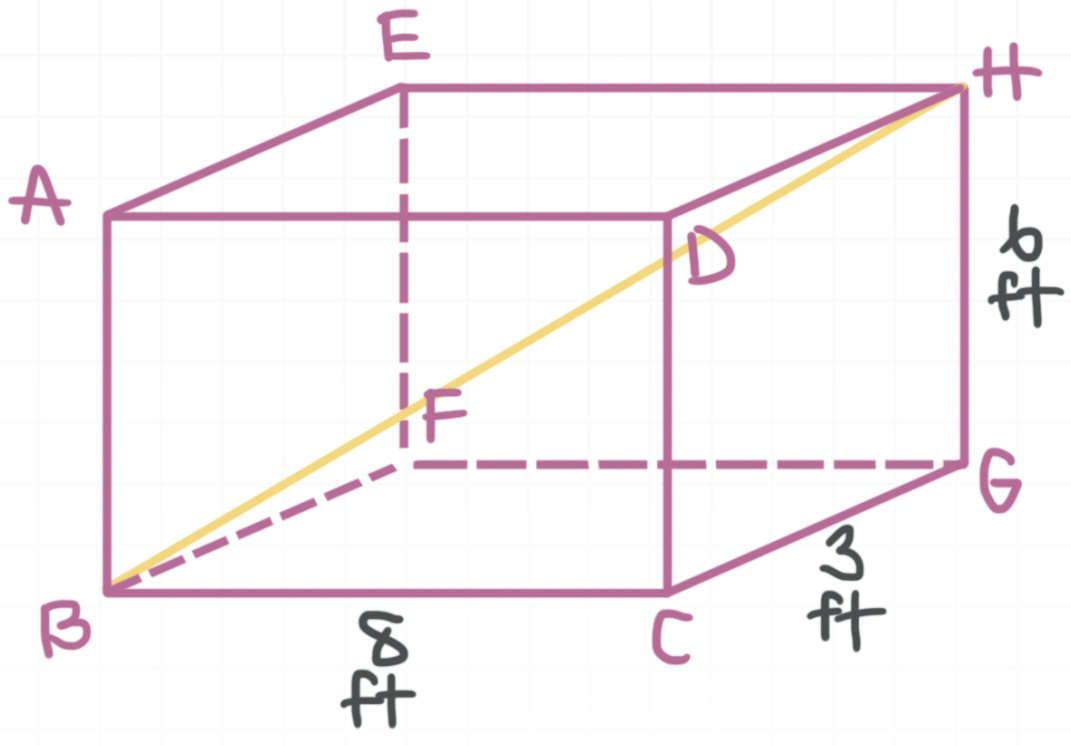


5. How many times greater will the surface area of this rectangular prism be if we double each side length?



DIAGONAL OF A RIGHT RECTANGULAR PRISM

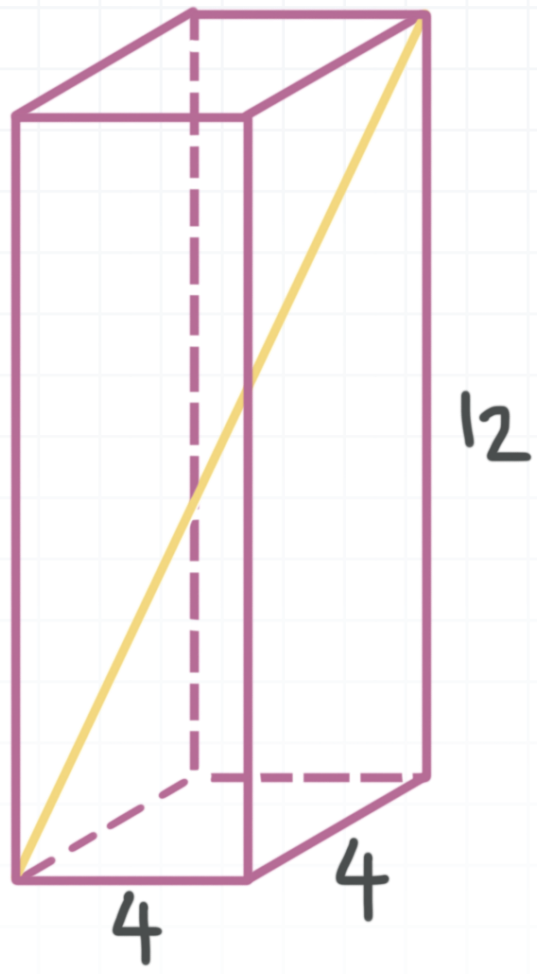
■ 1. Find the length of BH in the right rectangular prism.



■ 2. Find the length of the diagonal of a cube with side length 10.

■ 3. If the length of the diagonal of a cube is $4\sqrt{3}$, find the length of each side of the cube.

■ 4. Find the length of the diagonal of the right rectangular prism.



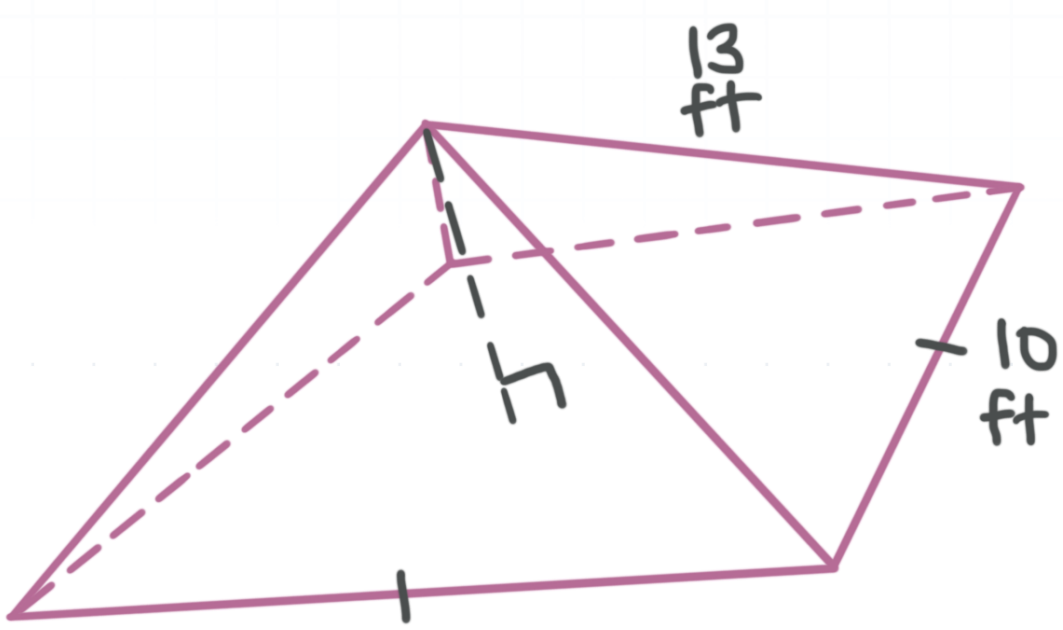
5. A right, rectangular prism has dimensions $4 \times 5 \times x$. Find the value of x if the diagonal is $5\sqrt{2}$.

NETS/VOLUME/SURFACE AREA OF PYRAMIDS

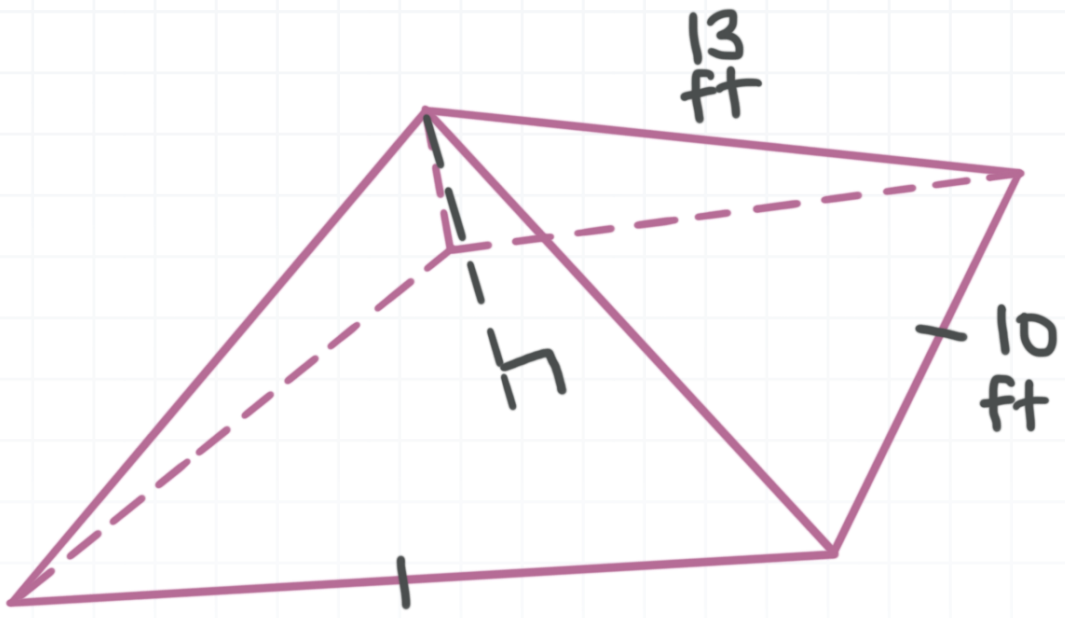
■ 1. A pyramid has a square base with area 25 ft^2 and height 6 feet. Find the volume of this pyramid.

■ 2. A pyramid has a square base with area 25 ft^2 and height 6 feet. Find the surface area of this pyramid.

■ 3. Find the surface area of the pyramid.



■ 4. Find the height of the following pyramid to the nearest tenth. Then find its volume.

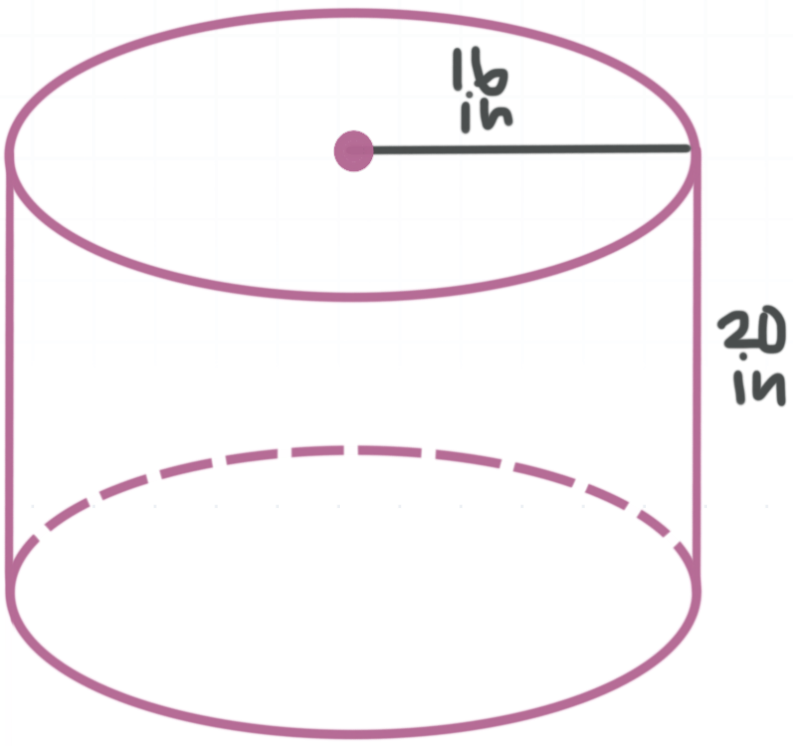


NETS/VOLUME/SURFACE AREA OF CYLINDERS

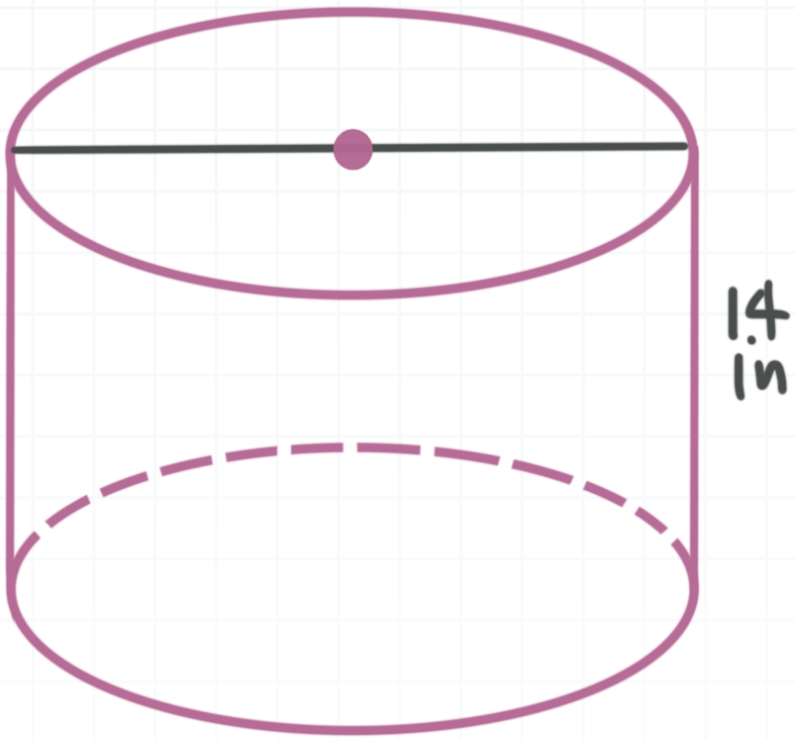
- 1. Find the volume of a cylinder with diameter 10 cm and height 12 cm.

- 2. Find the height of a cylinder with volume $2{,}814.867$ in^3 and radius 8.

- 3. Find the surface area of the cylinder.



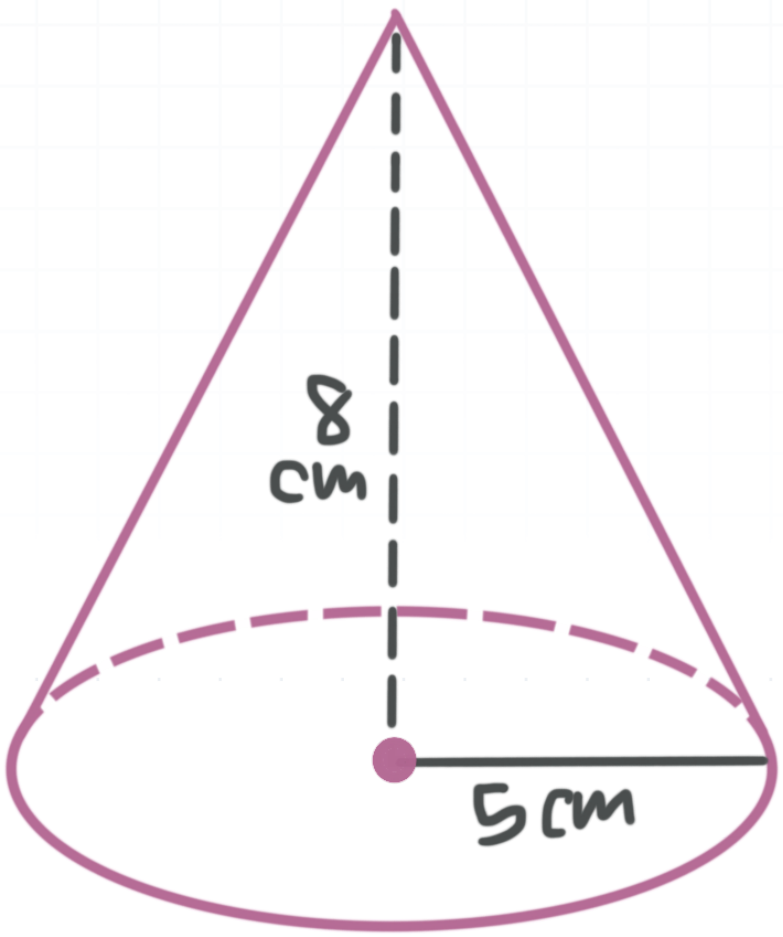
- 4. The circumference of the base of the cylinder is 62.832 inches. Find its volume.



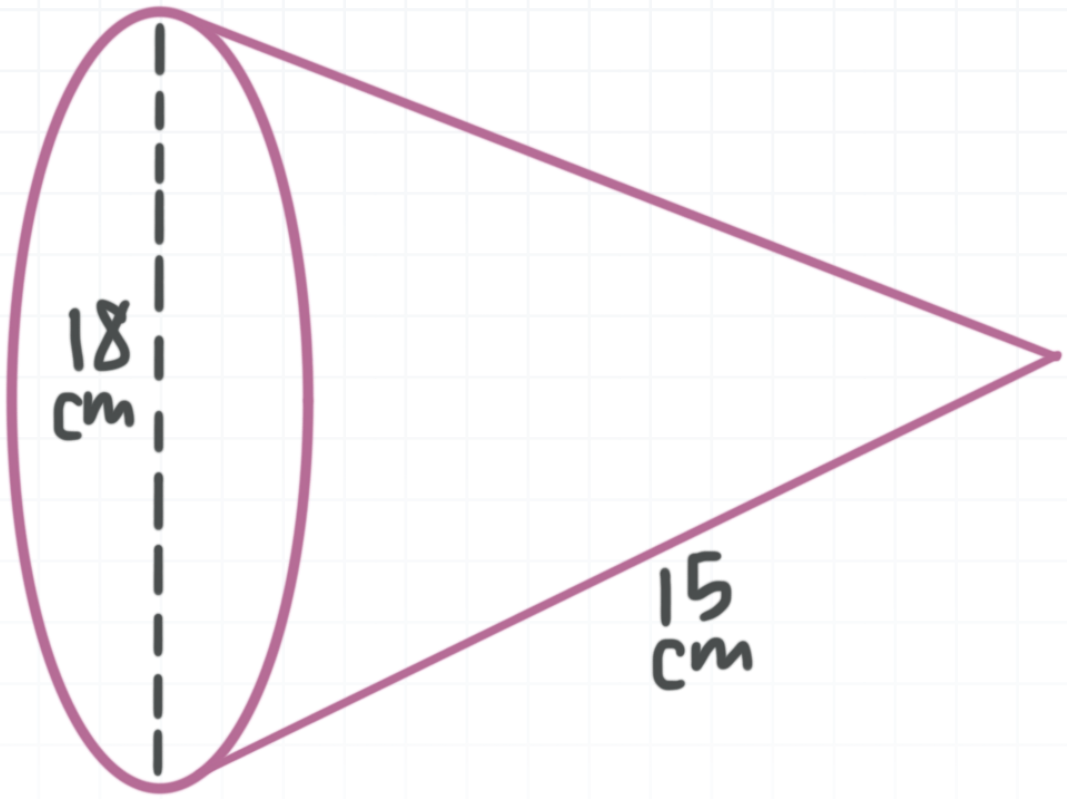
NETS/VOLUME/SURFACE AREA OF CONES

■ 1. Find the volume of a right cone with a height of 10.5 inches and a diameter of 8 inches at its base to the nearest hundredth.

■ 2. Find the slant height of the cone.



■ 3. Find the surface area of the cone in terms of π.



4. The volume of a cone is 100π. Find the length of its radius if its height is 12.

VOLUME/SURFACE AREA OF SPHERES

1. Find the volume to the nearest hundredth of a sphere with radius 15 inches.

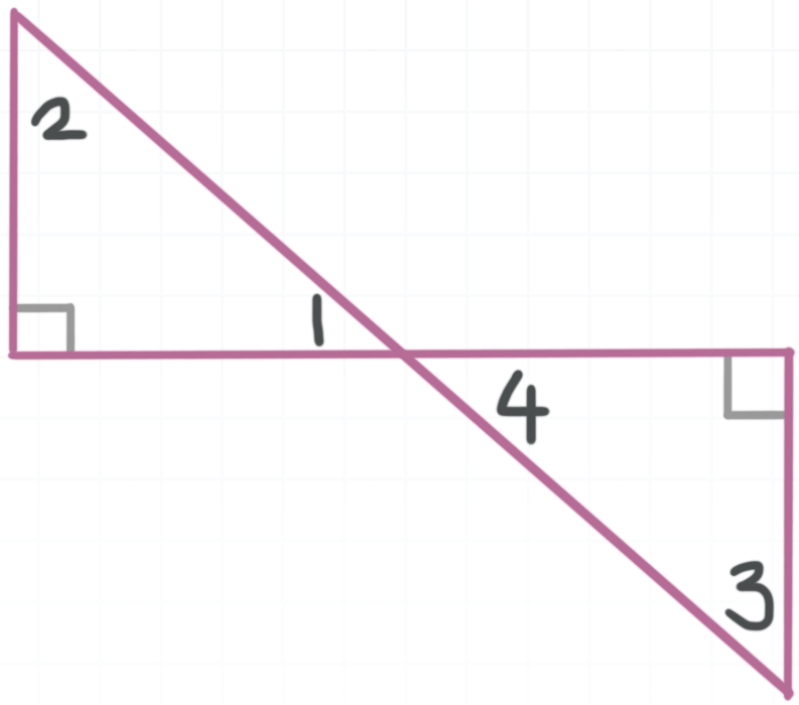
2. A basketball has a diameter of 9.55 inches. Find its surface area to the nearest hundredth.

