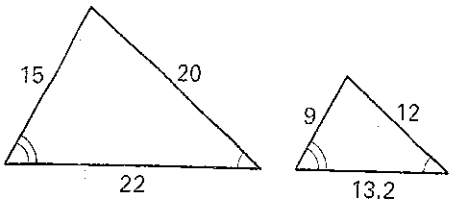
SCHOOL'S OUT!

AMI Day 6: Geometry

1

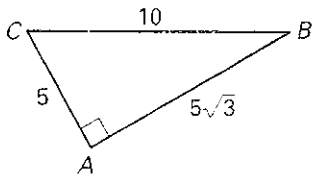
What is the scale factor for the triangles below?



(A) $\frac{3}{2}$ (B) $\frac{4}{3}$ (C) $\frac{3}{5}$
(D) $\frac{2}{5}$ (E) $\frac{3}{4}$

2

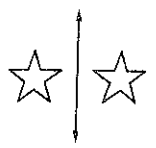
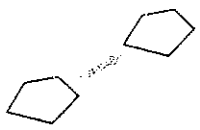
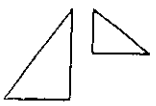
Find the cosine of $\angle B$.



(A) 1.7321
(B) 0.8660
(C) 2
(D) 1.1547
(E) 0.5774

3

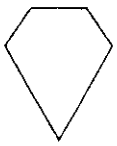
Which of the following is *not* an isometry?

(A) 
(B) 
(C) 
(D)

(E) None of these

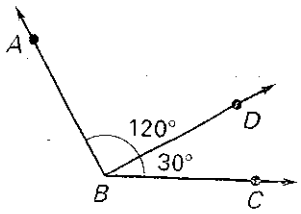
4

How many lines of symmetry does the polygon have?



5

Find the measure of $\angle ABD$.



6

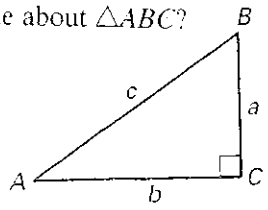
Which is the approximate measure of acute $\angle A$ when $\tan A = 0.698$?

(A) 44.3° (B) 12.2° (C) 34.9°
(D) 45.7° (E) 35.2°

7

Which equations below are true about $\triangle ABC$?

I. $a = \sqrt{c^2 - b^2}$
II. $c = \sqrt{a^2 + b^2}$
III. $b = c - a$



(A) I (B) II (C) III
(D) I and II (E) all of these

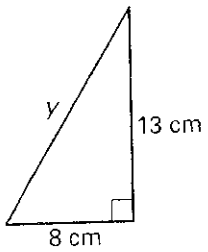
8

The translation "5 units to the left and 3 units up" in coordinate notation would be __?__.

(A) $(x, y) \rightarrow (x + 5, y + 3)$
(B) $(x, y) \rightarrow (x + 5, y - 3)$
(C) $(x, y) \rightarrow (x - 5, y + 3)$
(D) $(x, y) \rightarrow (x + 3, y - 5)$
(E) $(x, y) \rightarrow (x - 3, y + 5)$

9

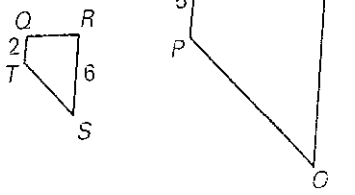
Find the value of y. Round to the nearest hundredth, if necessary.



10

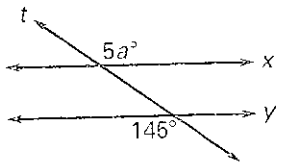
Find the scale factor of $MNOP$ to $QRST$, given that $MNOP \sim QRST$.

(A) 1:5
(B) 3:5
(C) 2:5
(D) 5:2
(E) 5:3



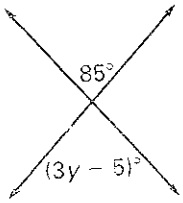
11

What value of a would make lines x and y parallel?



