

Math Skills Study Guide

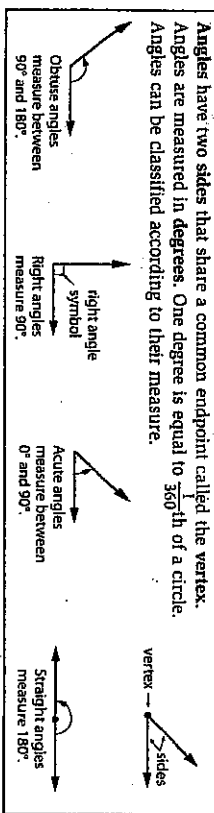
Angles

Name _____

Date _____

Period _____

Angles have two sides that share a common endpoint called the vertex. Angles are measured in degrees. One degree is equal to $\frac{1}{360}$ th of a circle. Angles can be classified according to their measure.



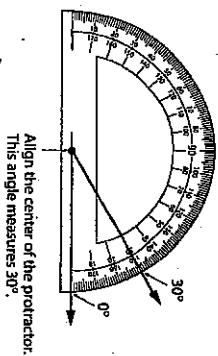
EXAMPLE 1 Use a protractor to find the measure of the angle. Then classify the angle as acute, obtuse, right, or straight.

To measure an angle, place the center of a protractor on the vertex of the angle. Place the zero mark of the scale along one side of the angle. Then read the angle measure where the other side of the angle crosses the scale.

The angle measures 30° . It is an acute angle.

Two angles are complementary if the sum of their measures is 90° .

Two angles are supplementary if the sum of their measures is 180° .



EXAMPLE 2 ALGEBRA Angles A and B are complementary. If $m\angle A = 25^\circ$, what is the measure of $\angle B$?

$$m\angle A + m\angle B = 90^\circ$$

$$25^\circ + m\angle B = 90^\circ$$

$$25^\circ + m\angle B - 25^\circ = 90^\circ - 25^\circ$$

$$m\angle B = 65^\circ$$

Since $25^\circ + 65^\circ = 90^\circ$, the answer is correct.

EXERCISES

Use a protractor to find the measure of each angle. Then classify each angle as acute, obtuse, right, or straight.



- ALGEBRA Angles K and L are supplementary. If $m\angle L = 80^\circ$, what is $m\angle K$?
- ALGEBRA If $m\angle C = 40^\circ$ and $\angle C$ and $\angle D$ are complementary, what is $m\angle D$?

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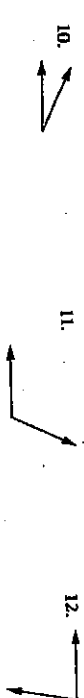
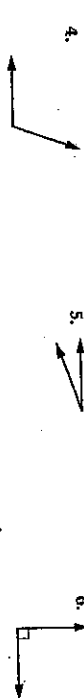
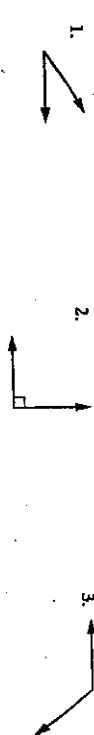
Angles

Name _____

Date _____

Period _____

Use a protractor to find the measure of each angle. Then classify each angle as acute, obtuse, right, or straight.



- ALGEBRA Angles A and B are supplementary. What is $m\angle B$ if $m\angle A = 120^\circ$?
- ALGEBRA If $m\angle K = 60^\circ$ and $\angle J$ and $\angle K$ are complementary, what is $m\angle J$?

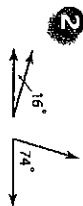
Angles that have the same measure are called **congruent angles**. Two angles are **supplementary** if the sum of their measures is 180° . Two angles are **complementary** if the sum of their measures is 90° . When two lines intersect, they form two pairs of opposite angles called **vertical angles**, which are always congruent.

EXAMPLES

Classify each pair of angles as **complementary**, **supplementary**, or **neither**.



$30^\circ + 150^\circ = 180^\circ$
The angles are supplementary.