3. A sphere has radius 10. How much greater is the volume than the surface area in terms of π?

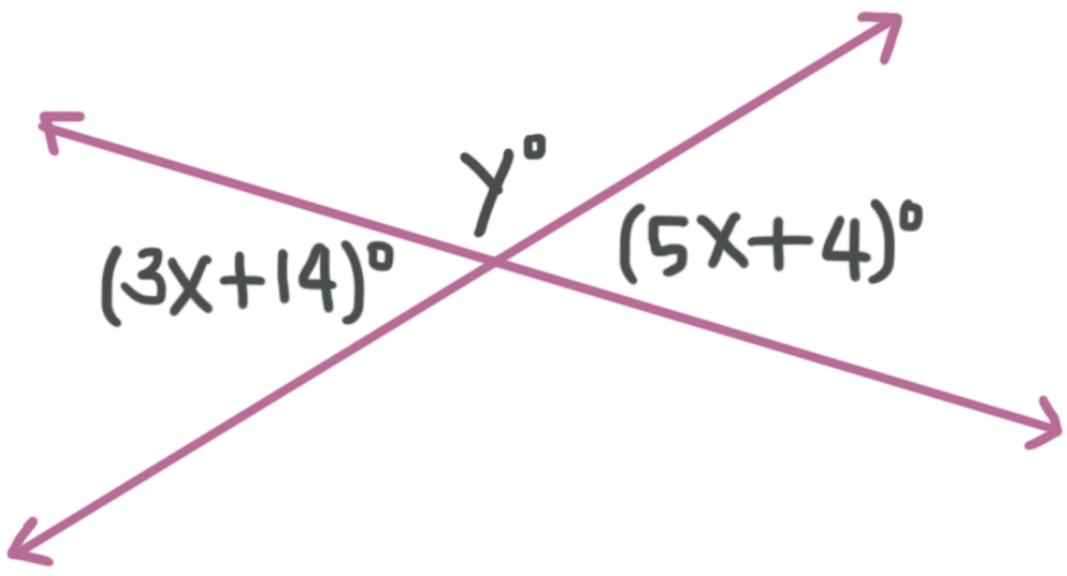
4. A sphere has a volume of 288π. Find its diameter.

CONGRUENT ANGLES

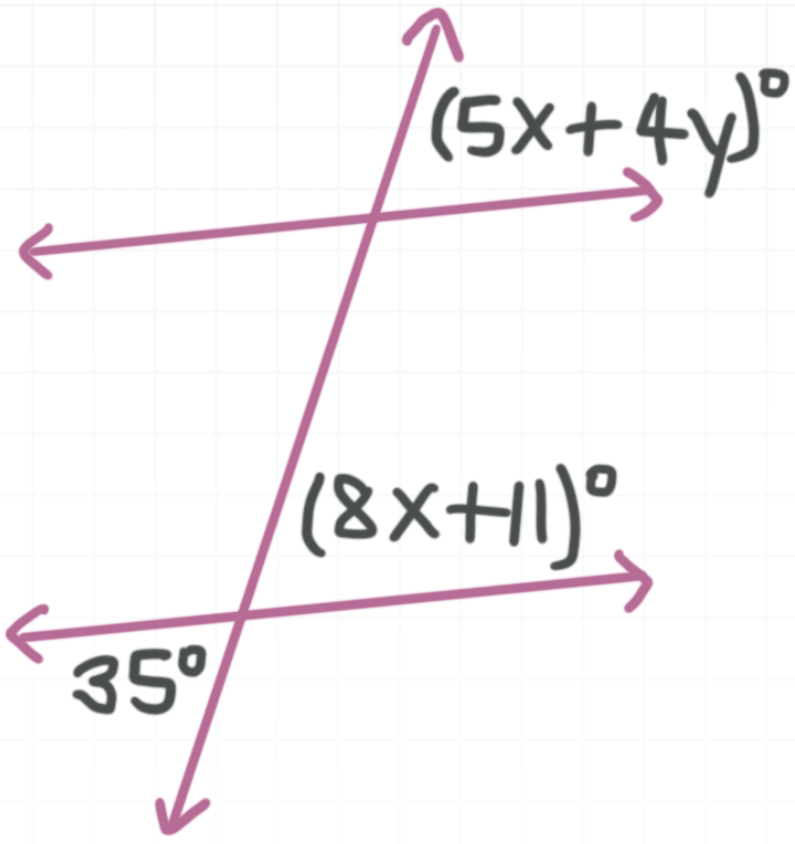
1. $m\angle 3 = 4x - 11$ and $m\angle 1 = 5x + 2$. Find $m\angle 2$.



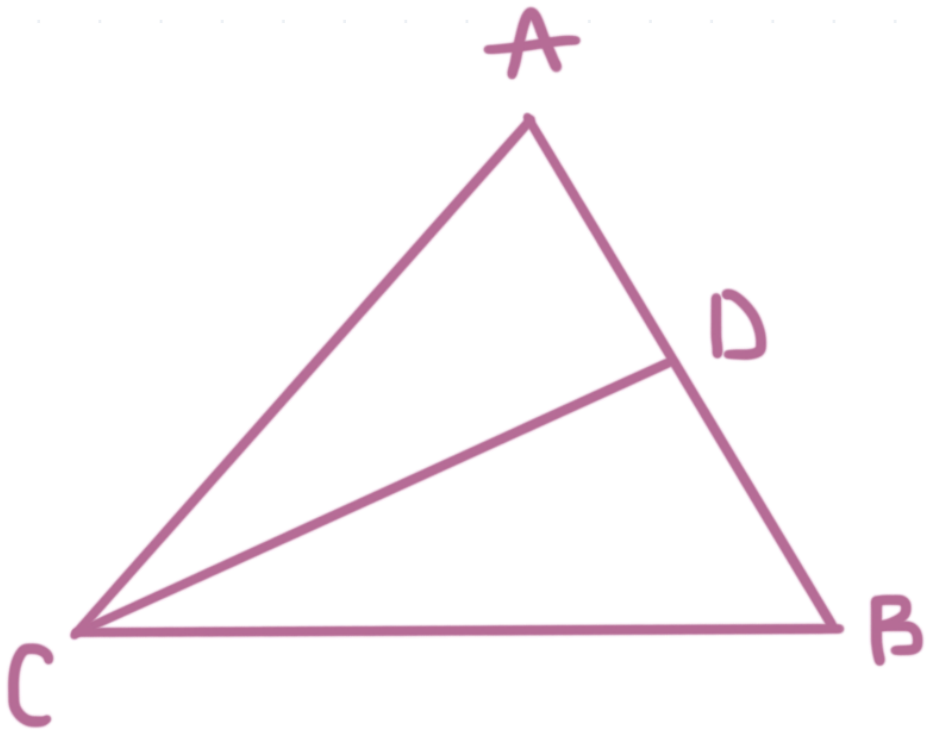
2. Find the values of x and y.



3. Find the value of x and y.

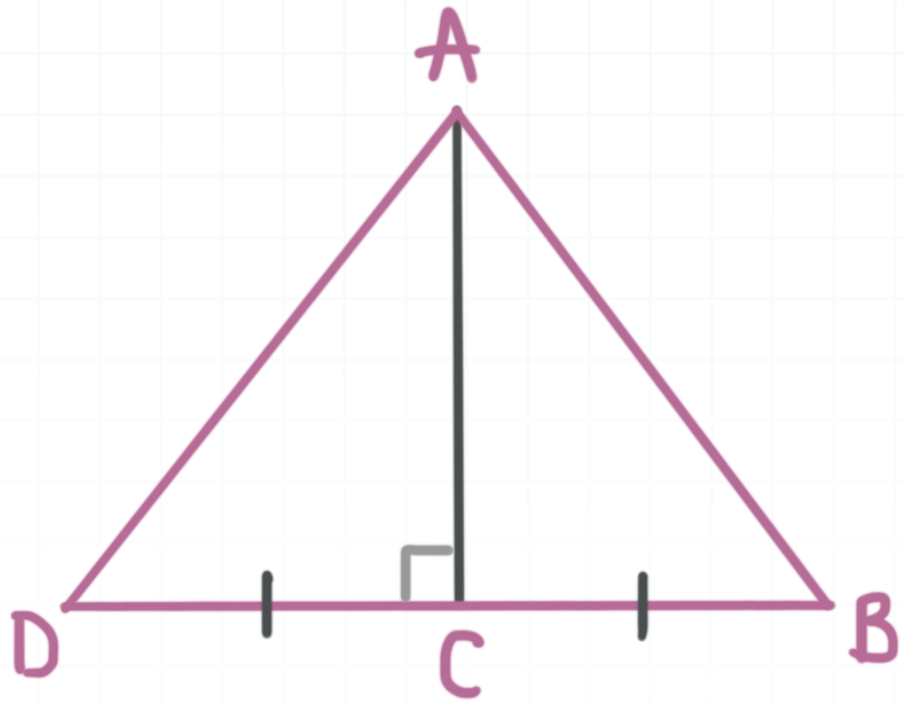


4. $\overline{CD}$ is an angle bisector of the triangle and $\overline{CD} \perp \overline{AB}$. $m\angle CAD = 5x - 10$ and $m\angle BCD = 25$. Find x.

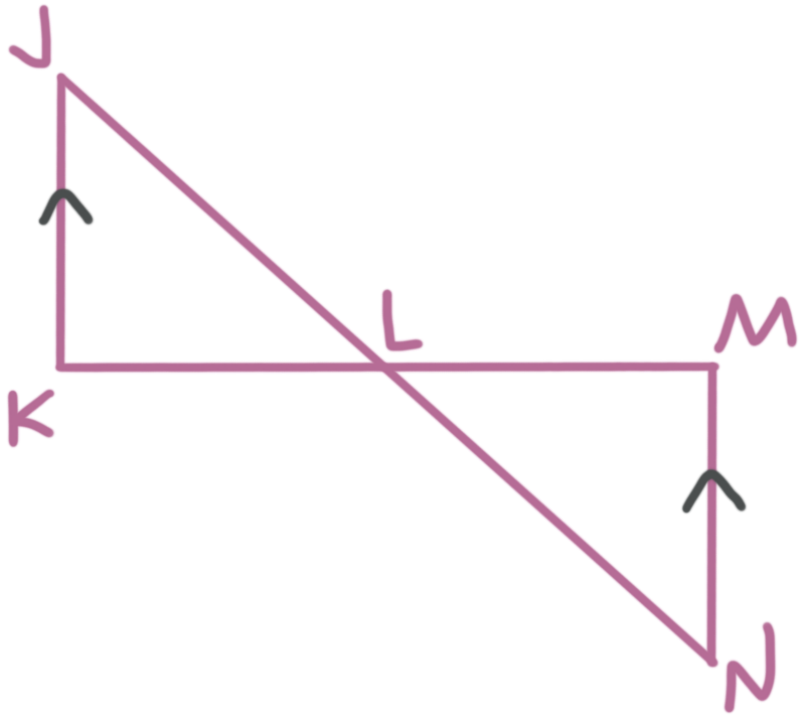


TRIANGLE CONGRUENCE WITH SSS, ASA, SAS

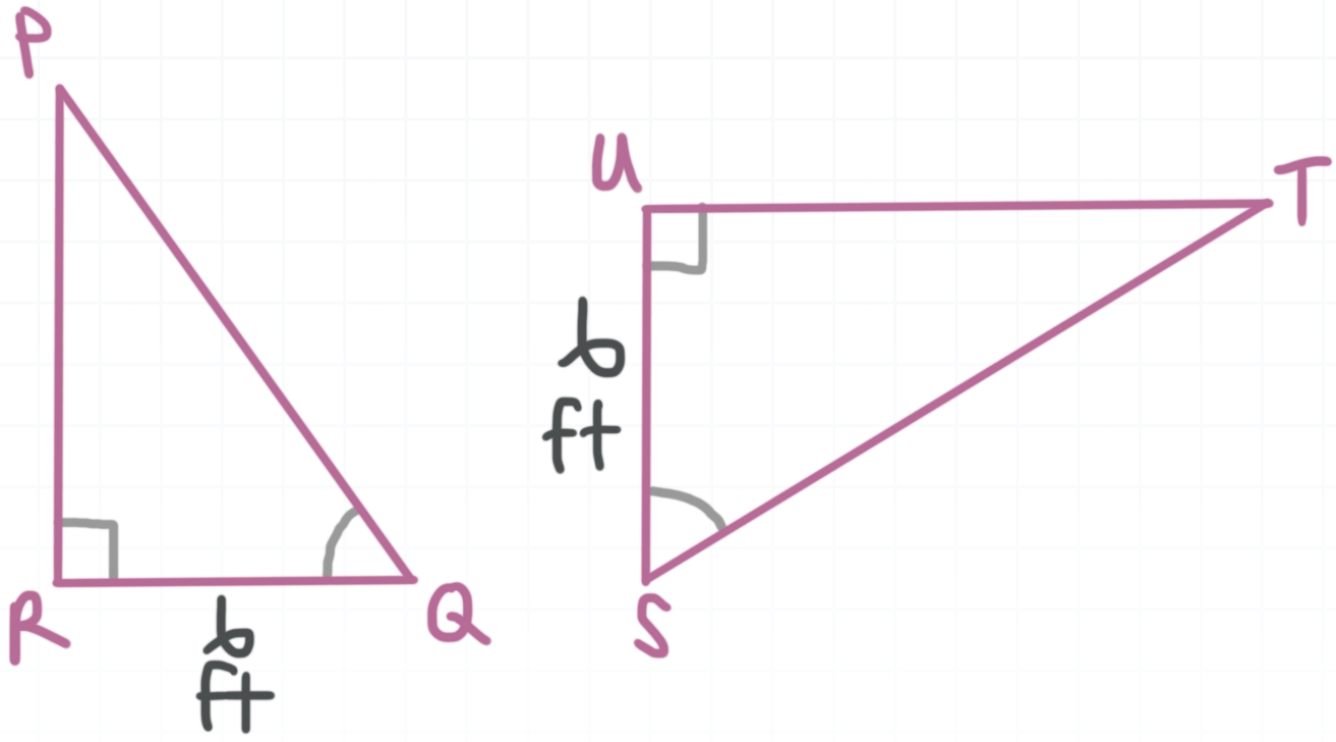
■ 1. Fill in the blank. $\triangle ABC \cong \triangle ADC$ by the _____ Theorem.



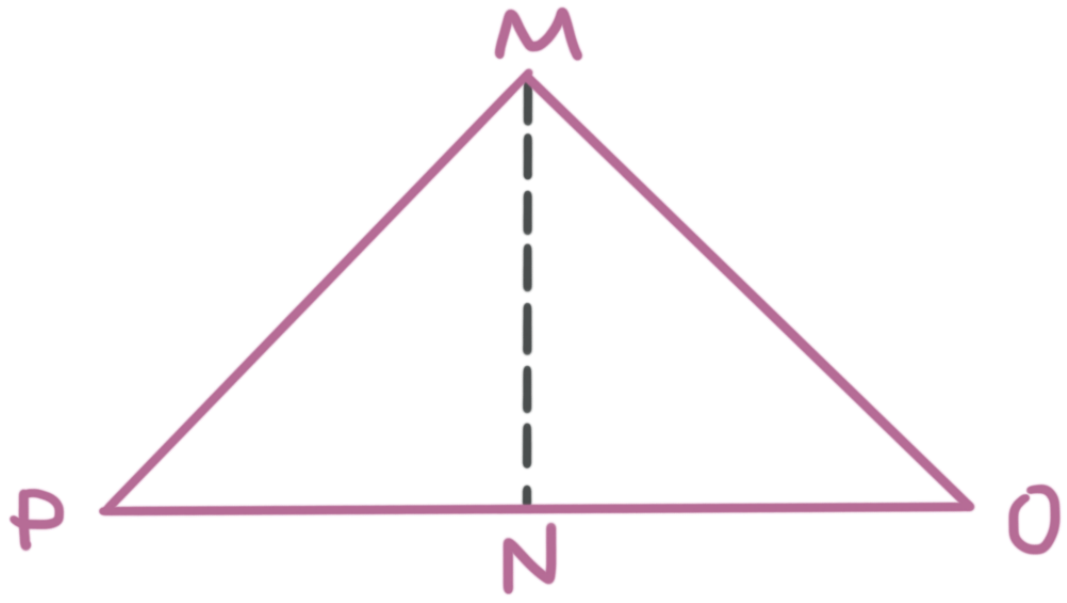
■ 2. Fill in the blank. L is a midpoint of $\overline{JN}$. $\triangle JKL \cong \triangle NML$ by the _____ Theorem.



■ 3. $\triangle PRQ \cong \triangle$ _____ by the _____ Theorem.

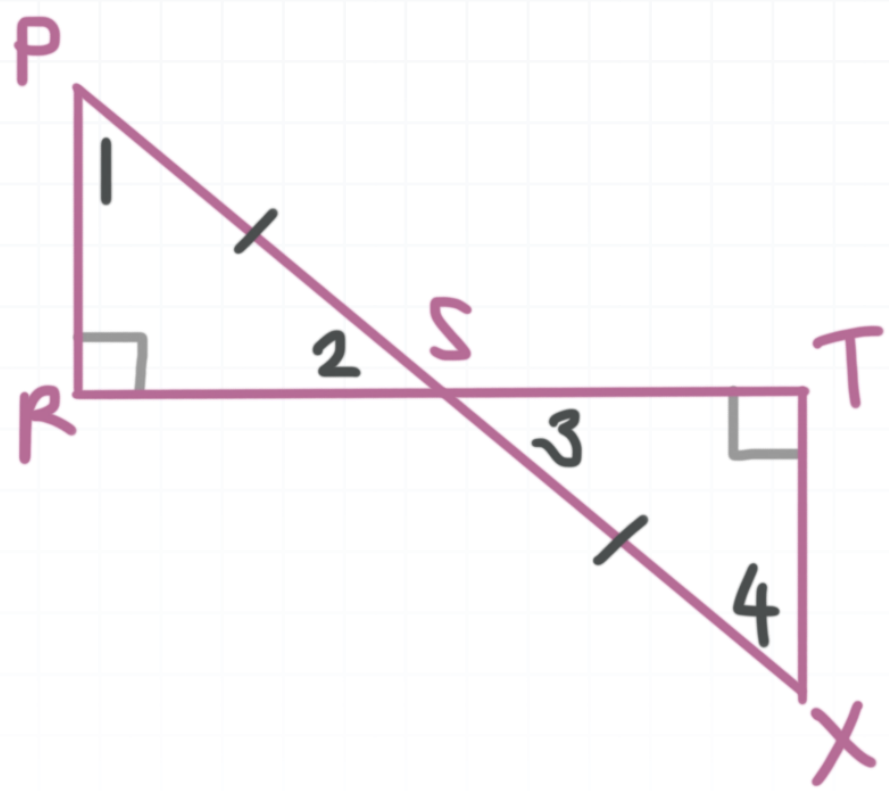


■ 4. $\triangle PMO$ is an isosceles triangle with vertex angle at M. N is a midpoint of $\overline{PO}$. $\triangle PMN \cong \triangle OMN$ by the _____ Theorem.



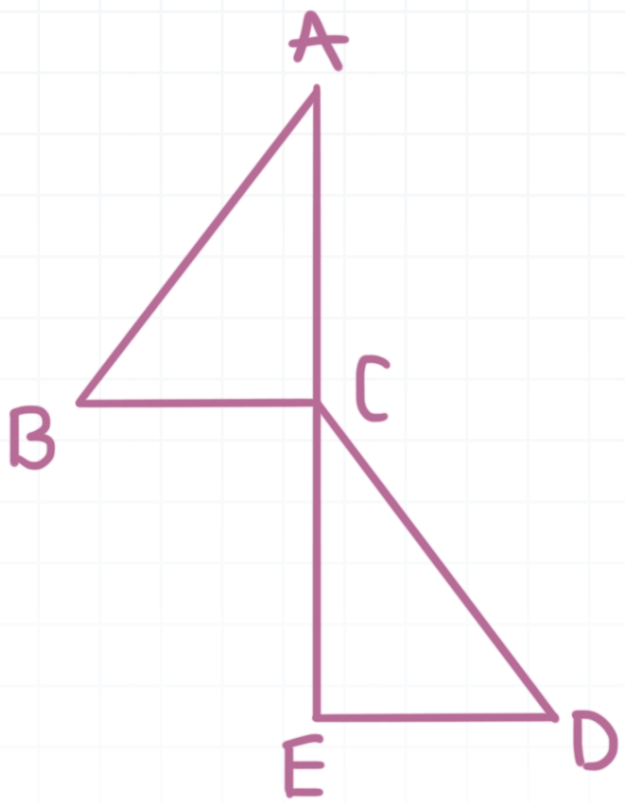
TRIANGLE CONGRUENCE WITH AAS, HL

■ 1. Which theorem could be used to prove $\triangle PRS \cong \triangle XTS$?