12

Find the value of y.

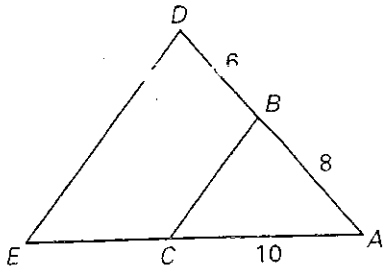


13

In the diagram, $\frac{AB}{BD} = \frac{AC}{CE}$.

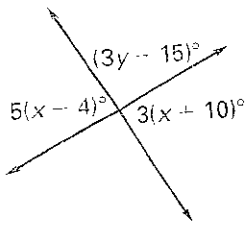
Find the length of $\overline{AE}$.

(A) 7.5
(B) 15
(C) 17.5
(D) $13\frac{1}{3}$
(E) $28\frac{1}{3}$



14

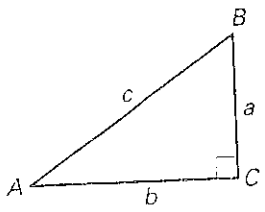
Solve for x



15

Use the triangle below. Choose the correct ratio to find tan B.

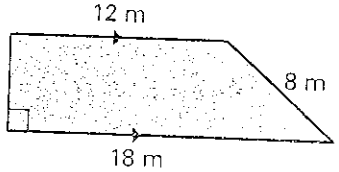
(A) $\frac{b}{a}$
(B) $\frac{a}{b}$
(C) $\frac{a}{c}$
(D) $\frac{c}{a}$
(E) $\frac{b}{c}$



16

Find the area of the figure. Round to the nearest hundredth, if necessary.

(A) 79.37 m²
(B) 53.61 m²
(C) 75. m²
(D) 57.0 m²
(E) 40.74 m²

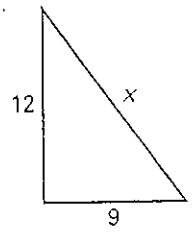


SCHOOL'S OUT!

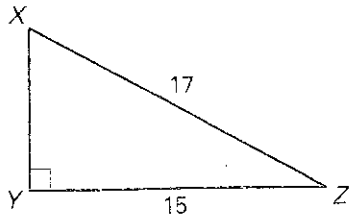
AMI Day 7: Geometry

17

Find the value of x that makes the triangle a right triangle.



19



find the measure of $\overline{XY}$.

18

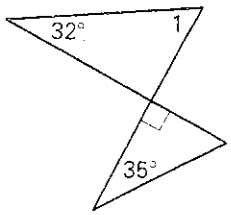
Points $A(-3, 2)$ and $B(-6, -8)$ are the initial and terminal points of vector $\overrightarrow{BA}$. What is its magnitude?

(A) $\langle 3, 10 \rangle$ (B) $\langle -9, -6 \rangle$ (C) 10.4

(D) 10.6 (E) 10.8

20

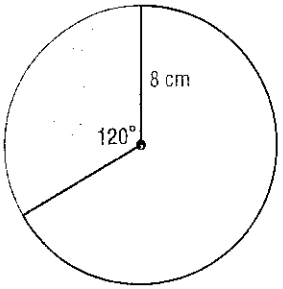
Find the measure of $\angle 1$.



16 The table below shows the sum of the interior angle measures of certain polygons. According to the information in the table, which is the best prediction of the sum of the interior angle measures in an 11-gon?