$16^\circ + 74^\circ = 90^\circ$
The angles are complementary.

EXAMPLE 3 Find the value of x in the figure below.



The two angles are supplementary,
so the sum of their measures is 180° .

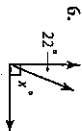
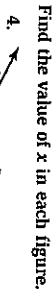
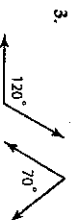
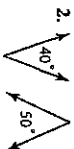
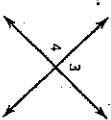
$$\begin{array}{r} x + 35 = 180 \\ - 35 \quad - 35 \\ \hline x = 145 \end{array}$$

Write the equation.
Subtract 35 from each side.
Simplify.

So, the angle is 145° .

EXERCISES

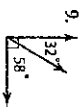
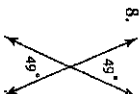
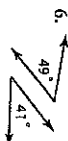
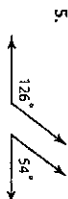
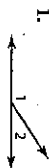
Classify each pair of angles as **complementary**, **supplementary**, or **neither**.



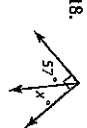
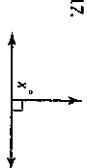
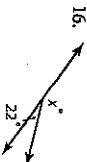
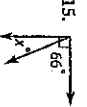
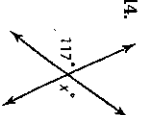
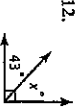
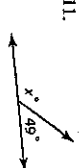
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Angle Relationships

Classify each pair of angles as **complementary**, **supplementary**, or **neither**.



Find the value of x in each figure.



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Triangles

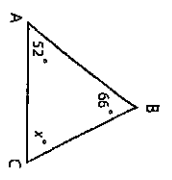
Name _____ Date _____ Period _____

A triangle is a figure with three sides and three angles. The sum of the measures of the angles of a triangle is 180° . You can use this to find a missing angle measure in a triangle.

EXAMPLE 1 Find the value of x in $\triangle ABC$.

$$\begin{aligned} x + 66 + 52 &= 180 && \text{The sum of the measures is } 180. \\ x + 118 &= 180 && \text{Simplify.} \\ -118 &-118 && \text{Subtract } 118 \text{ from each side.} \\ x &= 62 \end{aligned}$$

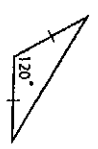
The missing angle is 62° .



Triangles can be classified by the measures of their angles. An acute triangle has three acute angles. An obtuse triangle has one obtuse angle. A right triangle has one right angle. Triangles can also be classified by the lengths of their sides. Sides that are the same length are congruent segments and are often marked by tick marks. In a scalene triangle, all sides have different lengths. An isosceles triangle has at least two congruent sides. An equilateral triangle has all three sides congruent.

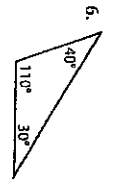
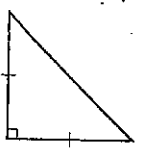
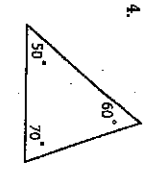
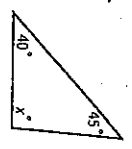
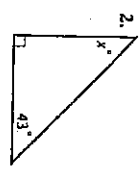
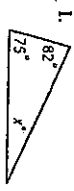
EXAMPLE 2 Classify the triangle by its angles and by its sides.

The triangle has one obtuse angle and two sides the same length. So, it is an obtuse, isosceles triangle.



EXERCISES

Find the missing measure in each triangle. Then classify the triangle as acute, right, or obtuse.