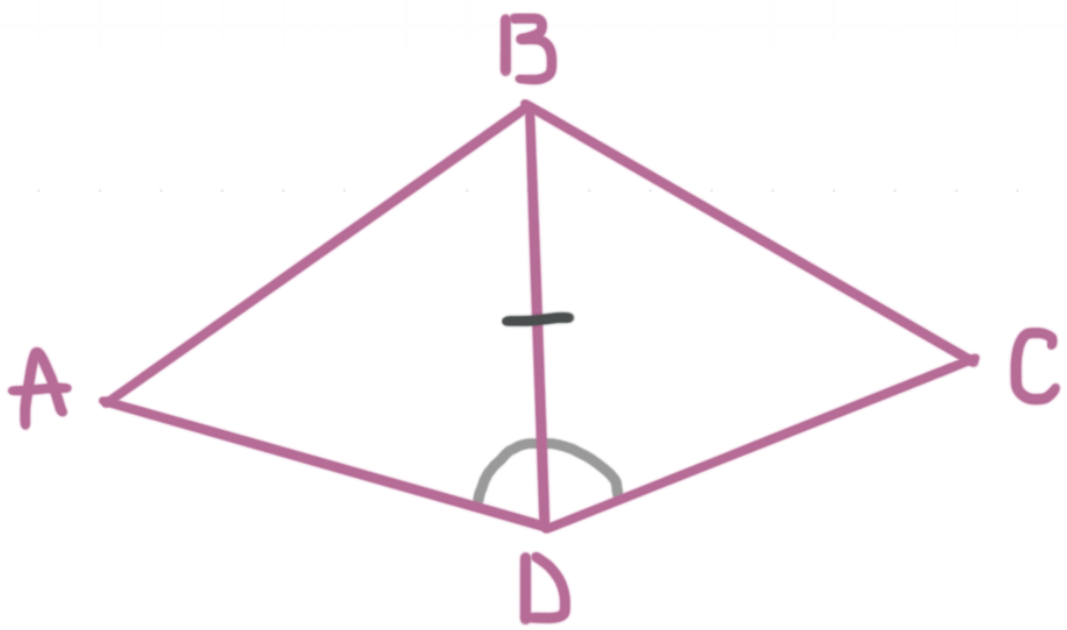


■ 2. Which theorem could be used to prove $\triangle ACB \cong \triangle CED$? The following facts are given about the triangles.

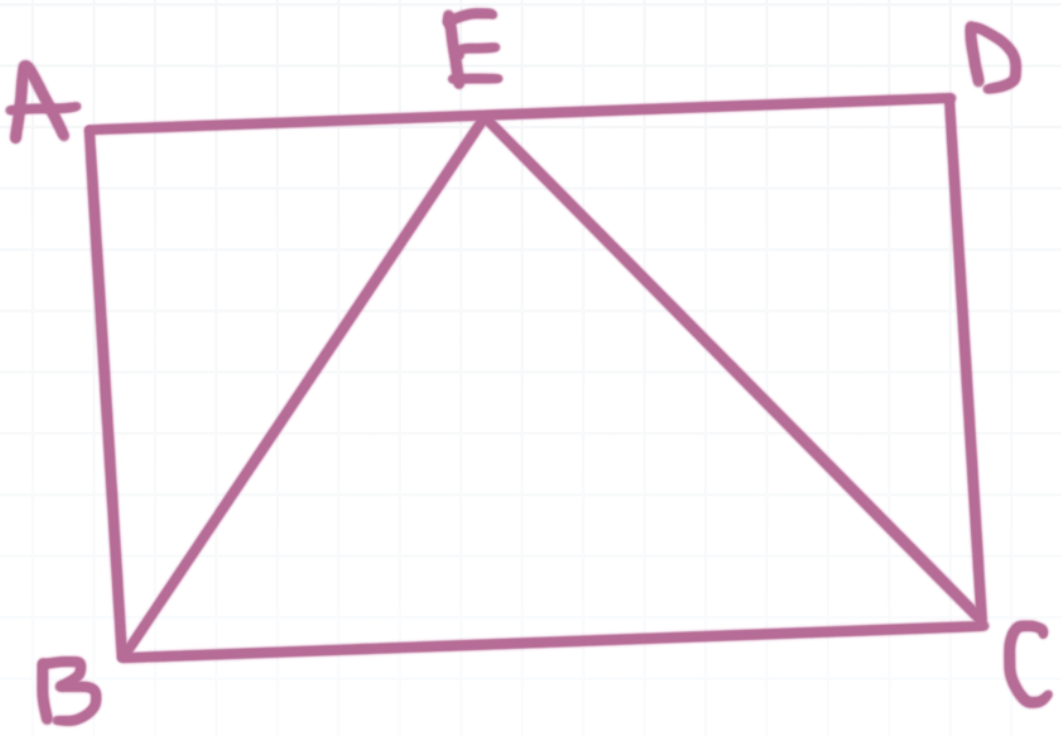
$\overline{AE} \perp \overline{BC}$, $BC||DE$, $\overline{AB} \cong \overline{DC}$, and C is a midpoint of $\overline{AE}$



■ 3. What additional information would we need to prove these triangles are congruent using AAS Theorem?

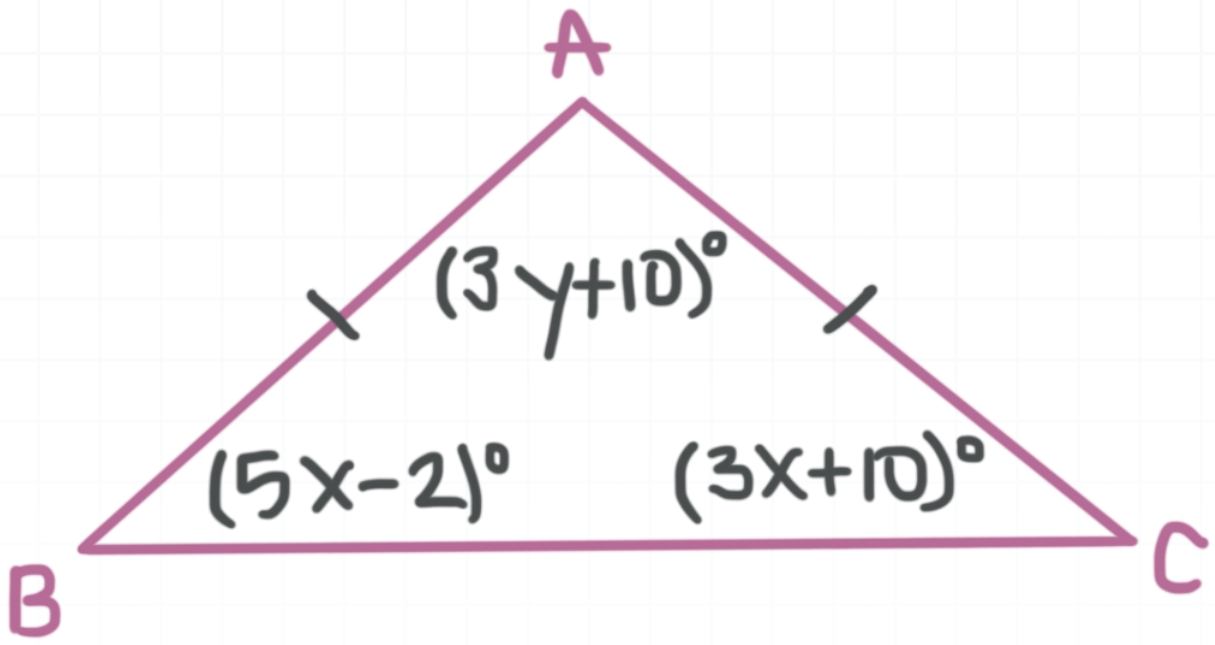


■ 4. $ABCD$ is a rectangle. BEC is an isosceles triangle with vertex angle at E. Write a proof to verify that $\triangle BAE \cong \triangle CDE$ by the HL Theorem.



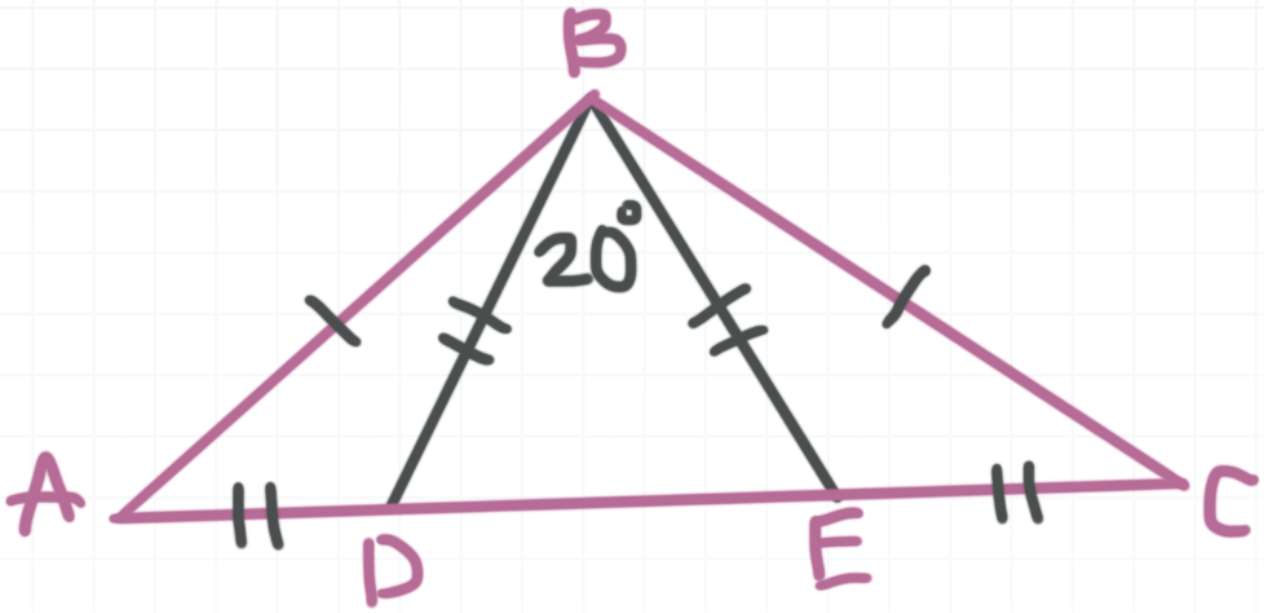
ISOSCELES TRIANGLE THEOREM

■ 1. Find the values of x and y.

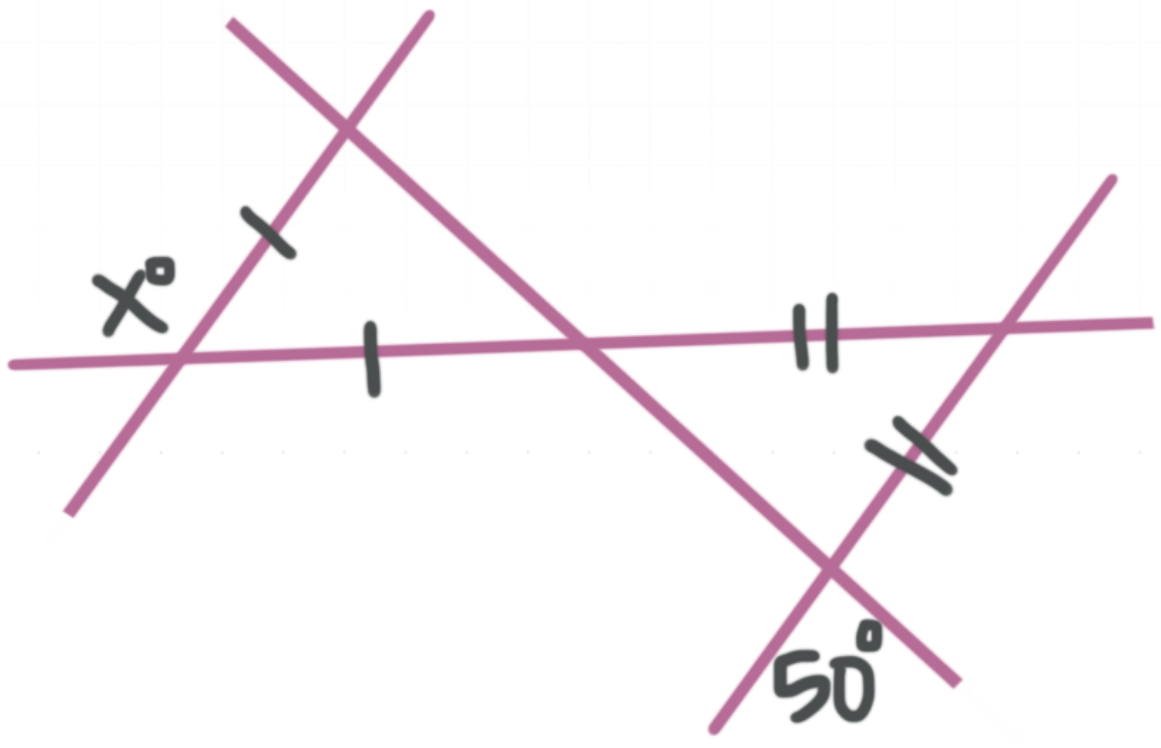


■ 2. $\triangle JKL$ is isosceles with vertex angle K. $JK = 4x - 5$, $LK = 3x + 8$, and $m\angle J = 2x + 4$. Find $m\angle L$.

■ 3. Find $m\angle ABC$.



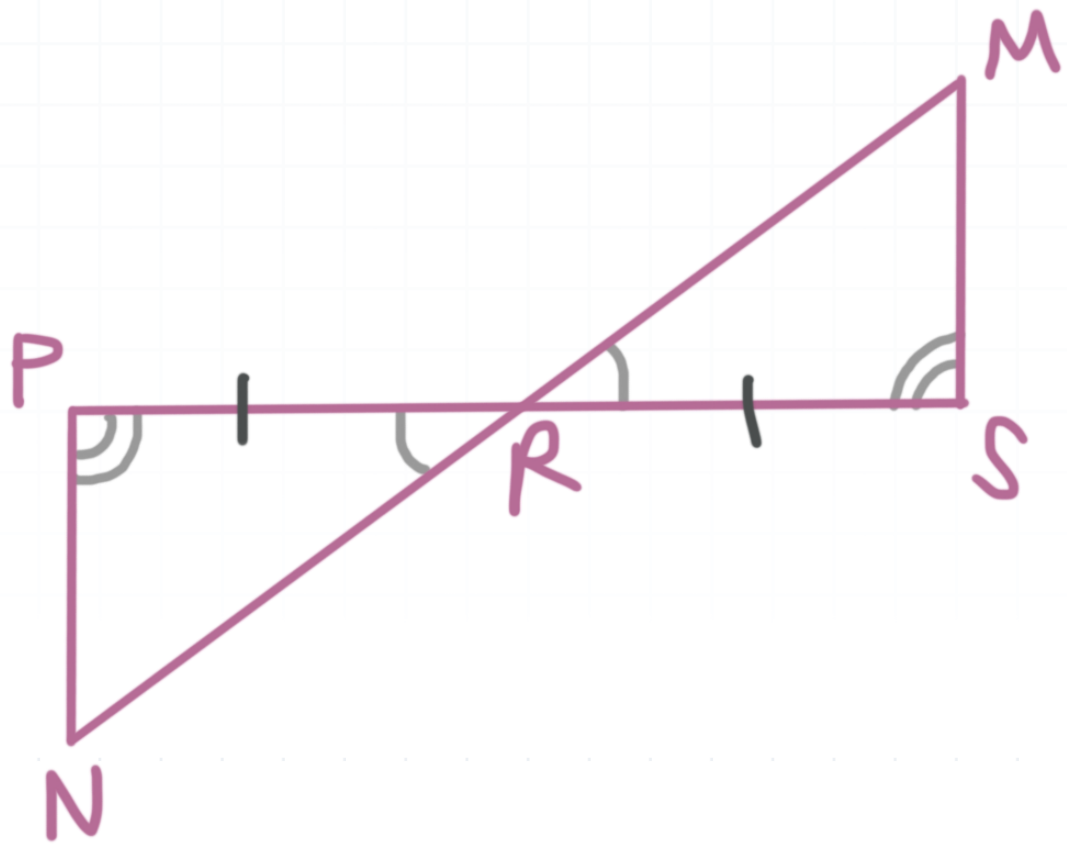
4. Find x.



CPCTC

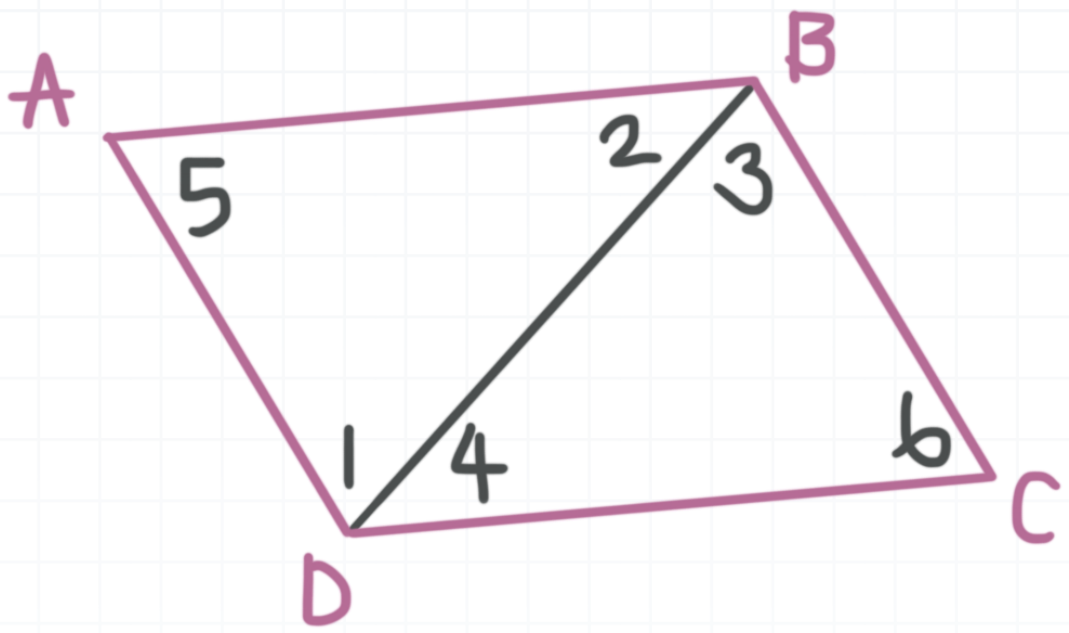
■ 1. Fill in the blank. Given $\triangle LMO \cong \triangle SQR$, $\overline{LO} \cong$ _____.

■ 2. Determine whether $\angle M \cong \angle N$. Justify your answer.