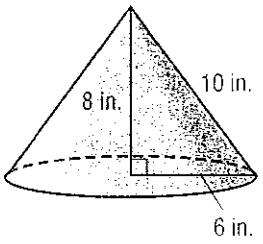
Number of Sides	Sum of Interior Angle Measures
3	180°
4	360°
5	540°
6	720°

24 For the circle below, which expression can be used to find the area of the shaded region?

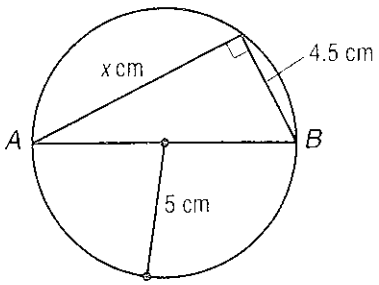


F $\frac{1}{3} \cdot 16\pi$ **G** $\frac{2}{3} \cdot 16\pi$ **H** $\frac{1}{3} \cdot 64\pi$ **J** $\frac{2}{3} \cdot 64\pi$

25 The volume of a cone is given by the formula $V = \frac{1}{3}\pi r^2 h$. What is the volume of the cone below, to the nearest whole number? Use 3.14 for π.



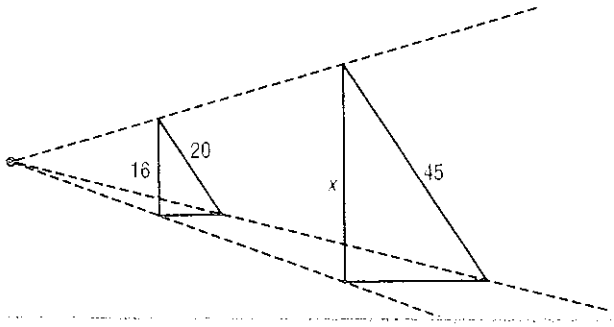
26 The radius of the circle below is 5 centimeters. Line segment *AB* is a diameter of the circle. What is the value of *x* to the nearest tenth?



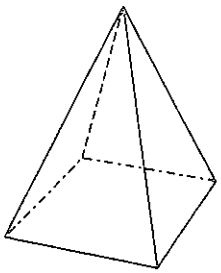
SCHOOL'S OUT!

AMI Day 8: Geometry

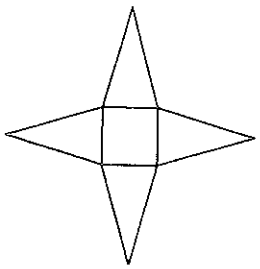
28 A triangle undergoes an enlargement as shown in the diagram below. What is x?



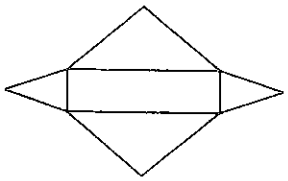
19 Which shows a net for the figure shown below?



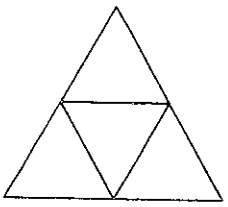
A



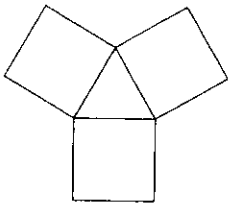
C



B



D



21 A sword fish can swim at a rate of 60 miles per hour. About how many meters per hour is this?

A 97m
B 966m
C 9660m
D 96600m

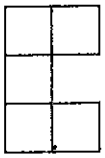
18 A plane intersects a right cylinder parallel to one of the cylinder's bases. What is the shape of the intersection?

F circle G rectangle H ellipse J trapezoid

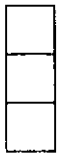
20 Which figure has the views shown?

Top

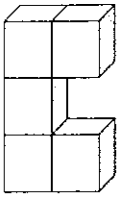
Front



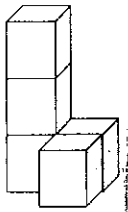
Side



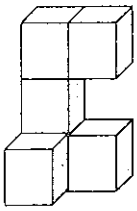
F



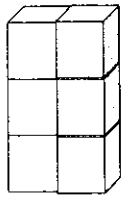
H



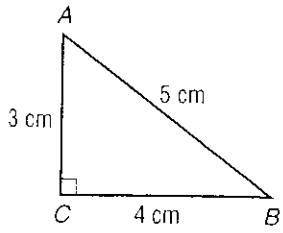
G



J



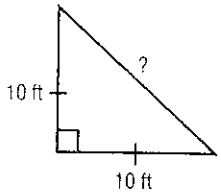
29 For the right triangle shown below, what is the tangent of $\angle A$?