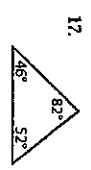
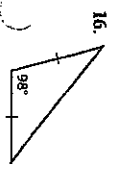
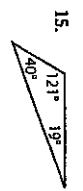
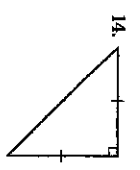
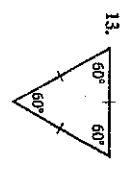
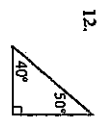
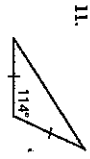
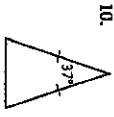
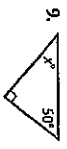
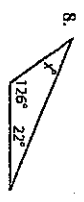
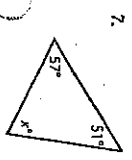
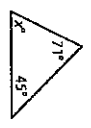
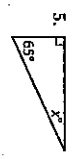
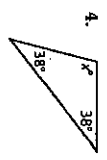
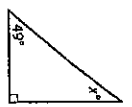
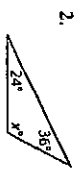


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Triangles

Name _____ Date _____ Period _____

Find the missing measure in each triangle. Then classify the triangle as acute, right, or obtuse.



Math Skills Study Guide

Quadrilaterals

A quadrilateral is a closed figure with four sides and four vertices. The segments that make up a quadrilateral intersect only at their endpoints.

The vertices are A, B, C, and D.
The angle are $\angle A$, $\angle B$, $\angle C$, and $\angle D$.

The sides are \overline{AB} , \overline{BC} , \overline{CD} , and \overline{DA} .

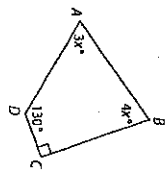
A quadrilateral can be separated into two triangles. Since the sum of the measures of the angles of a triangle is 180° , the sum of the measures of the angles of a quadrilateral is $2(180^\circ)$ or 360° .

EXAMPLE ALGEBRA Find the value of x . Then find each missing angle measure.

Words The sum of the measures of the angles is 360° .

Variable Let $m\angle A$, $m\angle B$, $m\angle C$, and $m\angle D$ represent the measures of the angles.

Equation $m\angle A + m\angle B + m\angle C + m\angle D = 360$



$$3x + 4x + 90 + 130 = 360$$

$$7x + 220 = 360$$

$$7x + 220 - 220 = 360 - 220$$

$$7x = 140$$

$$x = 20$$

Angles of a quadrilateral

Substitution

Combine like terms.

Simplify.

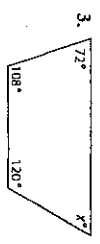
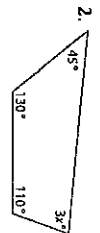
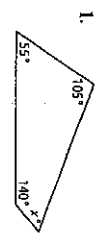
Subtract 220 from each side.

Divide each side by 7.

The value of x is 20. So, $m\angle A = 3(20)$ or 60° and $m\angle B = 4(20)$ or 80° .

EXERCISES

ALGEBRA Find the value of x . Then find the missing angle measures.

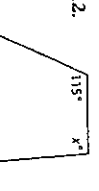
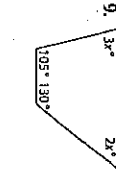
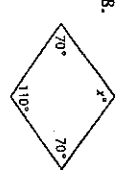
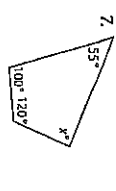
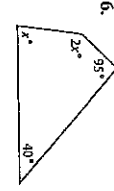
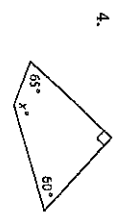


ALGEBRA Find the value of x . Then find the missing angle measures.

1.

2.

3.



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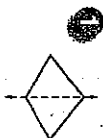
Lines of Symmetry

Name _____ Date _____ Period _____

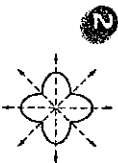
If a figure can be folded in half so that the two halves match exactly, the figure has line symmetry. The line that separates the figure into two matching halves is a line of symmetry. If a figure can be rotated less than 360° and look exactly as it did before being turned, the figure has rotational symmetry.

EXAMPLES

Draw all lines of symmetry for each figure.



one line of symmetry



four lines of symmetry



no lines of symmetry

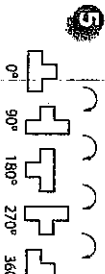
EXAMPLES

Tell whether each figure has rotational symmetry.