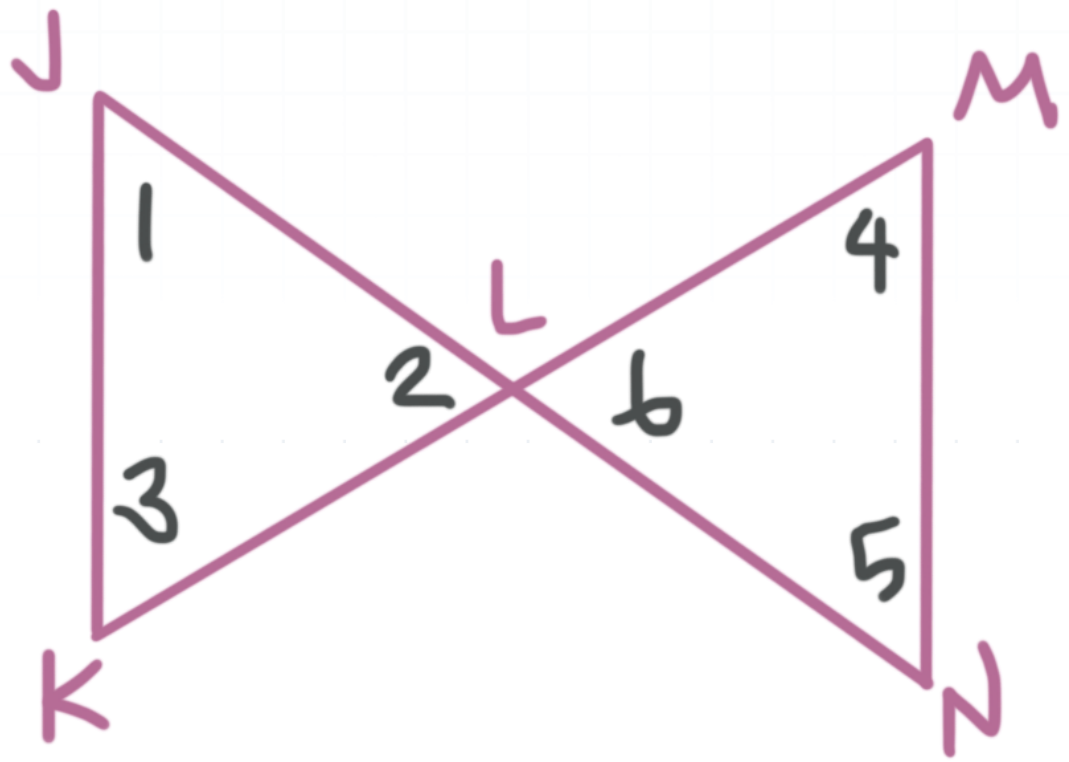


■ 3. $\triangle DOG \cong \triangle TCA$ by SSS. What three conclusions can be drawn by CPCTC?

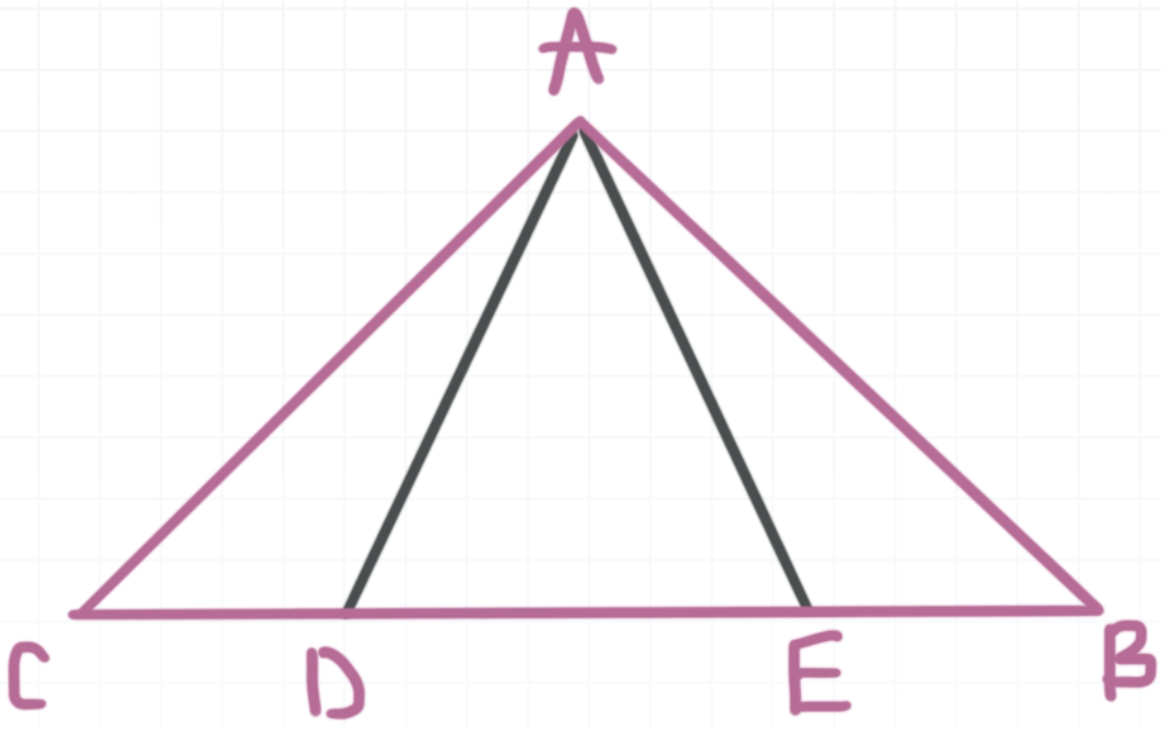
■ 4. Given $\angle 1 \cong \angle 3$ and $\angle 2 \cong \angle 4$, prove $\overline{AB} \cong \overline{CD}$.



■ 5. Given that L is the midpoint of $\overline{JN}$ and $\overline{KM}$, prove $\overline{JK} \cong \overline{NM}$.

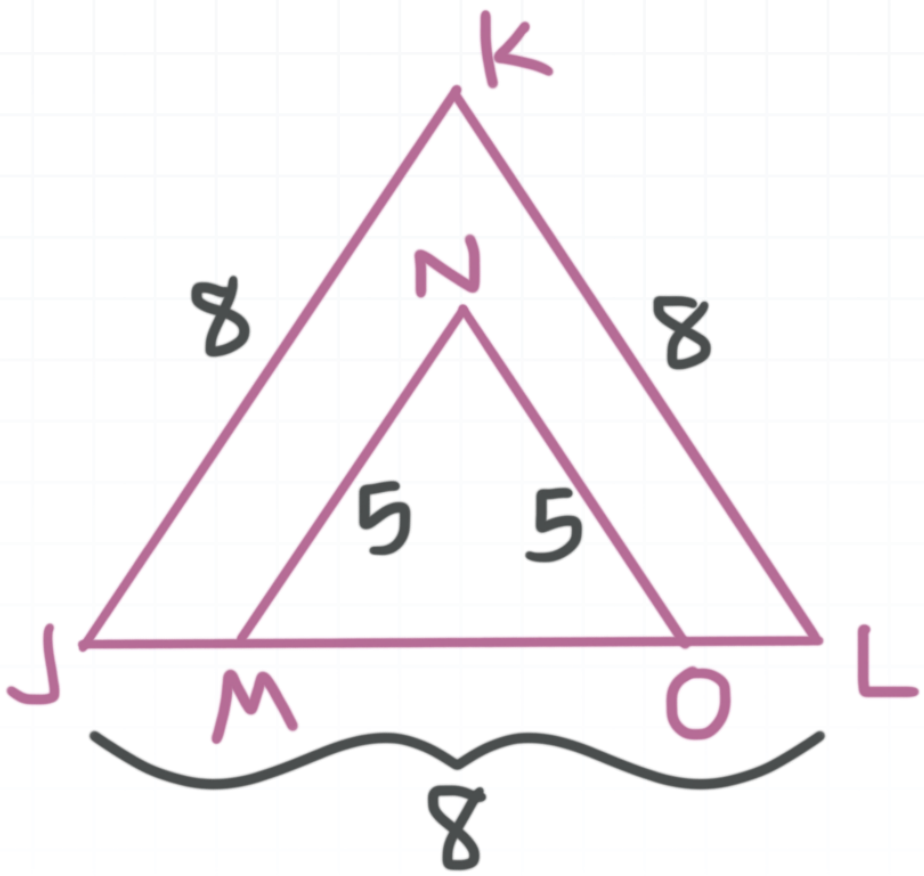


■ 6. Given that $\triangle CAB$ is an isosceles triangle, that D is the midpoint of $\overline{CE}$, and that E is the midpoint of $\overline{BD}$, prove that $\triangle DAE$ is isosceles.

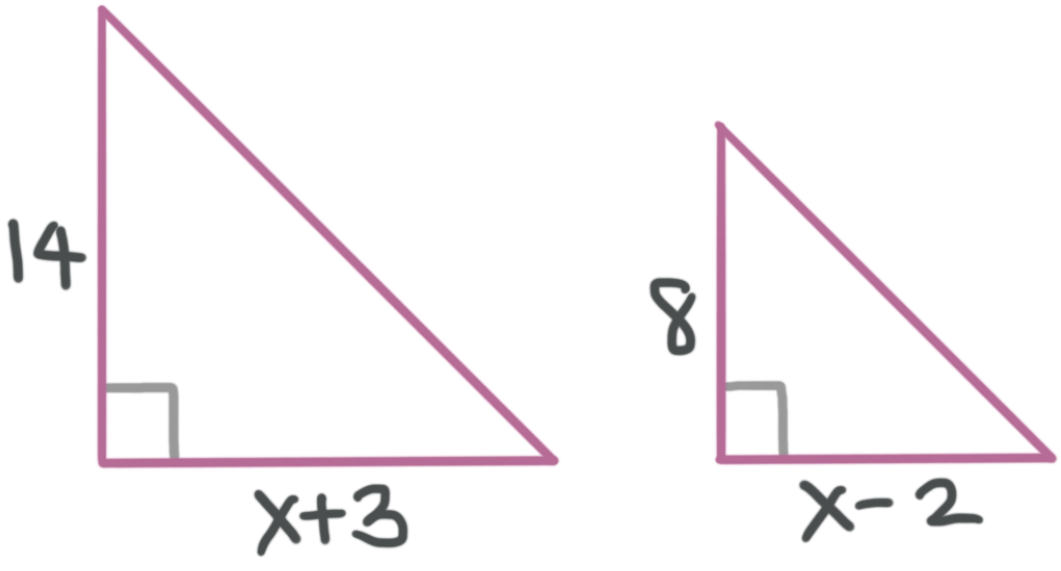


SIMILAR TRIANGLES

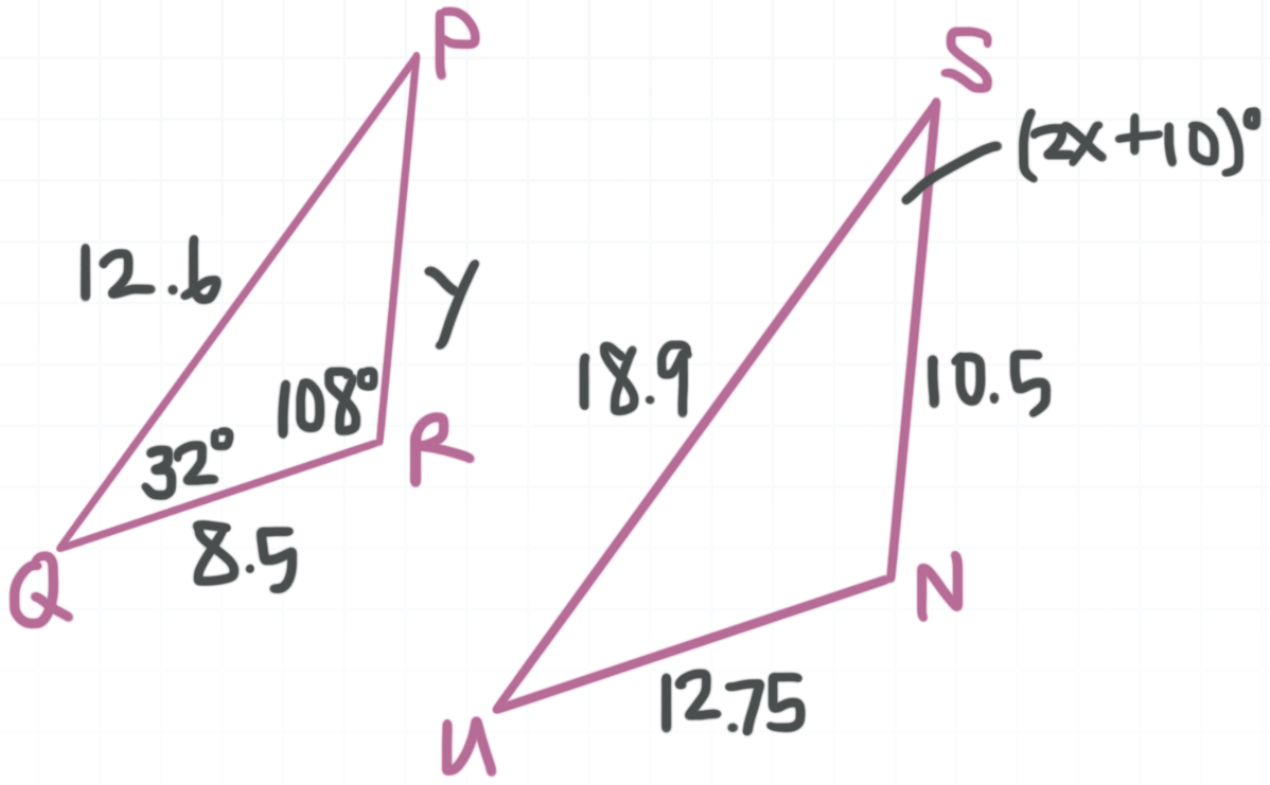
■ 1. $\triangle JKL$ is similar to $\triangle MNO$. Find MO.



■ 2. $\triangle ABC$ is similar to $\triangle DEF$. Set up a proportion to find the value of x.

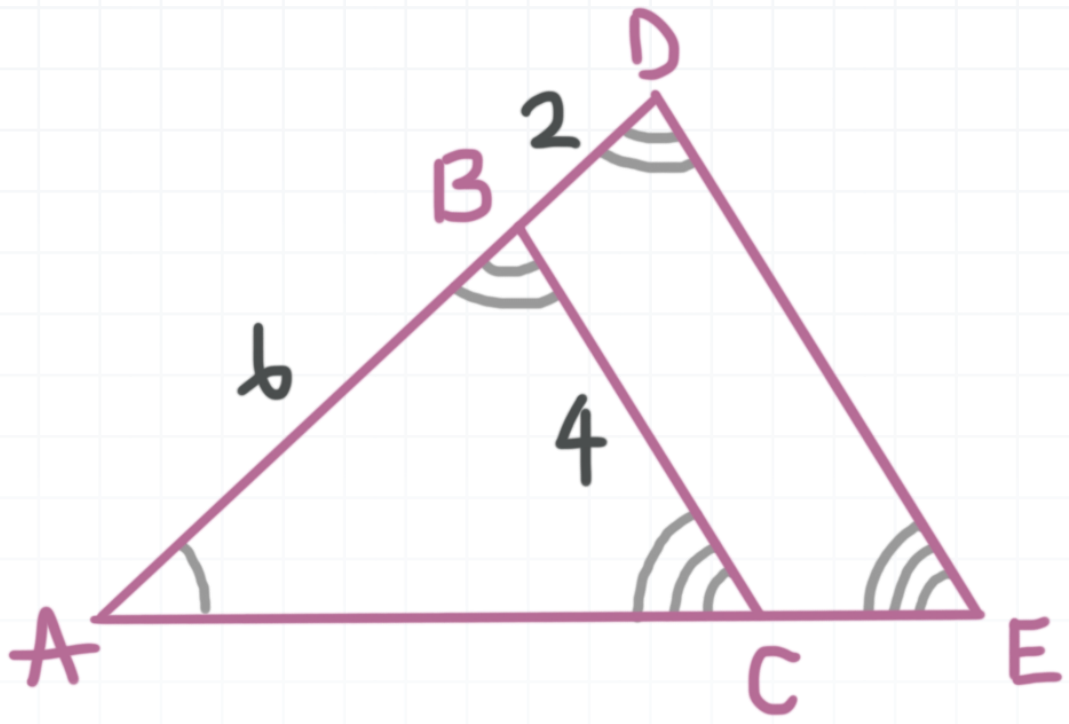


■ 3. $\triangle PQR$ is similar to $\triangle SUN$. Find the values of x and y.

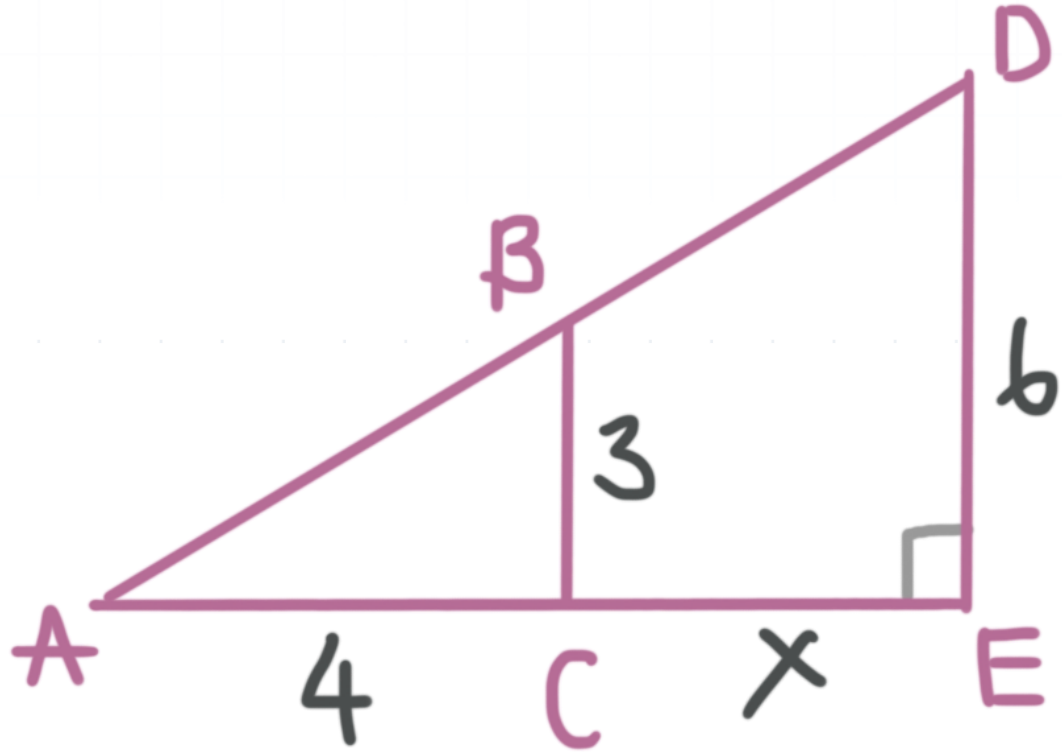


■ 4. A 14-foot tree casts a 6-foot long shadow. A 3.5-foot tall child would have a shadow length of how many feet?

■ 5. Find DE.



6. Find CE.

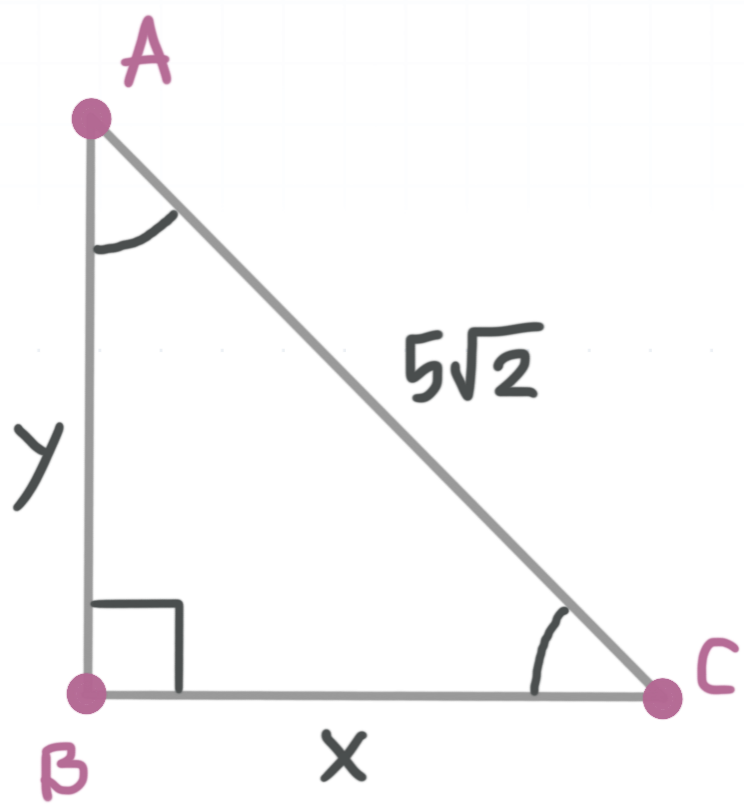


45-45-90 TRIANGLES

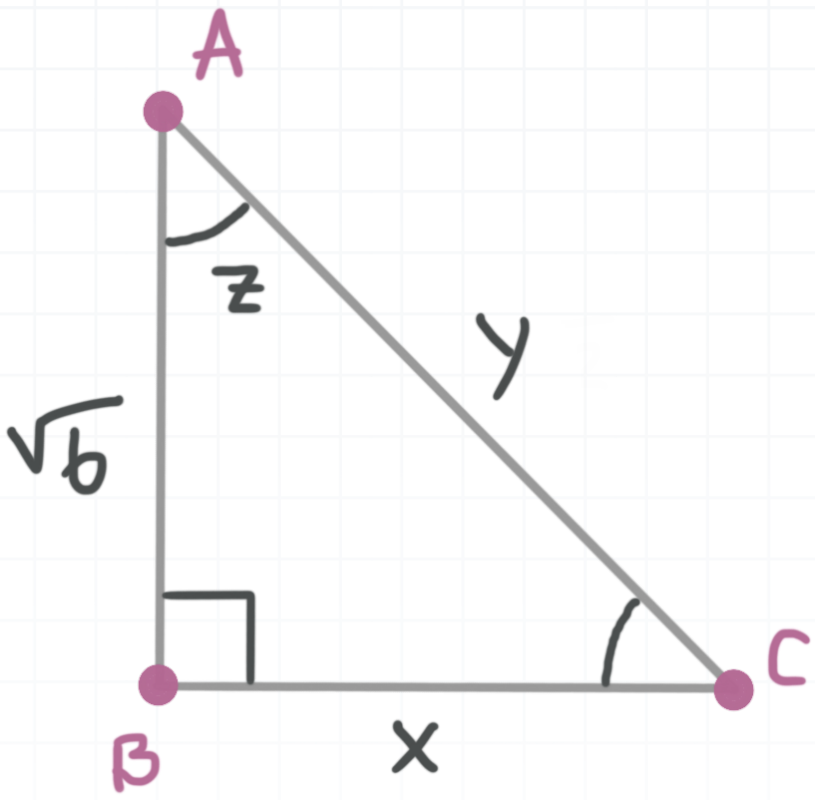
■ 1. $\triangle PDX$ is an isosceles right triangle with vertex $\angle D$, and $PD = 4$. Find DX and XP.