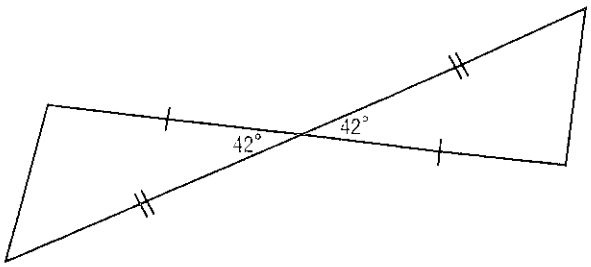
A $\tan A = \frac{3}{4}$ **B** $\tan A = \frac{4}{5}$

C $\tan A = \frac{5}{4}$ **D** $\tan A = \frac{4}{3}$

17 Eleanor has a garden in the shape of a right isosceles triangle. Two sides of the triangle measure 10 feet long each. What is the length of the third side?



27 Based on the information in the diagram, which triangle congruence property can be used to justify that $\triangle ABC \cong \triangle FGH$?



A SSS (If three sides of one triangle are congruent to three sides of another triangle, then the triangles are congruent.)

B SAS (If two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle, then the triangles are congruent.)

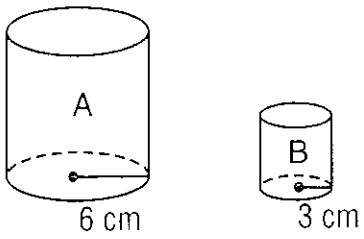
C ASA (If two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the triangles are congruent.)

D AAS (If two angles and a side of one triangle are congruent to two angles and a side of another triangle, then the triangles are congruent).

SCHOOL'S OUT!

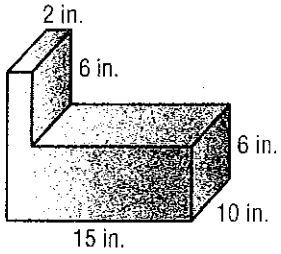
AMI Day 9: Geometry

30 A scientist has two similar cylindrical beakers. Beaker A has radius 6 centimeters. Beaker B has radius 3 centimeters. Which answer correctly completes the statement?

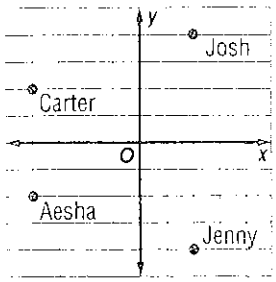


The volume of Beaker A is_____ times the volume of Beaker B.

22 Find the surface area of the composite figure below.

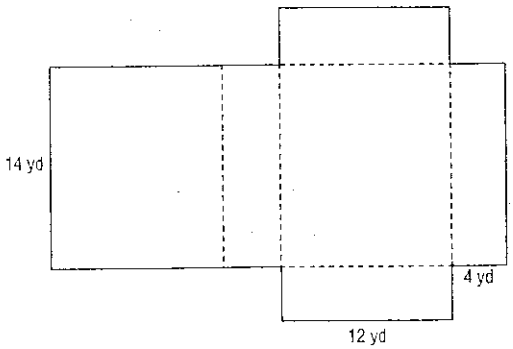


19 The map below shows where four of Nahimana's friends live.

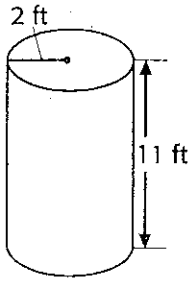


Which friend lives at the point (−4, 2)?

23 The figure below is a net of a rectangular prism with a length of 14 yards, a width of 12 yards, and a height of 4 yards.