0° , 90° , 180° , 270° , 360°

The figure appears as it did before being rotated after being rotated 180° . So, the figure has rotational symmetry.



0° , 90° , 180° , 270° , 360°

The figure looks the same only when rotated 360° . So, the figure does not have rotational symmetry.

EXERCISES

Draw all lines of symmetry for each figure.



2.



3.



4.



5.



6.



Tell whether each figure has rotational symmetry. Write yes or no.

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Lines of Symmetry

Name _____ Date _____ Period _____

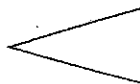
Draw all lines of symmetry for each figure.



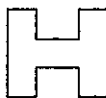
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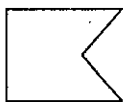
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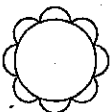
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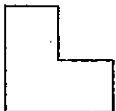
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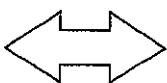


9.



Tell whether each figure has rotational symmetry. Write yes or no.

10.



11.

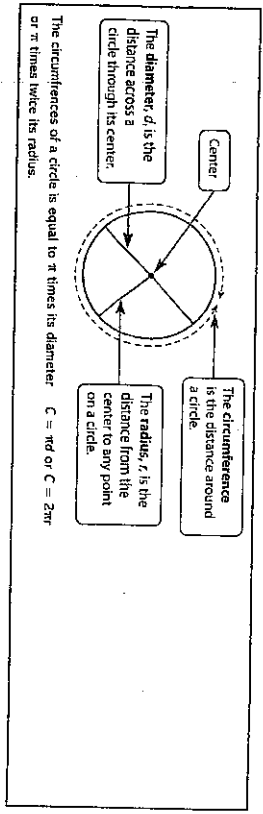


12.



Math Skills Study Guide

Circumference



The circumference of a circle is equal to π times its diameter. $C = \pi d$ or $C = 2\pi r$ or π times twice its radius.

EXAMPLE 1 Find the circumference of a circle whose diameter is 4.2 meters. Round to the nearest tenth.

$$C = \pi d$$

$$\approx 3.14 \times 4.2$$

$$\approx 13.188$$

$$\approx 13.2$$

Write the formula.
Replace π with 3.14 and d with 4.2.
Multiply.
Round to the nearest tenth.

The circumference of the circle is about 13.2 meters.

EXAMPLE 2 Find the circumference of a circle whose radius is 13 inches. Round to the nearest tenth.

$$C = 2\pi r$$

$$\approx 2 \times 3.14 \times 13$$

$$\approx 81.64$$

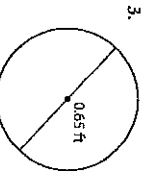
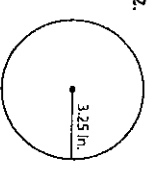
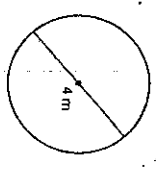
$$\approx 81.6$$

Write the formula.
Replace π with 3.14 and r with 13.
Multiply.
Round to the nearest tenth.

The circumference of the circle is about 81.6 inches.

EXERCISES

Find the circumference of each circle shown or described. Round to the nearest tenth.



4. The radius of a circle measures 16 miles. What is the measure of its circumference to the nearest tenth?

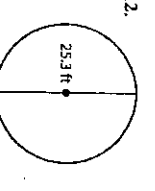
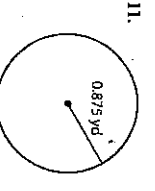
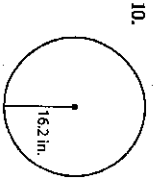
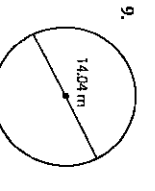
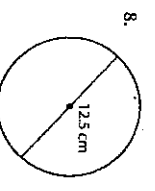
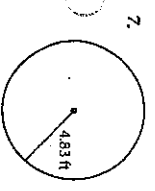
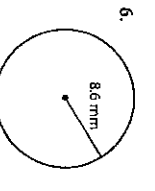
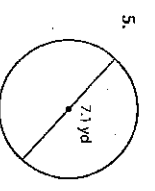
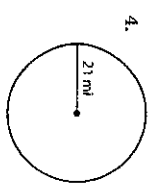
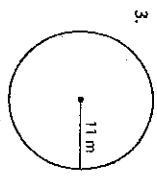
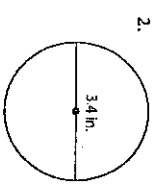
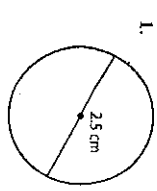
5. Find the circumference of a circle whose diameter is 12.5 yards to the nearest tenth.