■ 2. A square has a perimeter of 40 meters. Find the length of the diagonal of the square.

■ 3. Find the values of x and y.

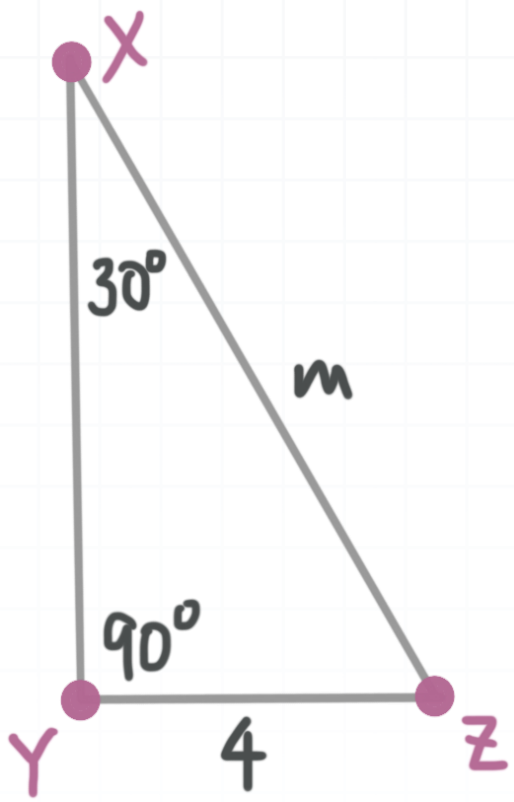


■ 4. Find the values of x, y, and z.

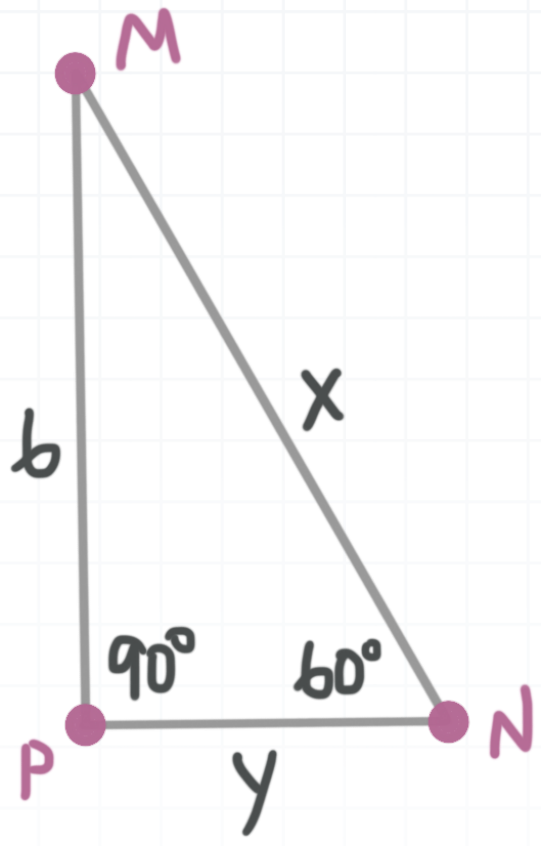


30-60-90 TRIANGLES

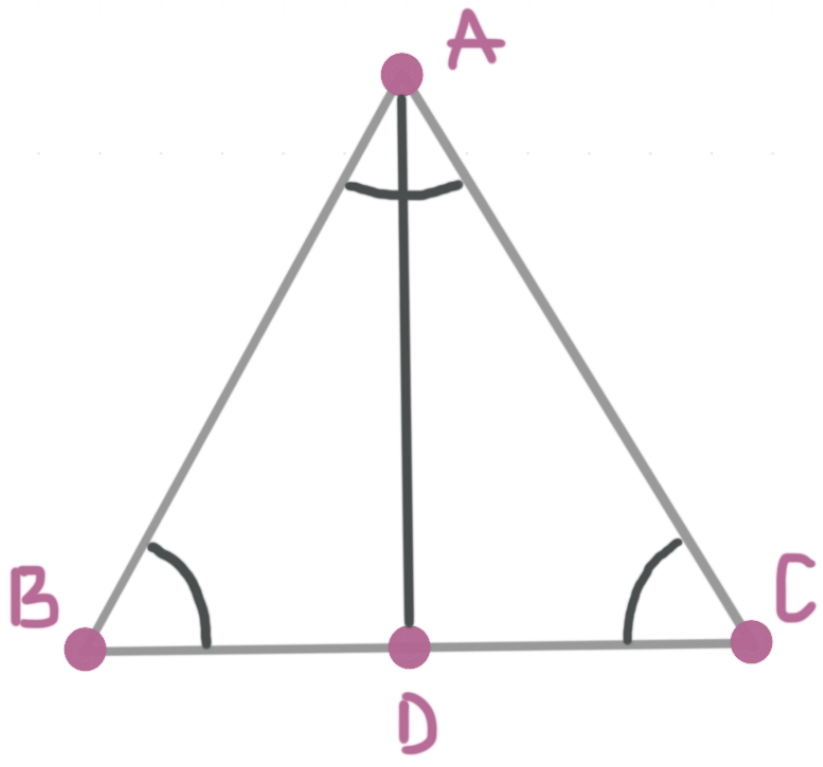
1. Find the value of m in the given triangle.



2. Find the values of x and y in the given triangle.

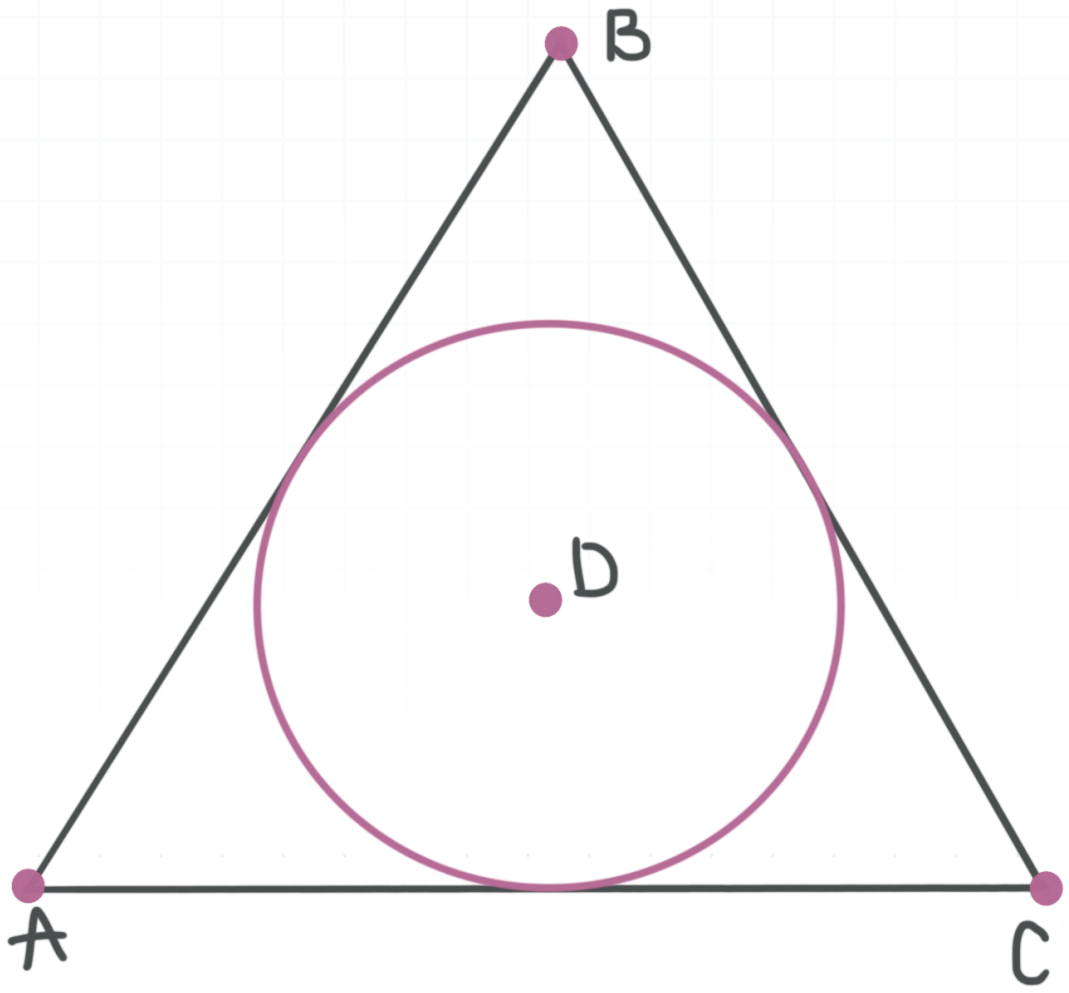


3. $\triangle BAC$ is an equilateral triangle. The perimeter is 42 cm and $m\angle ADC = 90$. Find AD.

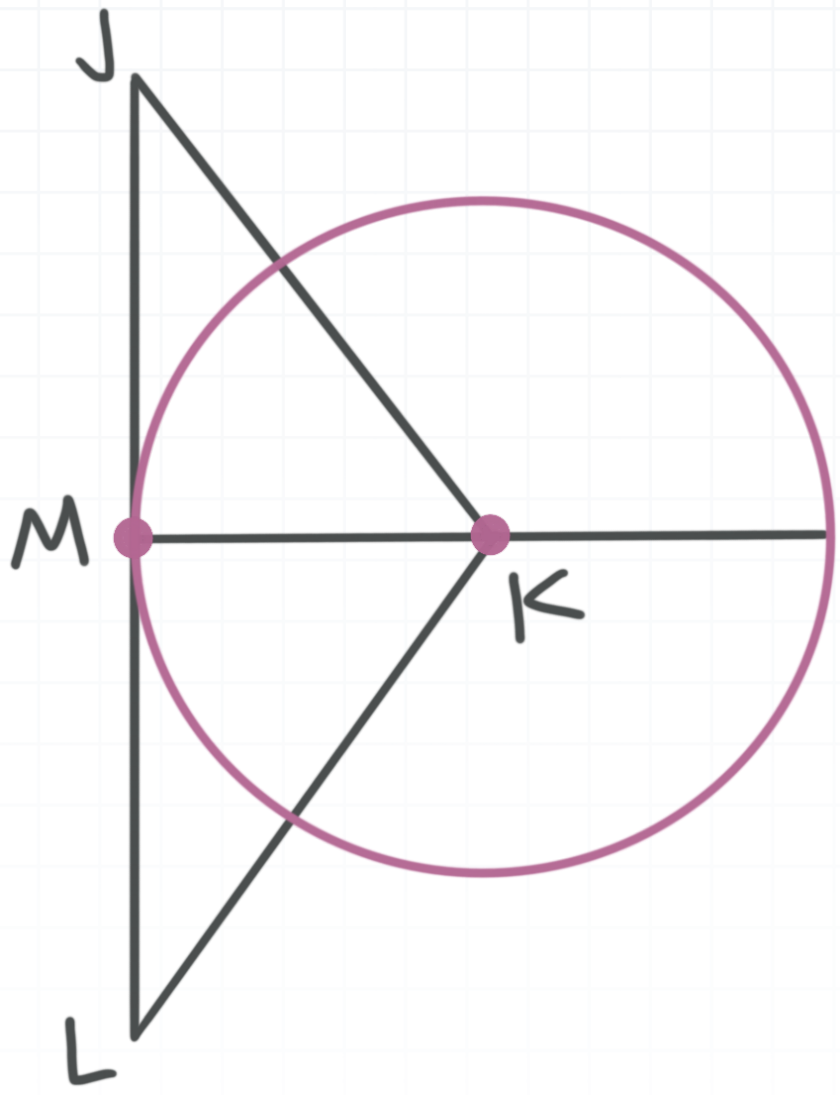


■ 4. $\triangle XYZ$ is an equilateral triangle. $\overline{XM}$ is an altitude, median, and angle bisector of the triangle. If $XM = 9$, find the perimeter of the triangle.

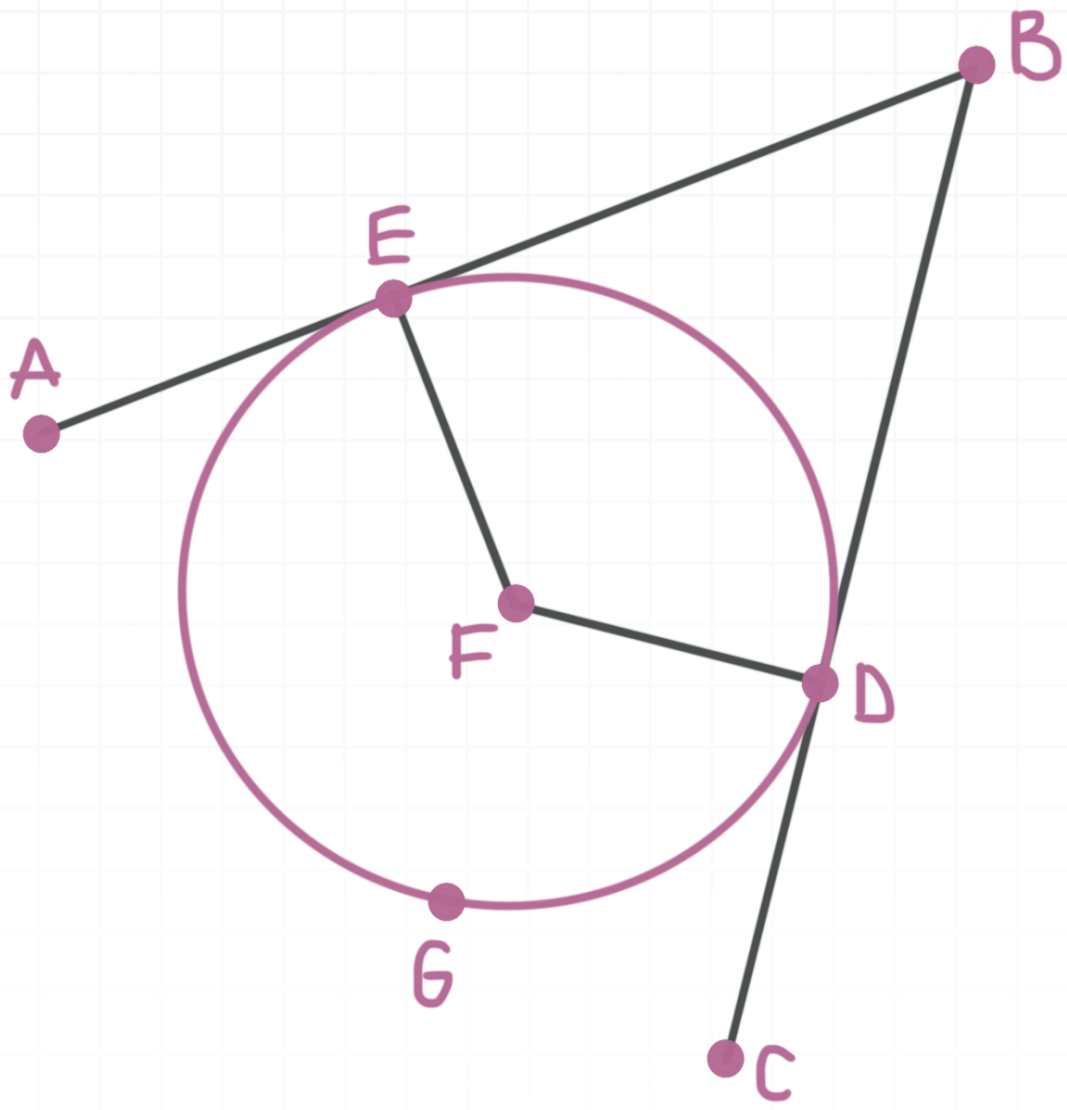
■ 5. Find the perimeter of $\triangle ABC$ if the radius of $\odot D$ is 10 feet and $\triangle ABC$ is equilateral.



■ 6. $\triangle JKL$ is isosceles, $\overline{JL}$ is a tangent line, $JM = LM$ and $m\angle JKL = 120°$. If $MK = 8$, find JL.