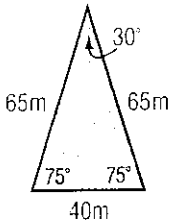


24 What is the volume of the cylinder shown below?

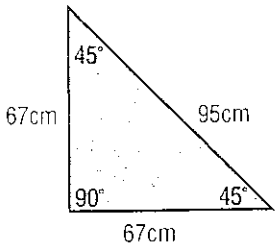


18 Which picture below is an obtuse isosceles triangle?

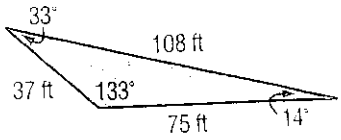
F



H



G



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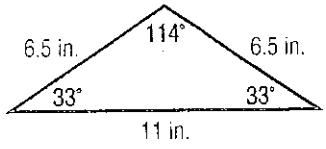


18

The perimeter of a rectangle is 28 in. If its length is 9 in., find its area.

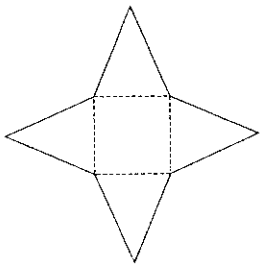
19

A boy is mowing a rectangular lawn 40 ft. long and 30 ft. wide. He has cut all of it except for a rectangle that is 20 ft. long and 15 ft. wide. What fractional part of the lawn remains uncut?

A) $\frac{1}{4}$ B) $\frac{9}{40}$ C) $\frac{7}{240}$ D) $\frac{1}{2}$ E) NOTA

---

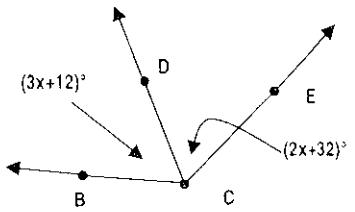
20 What three-dimensional figure can be made from the net shown?



F Triangular pyramid
G Cube
H Rectangular pyramid
J Rectangular prism

21

In the diagram at the right, m∠BCE is 144°. Find m∠ECD.



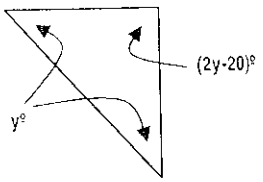
22

Give the most specific name for the polygon with vertices (5,-2), (4,2), (0,3), and (1,-1)

A) parallelogram
B) rectangle
C) square
D) rhombus
E) quadrilateral

23

Find the value of y.

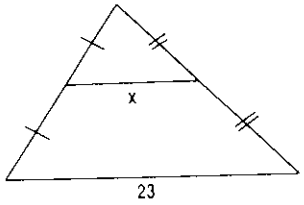


A) 50 B) 55 C) 40 D) $\frac{200}{3}$ E) 45

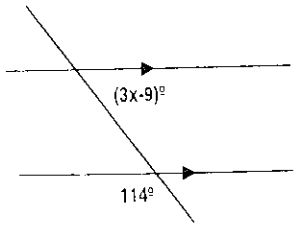
SCHOOL'S OUT!

AMI Day 10: Geometry

38. Find the value of x.

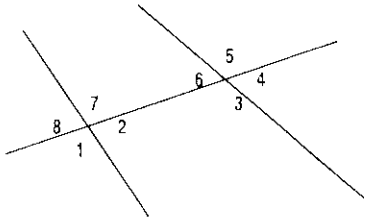


39. Find the value of x.

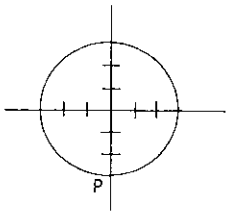


43. Which of these are a pair of same-side interior angles?

A) 7, 3 B) 2, 3 C) 1, 3 D) 5, 3



22. In the figure to the right, the circle is centered at the origin and passes through point P (0, -3). Which of the following points does it also pass through?



A) (3, 3) B) $(-2\sqrt{2}, -1)$ C) (2, 6)

D) (1.5, 1.3) E) (-3, 4)

24. Find the geometric mean between 8 and ¼

A) $\sqrt{2}$ B) $\frac{1}{2}$ C) $\frac{\sqrt{2}}{2}$ D) 2 E) 16

For problems 48-50:

Fill-in the blanks for a two-column proof of the theorem:
The two acute angles of a right triangle are complementary.