6. What is the circumference of a circle with a radius of 2.05 inches to the nearest tenth?

Math Skills Study Guide

Circumference

Find the circumference of each circle shown or described. Use 3.14 for π . Round to the nearest tenth.



13. $r = 13$ cm

14. $d = 4.1$ ft

15. $r = 22$ mm

16. $d = 1.25$ in.

17. $r = 10.6$ mi

18. $d = 14.23$ yd

Math Skills Study Guide

Geometry: Perimeter

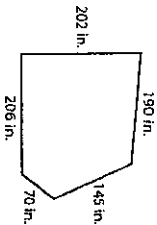
The distance around a geometric figure is called the perimeter. To find the perimeter of any geometric figure, add the measures of its sides. The perimeter of a rectangle is twice the length ℓ plus twice the width w .

$$P = 2\ell + 2w$$

EXAMPLE 1 Find the perimeter of the figure at the right.

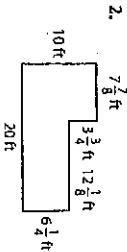
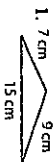
$$P = 145 + 70 + 206 + 202 + 190 = 813$$

The perimeter is 813 inches.

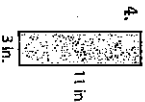
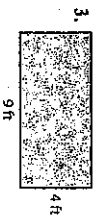


EXERCISES

Find the perimeter of each figure.



Find the perimeter of each rectangle.



5. $\ell = 8$ ft, $w = 5$ ft

6. $\ell = 3.5$ m, $w = 2$ m

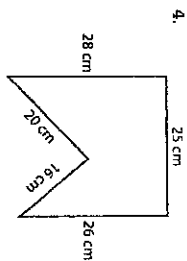
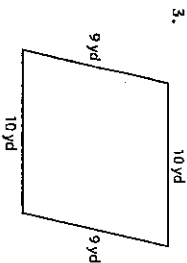
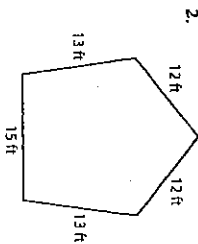
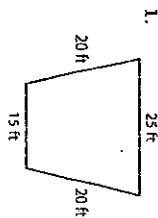
7. $\ell = 8$ yd, $w = 4\frac{1}{2}$ yd

8. $\ell = 29$ cm, $w = 7.3$ cm

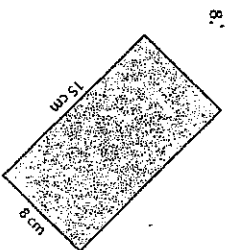
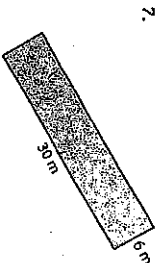
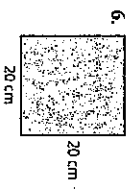
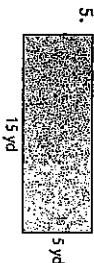
Math Skills Study Guide

Geometry: Perimeter

Find the perimeter of each figure.



Find the perimeter of each rectangle.



9. $\ell = 6$ yd, $w = 4$ yd

10. $\ell = 8.2$ m, $w = 7.1$ m

11. $\ell = 50$ in., $w = 10$ in.

12. $\ell = 10$ cm, $w = 4\frac{1}{2}$ cm

13. $\ell = 4.5$ ft, $w = 3$ ft

14. $\ell = 7\frac{1}{2}$ mm, $w = 6\frac{3}{8}$ mm