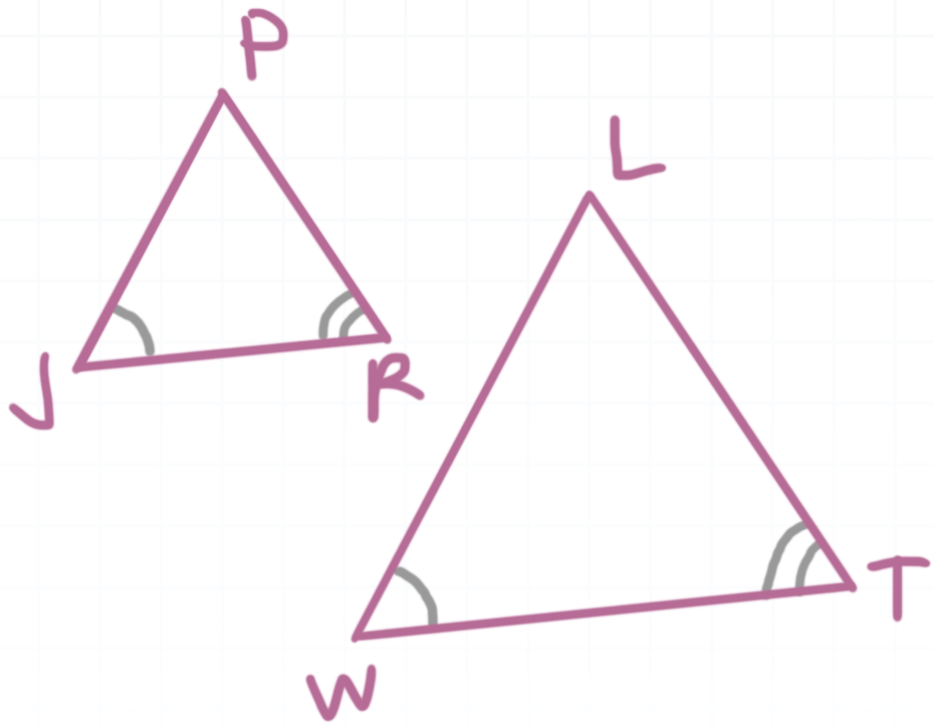


7. Arc $EGD = 240°$ and $\overline{BF}$ bisects $\angle EFD$. Find the length of the radius of $\odot F$ if $FB = 14$.

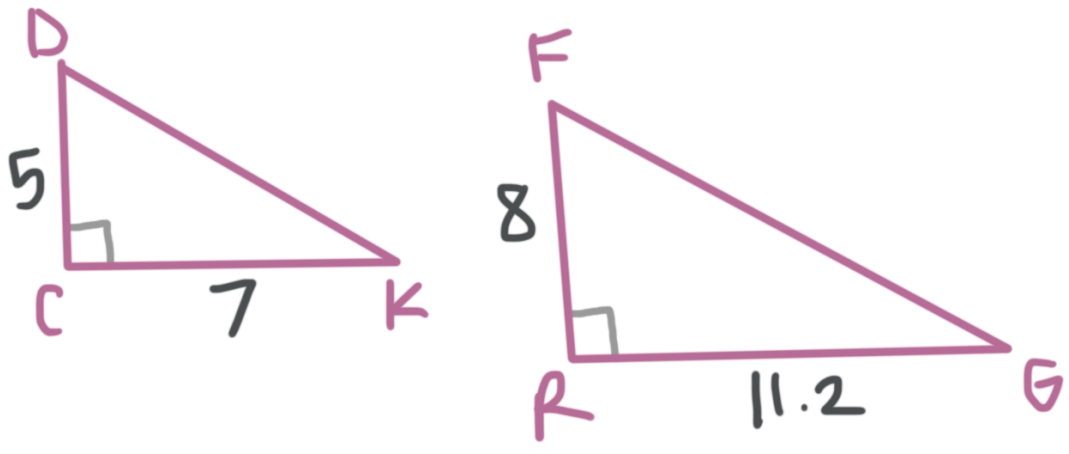


TRIANGLE SIMILARITY THEOREMS

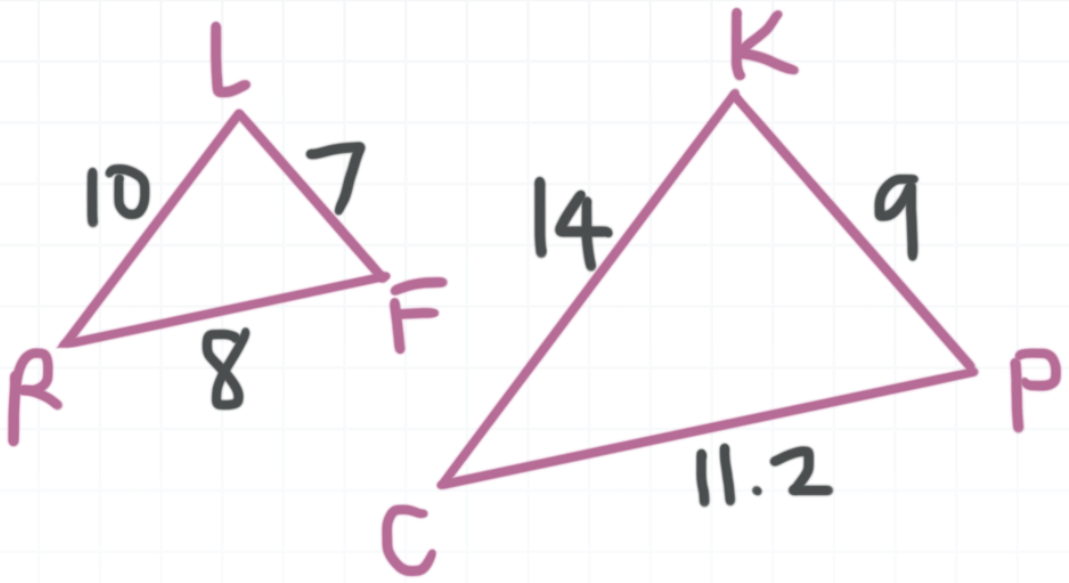
■ 1. Write a similarity statement for the triangles and provide the theorem that proves they're similar.



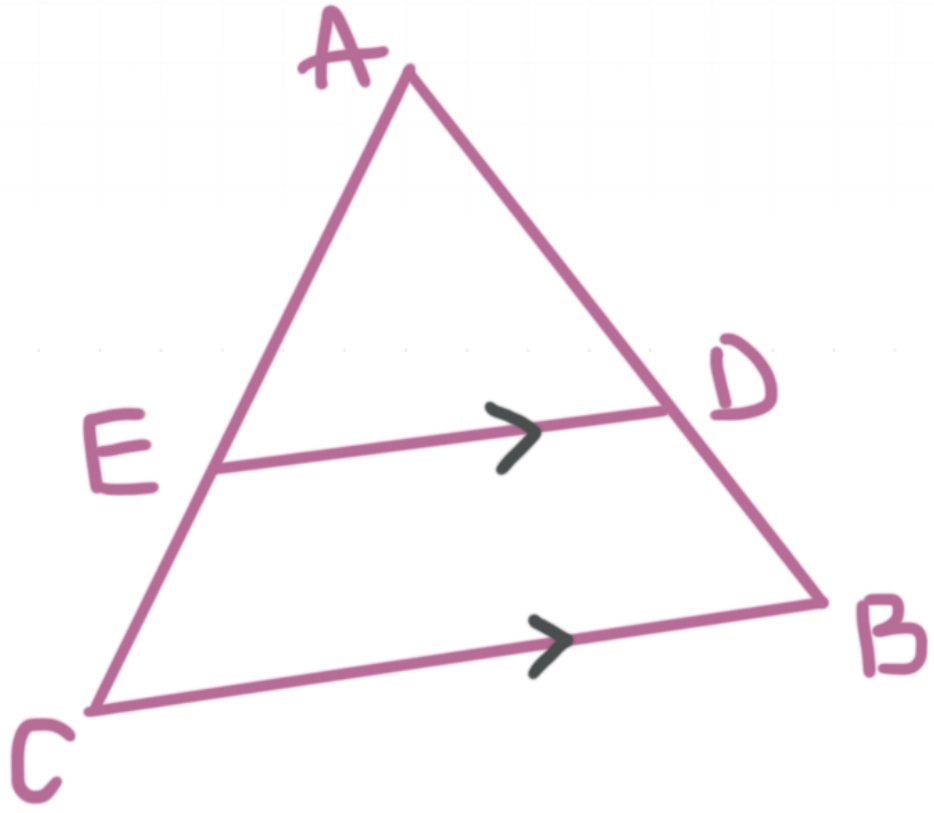
■ 2. Write a similarity statement for the triangles and provide the theorem that proves they're similar.



■ 3. Is $\triangle RLF \sim \triangle CKP$? Explain.

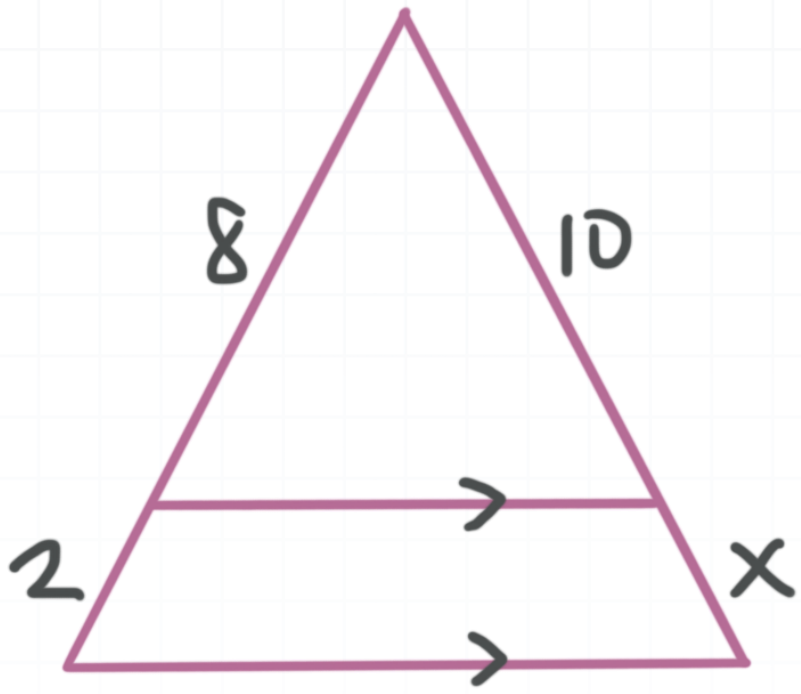


■ 4. Prove $\triangle AED \sim \triangle ACB$.

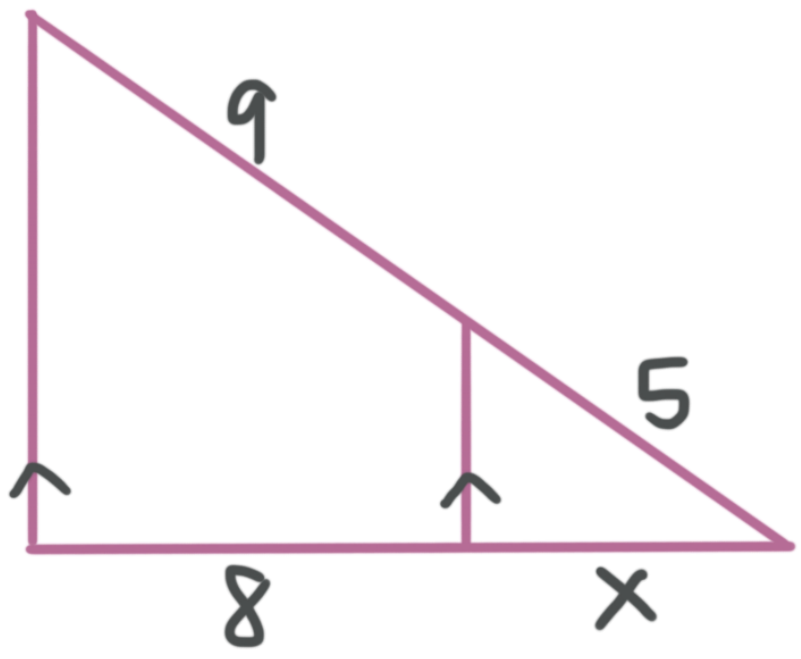


TRIANGLE SIDE-SPLITTING THEOREM

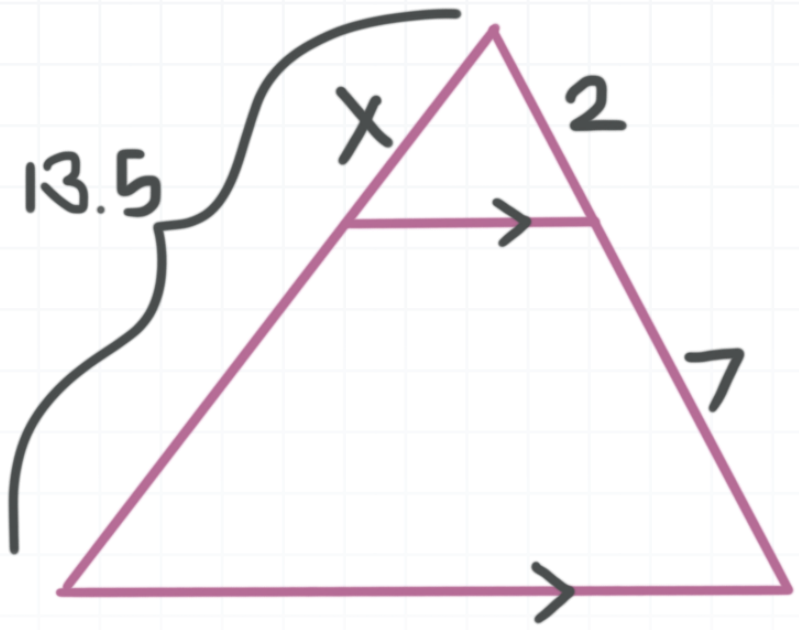
1. Solve for x.



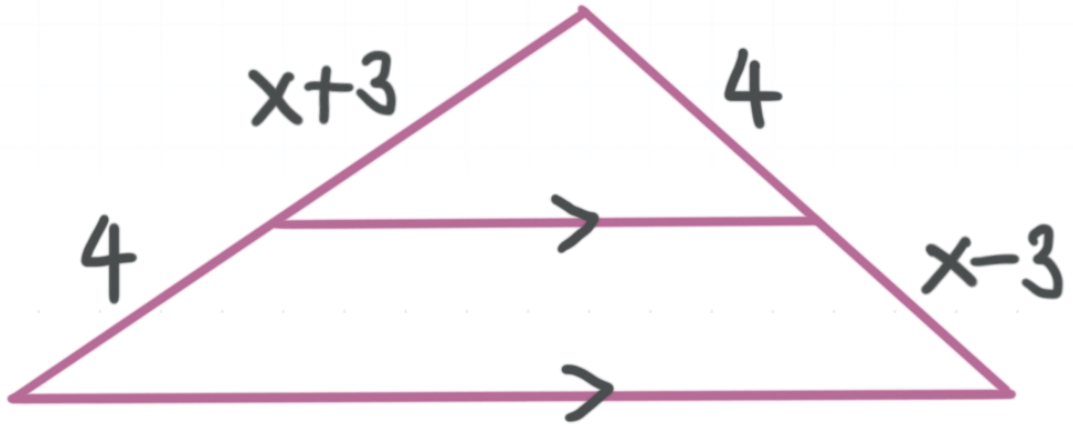
2. Solve for x.



■ 3. Solve for x.

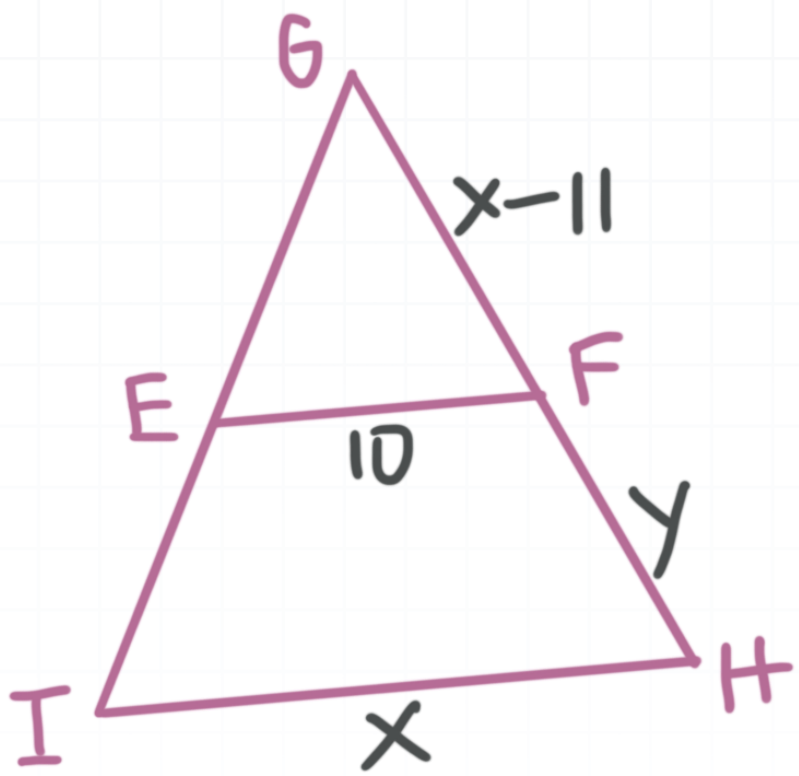


■ 4. Solve for x.

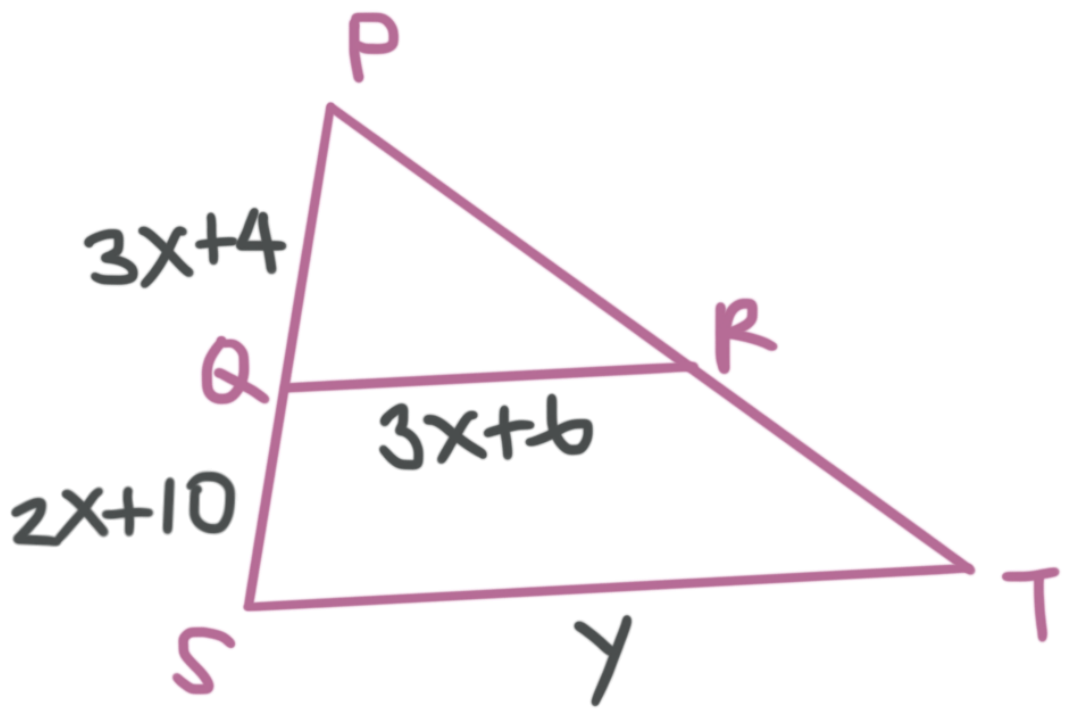


MIDSEGMENTS OF TRIANGLES

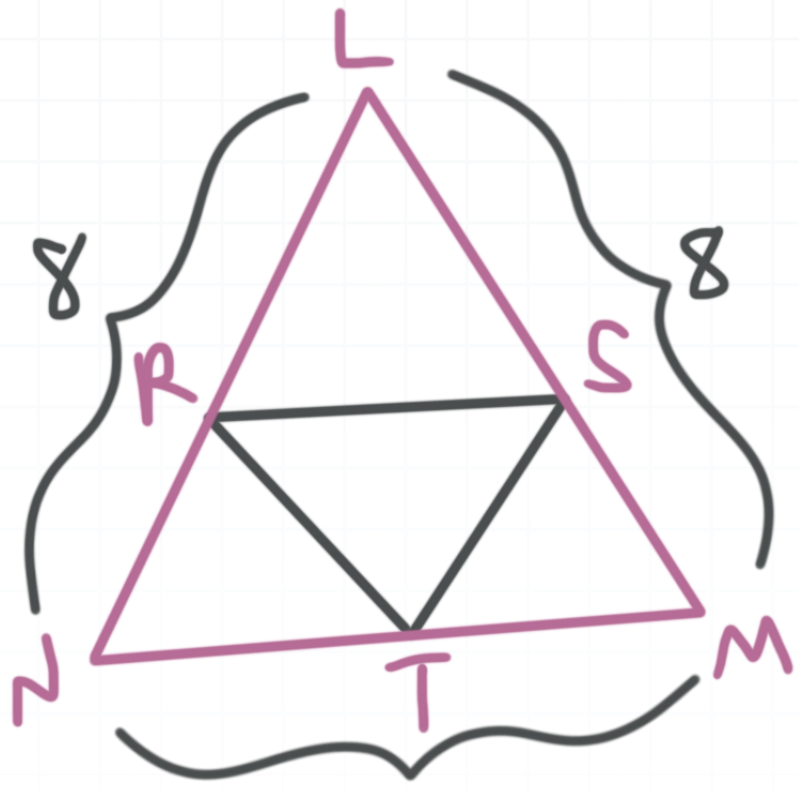
1. $\overline{EF}$ is a midsegment of $\triangle IGH$. Find x and y.



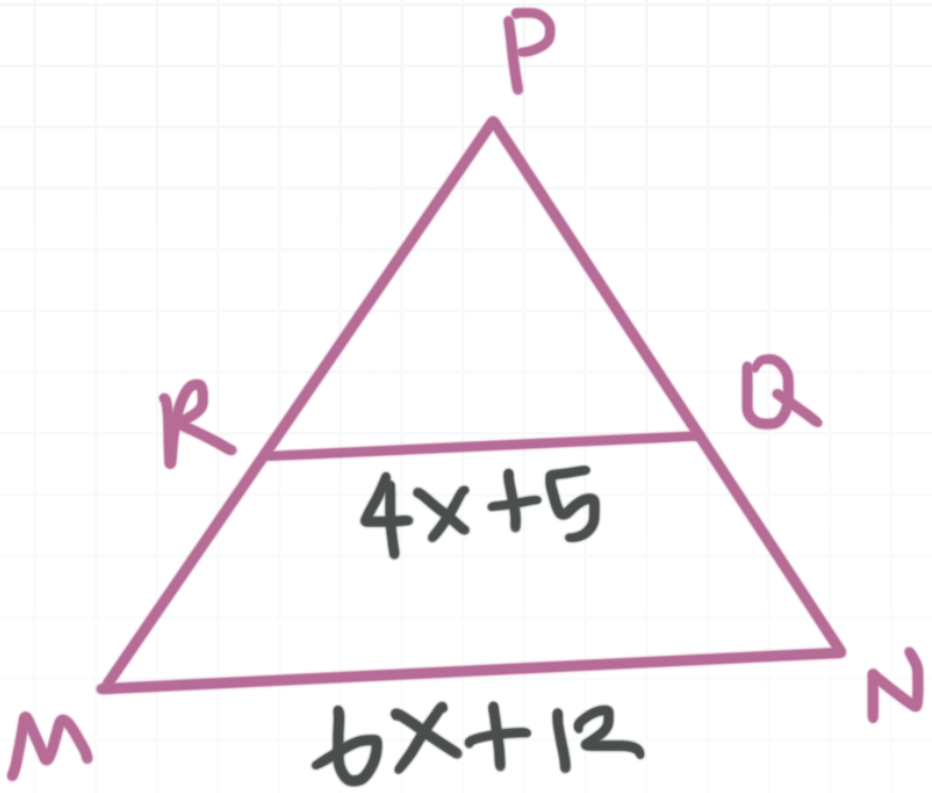
2. $\overline{QR}$ is a midsegment of $\triangle SPT$. Find x and y.