Given: In ΔABC, $\angle B$ is a right angle
Prove: $\angle A$ and $\angle C$ are complementary

Statements:	Reasons:
1. In ΔABC, $\angle B$ is a right angle.	1. Given
2. $m\angle B = 90°$	2. #48
3. $m\angle A + m\angle B + m\angle C = 180°$	3. #49
4. $m\angle A + 90° + m\angle C = 180°$	4. Substitution (steps 2 & 3)
5. $m\angle A + m\angle C = 90°$	5. Subtraction Property
6. $\angle A$ and $\angle C$ are complementary	6. #50

48. Choose from:

A) Triangle Sum Theorem
B) Definition of a right angle
C) Definition of congruent angles
D) Linear Pair Theorem
E) Definition of complementary angles

49. Choose from:

A) Triangle Sum Theorem
B) Definition of a right angle
C) Definition of congruent angles
D) Linear Pair Theorem
E) Definition of complementary angles

50. Choose from:

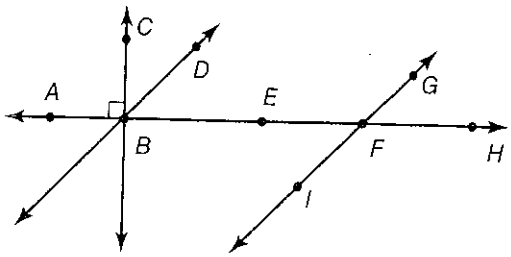
A) Triangle Sum Theorem
B) Definition of a right angle
C) Definition of congruent angles
D) Linear Pair Theorem
E) Definition of complementary angles

SCHOOL'S OUT!

AMI Day 11: Geometry

Pairs of Angles **Adjacent angles** are two angles that lie in the same plane and have a common vertex and a common side, but no common interior points. A pair of adjacent angles with noncommon sides that are opposite rays is called a **linear pair**. **Vertical angles** are two nonadjacent angles formed by two intersecting lines.

Example **Name an angle or angle pair that satisfies each condition.**



a. two vertical angles

$\angle EFI$ and $\angle GFH$ are nonadjacent angles formed by two intersecting lines. They are vertical angles.

b. two adjacent angles

$\angle ABD$ and $\angle DBE$ have a common vertex and a common side but no common interior points. They are adjacent angles.

c. two supplementary angles

$\angle EFG$ and $\angle GFH$ form a linear pair. The angles are supplementary.

d. two complementary angles

$m\angle CBD + m\angle DBE = 90$. These angles are complementary.

Exercises

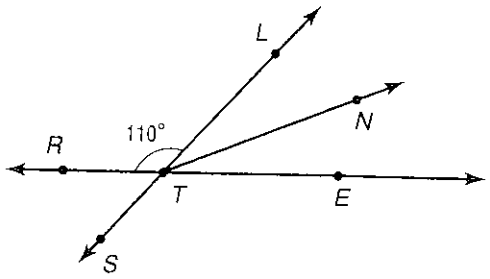
Name an angle or angle pair that satisfies each condition.

1. two adjacent angles

2. two acute vertical angles

3. two supplementary adjacent angles

4. an angle supplementary to $\angle RTS$

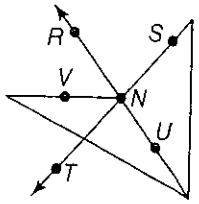


For Exercises 5–7, use the figure at the right.

5. Identify two obtuse vertical angles.

6. Identify two acute adjacent angles.

7. Identify an angle supplementary to $\angle TNU$.



8. Find the measures of two complementary angles if the difference in their measures is 18.

AMI Day 12: Geometry

Perimeter and Area of Irregular Shapes

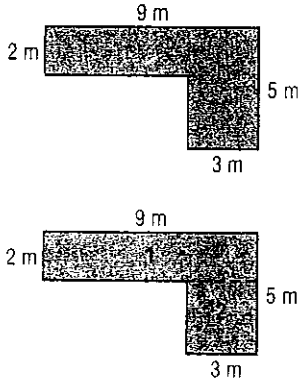
Two formulas that are used frequently in mathematics are perimeter and area of a rectangle.

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

Area: $A = \ell w$, where ℓ is the length and w is the width

However, many figures are combinations of two or more rectangles creating **irregular shapes**. To find the area of an irregular shape, it helps to separate the shape into rectangles, calculate the formula for each rectangle, then find the sum of the areas.

Example **Find the area of the figure at the right.**



Separate the figure into two rectangles.

$A = \ell w$

$A_1 = 9 \cdot 2$ $\quad A_2 = 3 \cdot 3$

$= 18$ $\quad = 9$

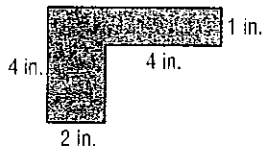
$18 + 9 = 27$

The area of the irregular shape is 27 m^2.

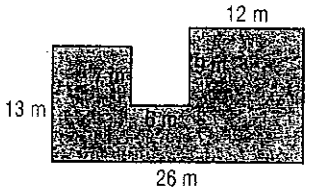
Exercises

Find the area of each irregular shape.

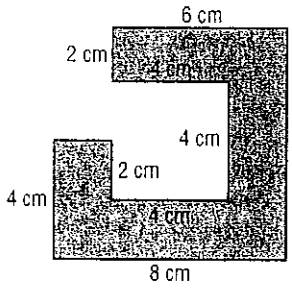
1.



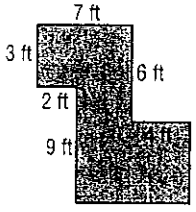
2.



3.



4.



For Exercises 5–8, find the perimeter of the figures in Exercises 1–4.

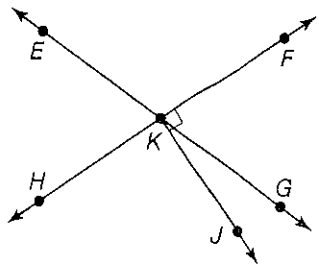
5. _____ **6.** _____ **7.** _____ **8.** _____

9. Describe the steps you used to find the perimeter in Exercise 1.

AMI Day 13: Geometry

Angle Relationships

For Exercises 1–6, use the figure at the right. Name an angle or angle pair that satisfies each condition.



1. Name two acute vertical angles.

2. Name two obtuse vertical angles.

3. Name a linear pair.

4. Name two acute adjacent angles.

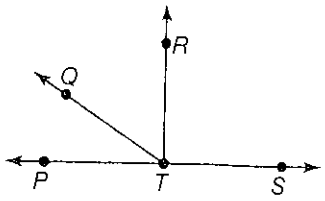
5. Name an angle complementary to $\angle EKH$.

6. Name an angle supplementary to $\angle FKG$.

7. Find the measures of an angle and its complement if one angle measures 24 degrees more than the other.

8. The measure of the supplement of an angle is 36 less than the measure of the angle. Find the measures of the angles.

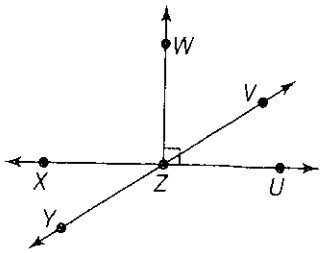
ALGEBRA For Exercises 9–10, use the figure at the right.



9. If $m\angle RTS = 8x + 18$, find the value of x so that $\overrightarrow{TR} \perp \overrightarrow{TS}$.

10. If $m\angle PTQ = 3y - 10$ and $m\angle QTR = y$, find the value of y so that $\angle PTR$ is a right angle.

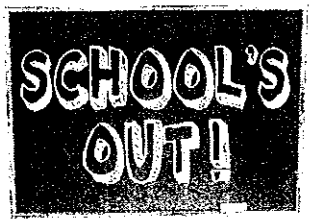
Determine whether each statement can be assumed from the figure. Explain.