■ 3. $\overline{RS}$, $\overline{ST}$, and $\overline{RT}$ are midsegments of $\triangle NLM$. Find the perimeter of quadrilateral $RTMS$.

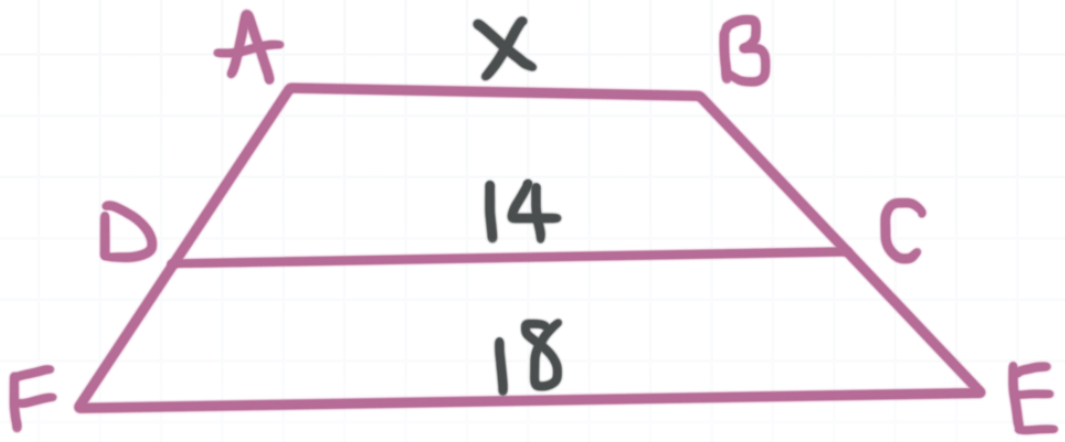


■ 4. $\overline{RQ}$ is a midsegment of $\triangle MPN$. Find x and MN.

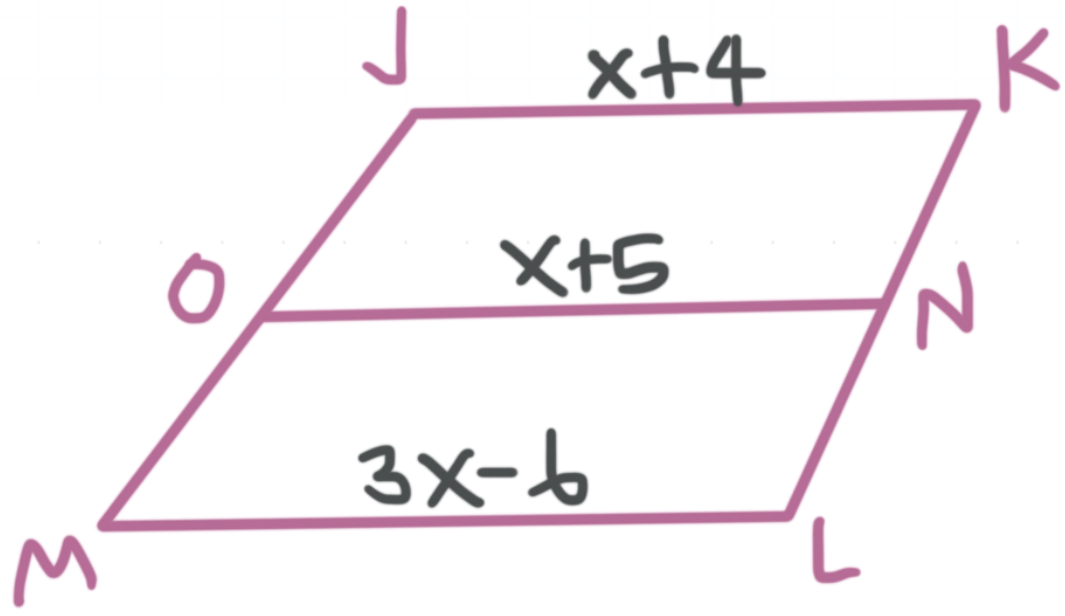


MIDSEGMENTS OF TRAPEZOIDS

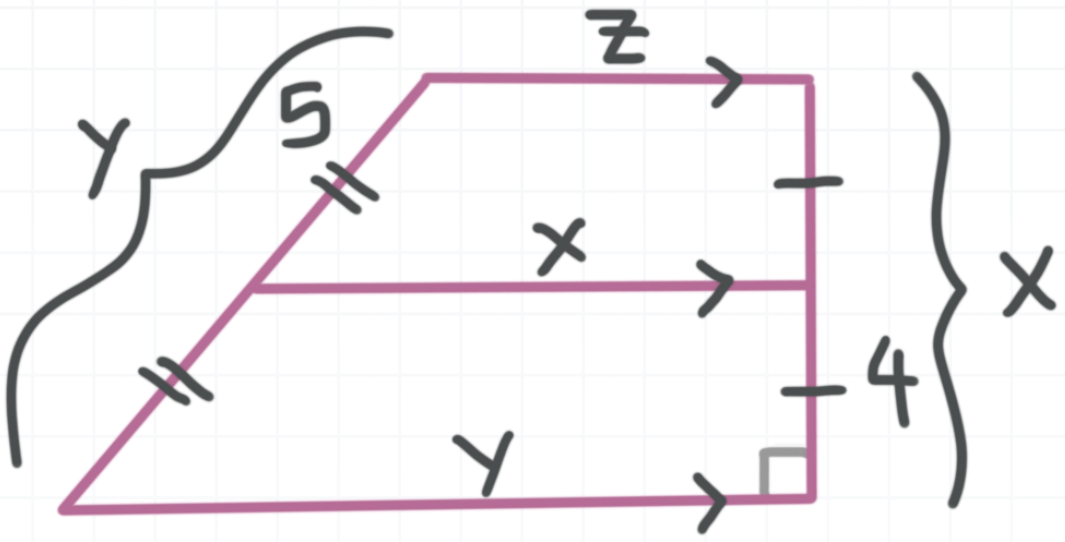
■ 1. The trapezoid has midsegment $\overline{DC}$. Find the value of x.



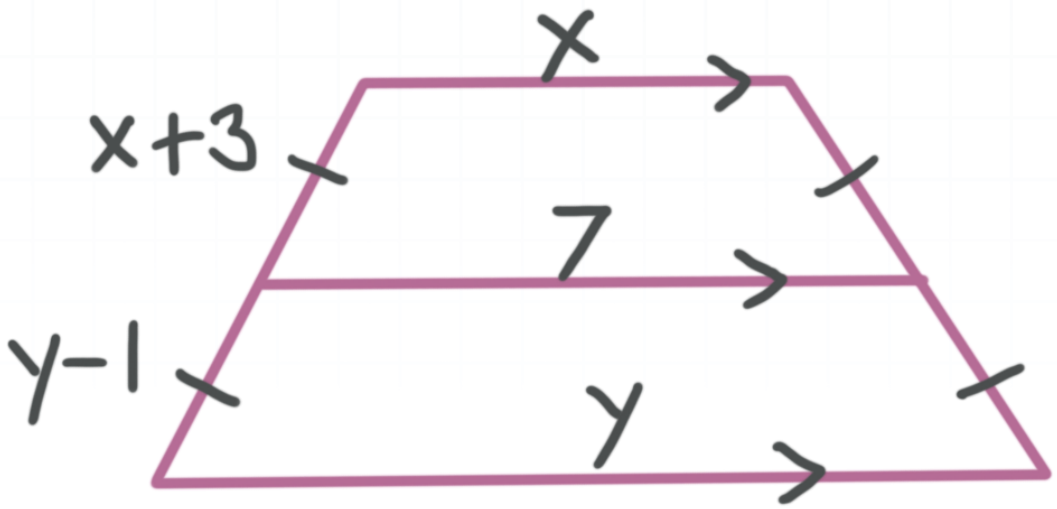
■ 2. $\overline{ON}$ is a midsegment of trapezoid $JKLM$. Find JK, ON, and ML.



■ 3. Find x, y, and z.

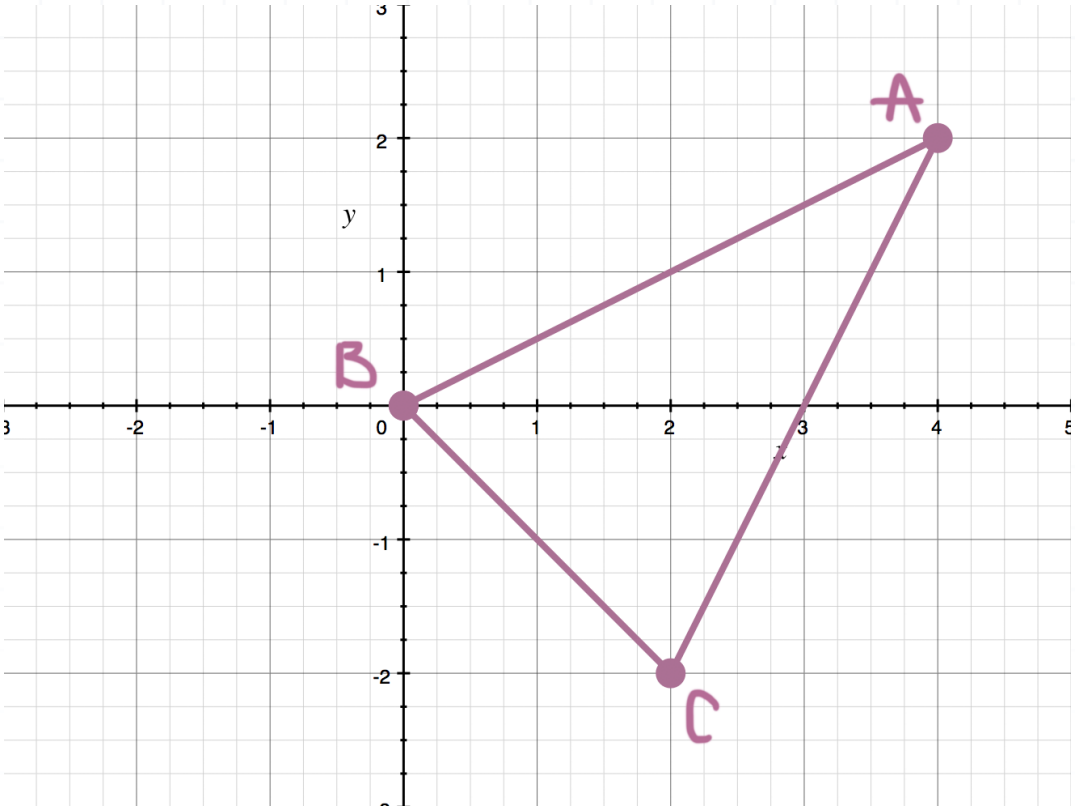


4. Find x and y.

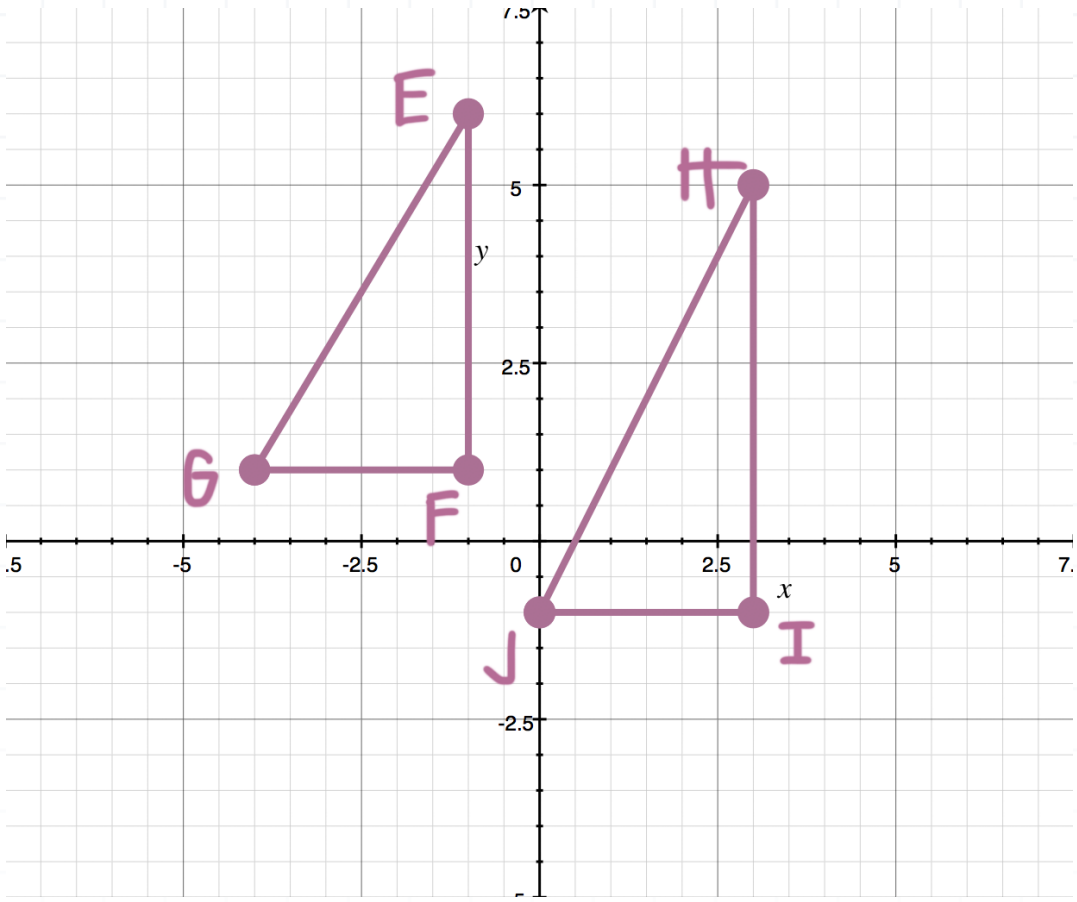


TRANSLATING FIGURES IN COORDINATE SPACE

■ 1. Find the new coordinates of $\triangle ABC$ under a translation of $(x, y) \rightarrow (x + 3, y - 2)$.



■ 2. Is $\triangle EFG$ is a translation of $\triangle HIJ$? Explain why or why not.



■ 3. $\odot A$ has its center at the origin and radius 3. Find the equation of this circle under a translation of 2 units to the right and 4 units up on the coordinate plane.

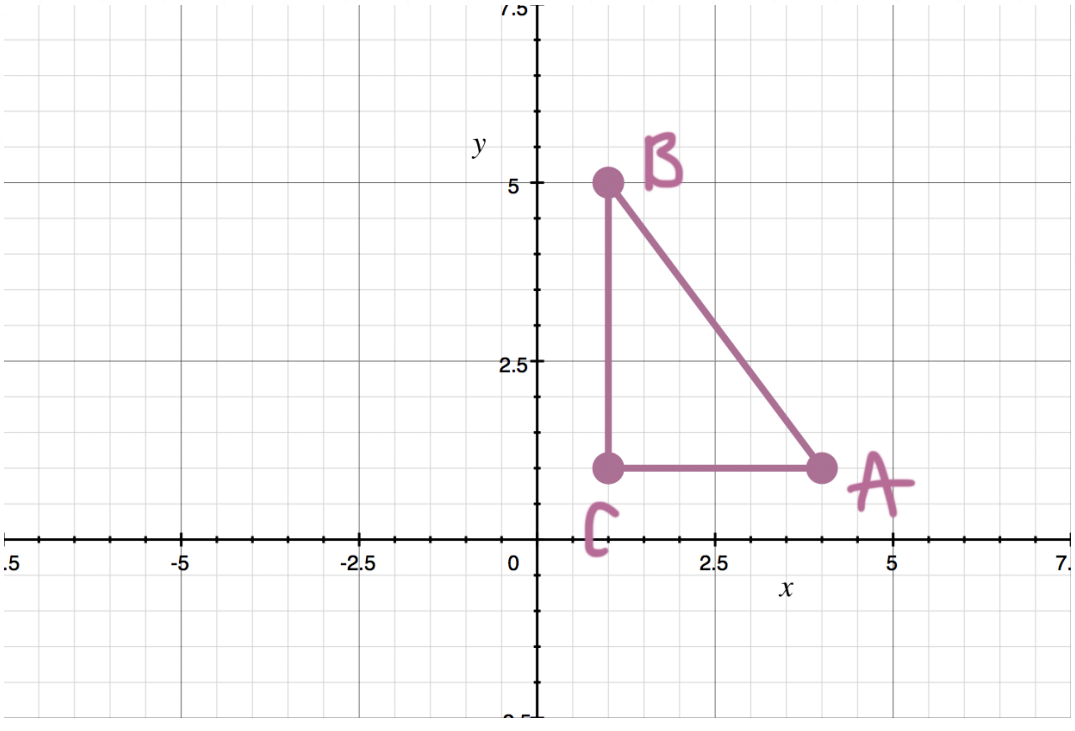
■ 4. A rectangle has a diagonal with endpoints at $(5,1)$ and $(14,7)$. Find the area of this rectangle under the translation $(x, y) \rightarrow (x - 5, y - 4)$.

ROTATING FIGURES IN COORDINATE SPACE

■ 1. $X(2,5)$ is rotated clockwise about the origin and its translated coordinate is $X'(-5,2)$. By how many degrees was this point rotated?

■ 2. $B(-3-1)$ is rotated $180°$ counterclockwise about the origin. Find B'.

■ 3. Graph $\triangle ABC$ under a rotation of $90°$ counterclockwise.



■ 4. $G(-4,-6)$ is first translated 5 units to the right and 3 units up on the coordinate plane. Then this new coordinate is rotated $90°$ clockwise about the origin. Find its new coordinate.

REFLECTING FIGURES IN COORDINATE SPACE

1. Find the coordinates of $A(-4,5)$ under a reflection over the x-axis.

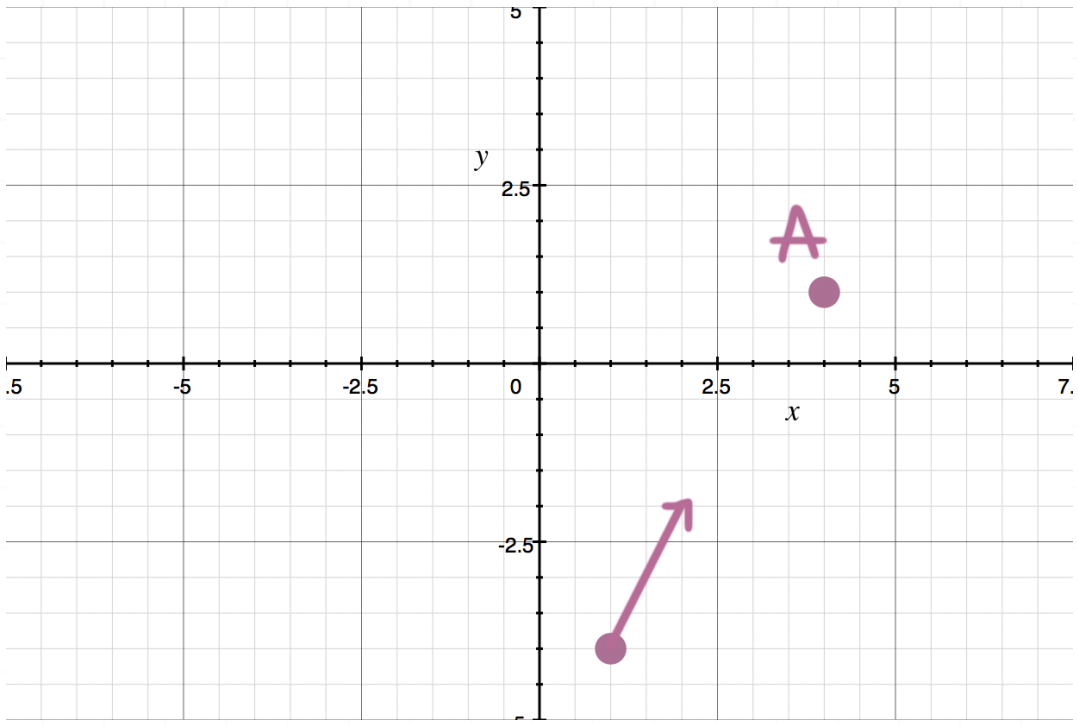
2. Find the coordinates of $J(3,4)$ under a reflection over the y-axis.

3. Find the coordinates of $K(-1,4)$ under a reflection over the line $y = 2$.

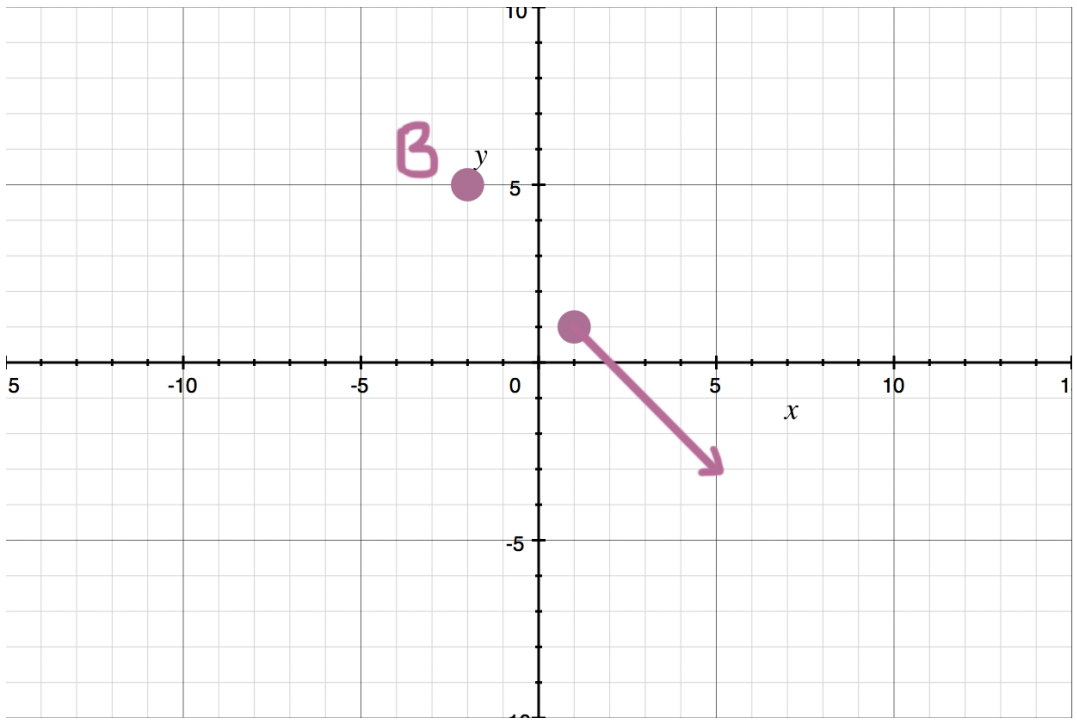
4. Find the coordinates of $P(5, -2)$ under a reflection over the line $y = x$.

TRANSLATION VECTORS

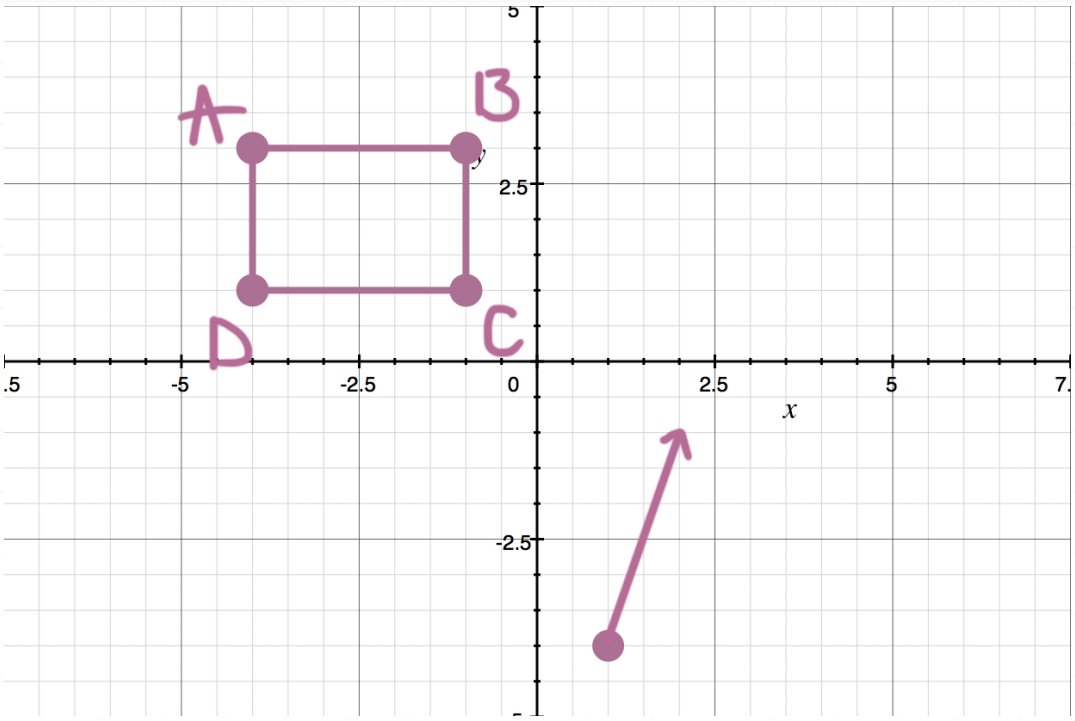
1. Find A' as directed by the vector shown.



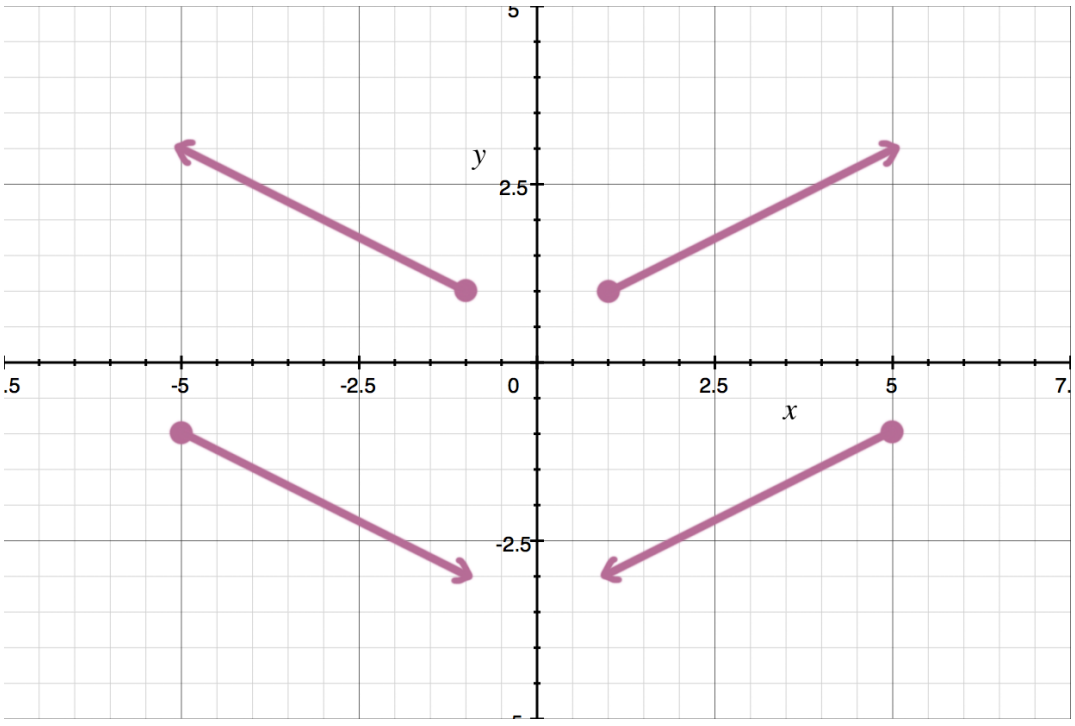
2. Find B' as directed by the vector shown.



■ 3. Find D' as directed by the vector shown.

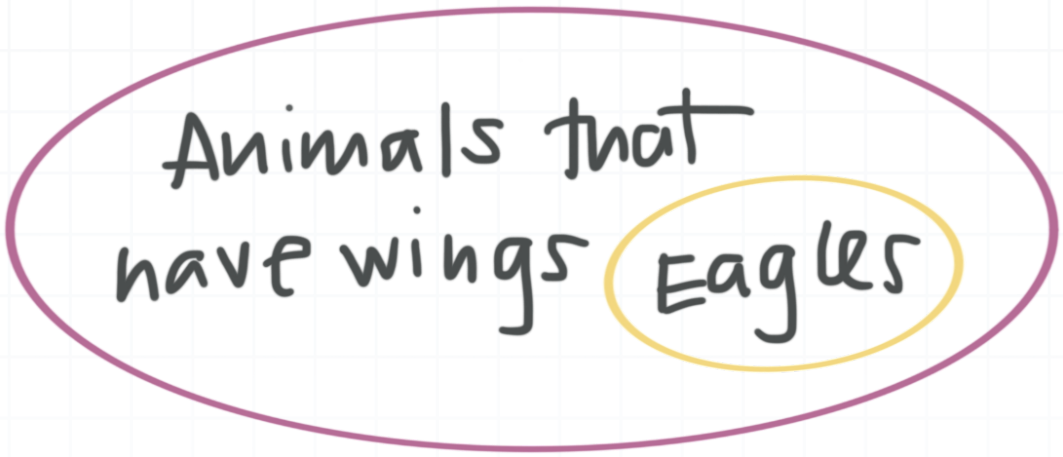


■ 4. $M(3,1)$ is rotated $90°$ counterclockwise about the origin. Which translation vector (name the quadrant that contains the vector) would translate M to the correct location on the coordinate plane?



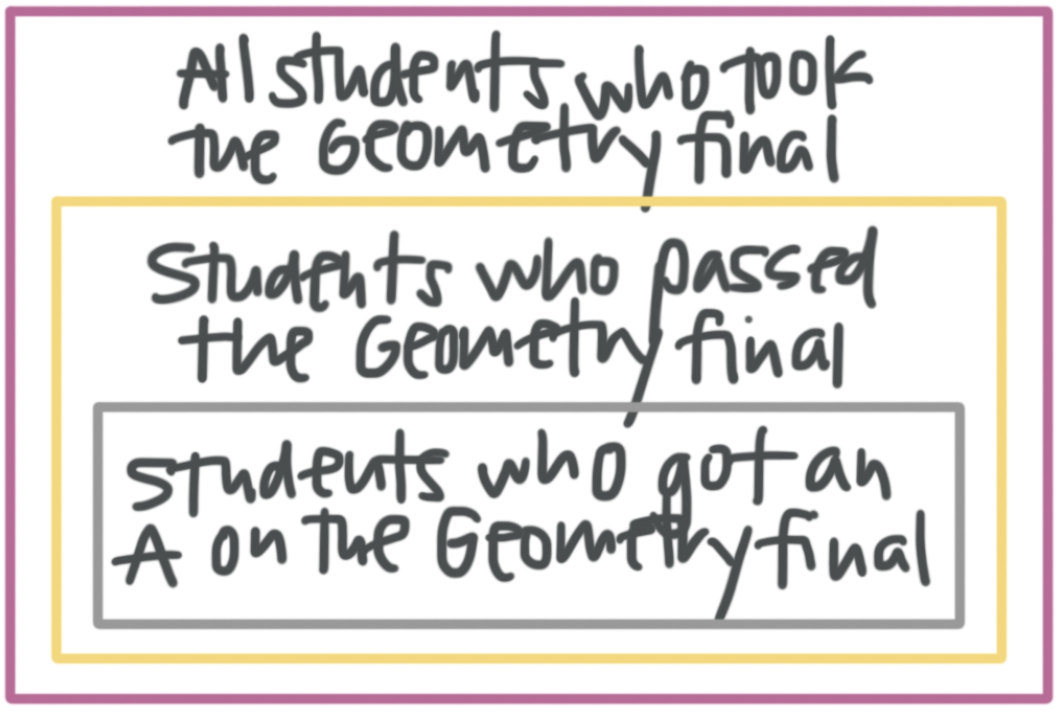
CONDITIONALS AND EULER DIAGRAMS

■ 1. Write the if-then statement that corresponds to the Euler diagram.



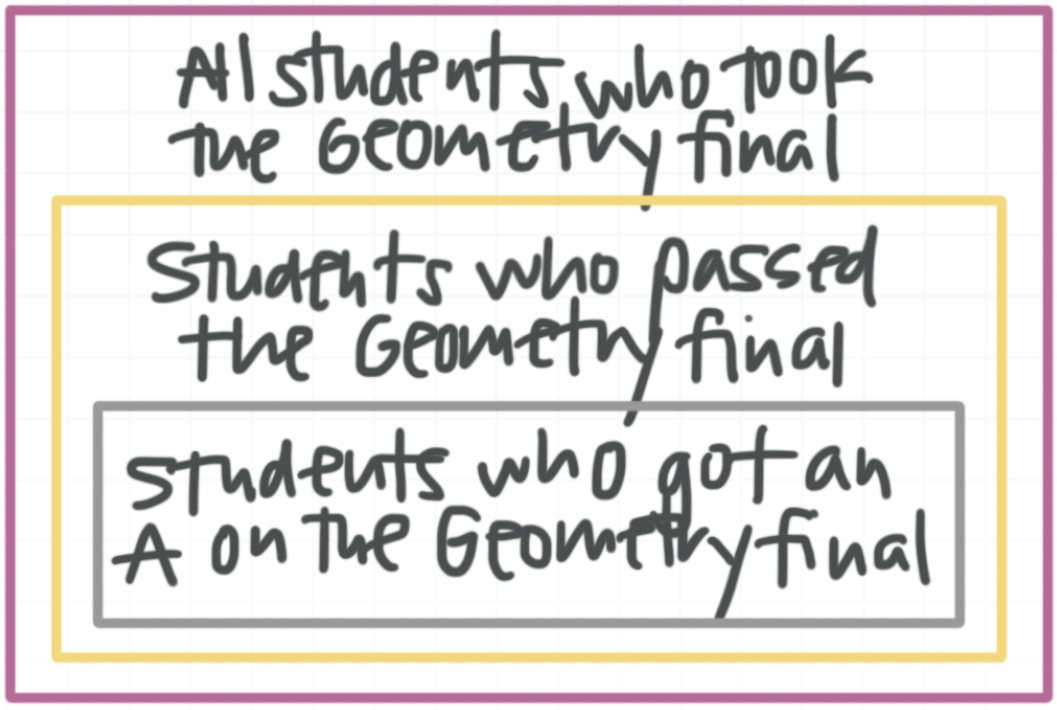
■ 2. True or false? The if-then statement is true based on the Euler diagram.

"If a student passed the geometry final, then they got an A."



■ 3. True or false? The statement is true based on the Euler diagram.

"If a student took the Geometry final exam, then they passed the test."



■ 4. Draw a Euler diagram for the statement, "All quadrilaterals are polygons."

CONVERSES OF CONDITIONALS

■ 1. Write the converse for the if-then statement.

"If M is a midpoint of $\overline{AB}$, then $AM = MB$."

■ 2. Write the converse for the if-then statement.

"If a polygon is a triangle, the sum of its angles is $180°$.

■ 3. Write the converse of the if-then statement. Then determine if the converse is always, sometimes, or never true.

"If $\angle 1$ and $\angle 2$ are vertical angles, then they are congruent."

■ 4. Write the converse of the if-then statement. Determine if the converse is true or false. If it's false, provide a counterexample.

"If an animal is a cow, then it has four legs."

ARRANGING CONDITIONALS IN A LOGICAL CHAIN

■ 1. Fill in the blank with a logical conclusion.

All parallelograms have four sides.

All four-sided figures are quadrilaterals.

All parallelograms _____.

■ 2. If Jane's alarm does not go off, she will be late to school. If Jane is late to school, she will get in trouble. Jane got in trouble. Can a valid conclusion be drawn? Explain.

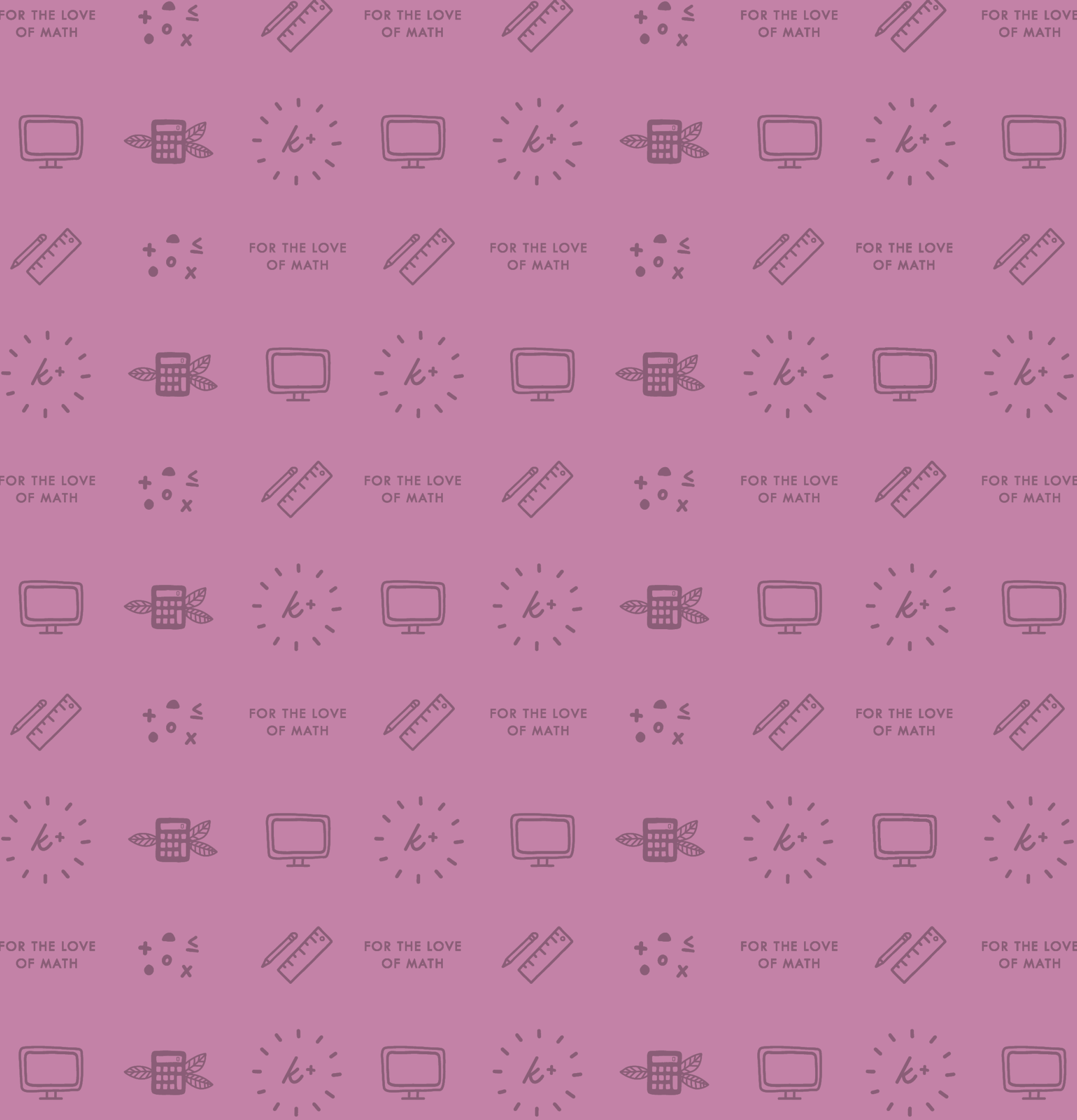
■ 3. Write the missing statement that will make the conclusion true.

1. If a driver is going 60 mph, he is speeding.

2. _____

Conclusion: If a driver is going 60 mph, he will get a speeding ticket.

■ 4. All squares are rectangles. Rewrite this statement in if-then form: $JKLM$ is a rectangle. Can a valid conclusion be drawn?


FOR THE LOVE OF MATH