11. $\angle WZU$ is a right angle.

12. $\angle YZU$ and $\angle UZV$ are supplementary.

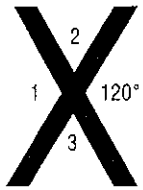
13. $\angle VZU$ is adjacent to $\angle YZX$.



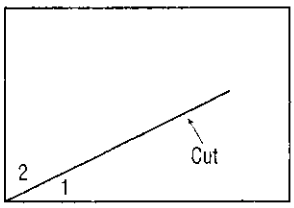
AMI Day 14: Geometry

Angle Relationships

1. LETTERS A sign painter is painting a large "X". What are the measures of angles 1, 2, and 3?

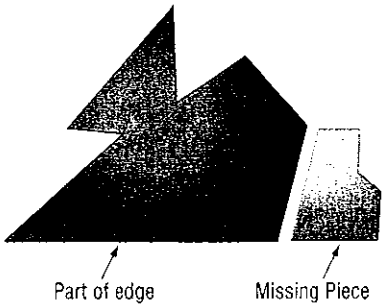


2. PAPER Matthew cuts a straight line segment through a rectangular sheet of paper. His cuts goes right through a corner. How are the two angles formed at that corner related?



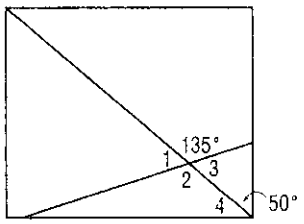
3. PIZZA Ralph has sliced a pizza using straight line cuts through the center of the pizza. The slices are not exactly the same size. Ralph notices that two adjacent slices are complementary. If one of the slices has a measure of $2x°$, and the other a measure of $3x°$, what is the measure of each angle?

4. GLASS Carlo dropped a piece of stained glass and the glass shattered. He picked up the piece shown on the left.



He wanted to find the piece that was adjoining on the right. What should the measurement of the angle marked with a question mark be? How is that angle related to the angle marked 106°?

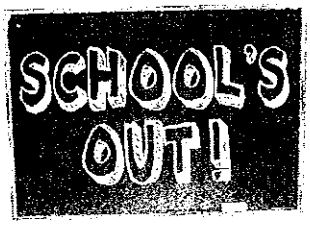
5. LAYOUTS A rectangular plaza has a walking path along its perimeter in addition to two paths that cut across the plaza as shown in the figure.



a. Find the measure of $\angle 1$.

b. Find the measure of $\angle 4$.

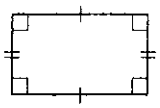
c. Name a pair of vertical angles in the figure. What is the measure of $\angle 2$?

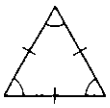


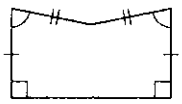
AMI Day 15: Geometry

Two-Dimensional Figures

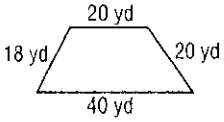
Name each polygon by its number of sides and then classify it as *convex* or *concave* and *regular* or *irregular*.

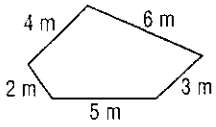
1. 

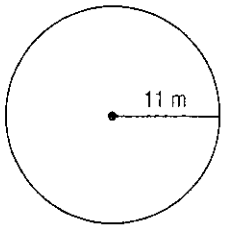
2. 

3. 

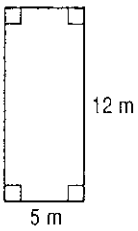
Find the perimeter or circumference of each figure. Round to the nearest tenth.

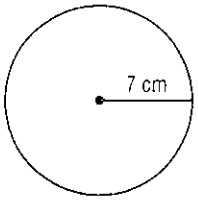
4. 

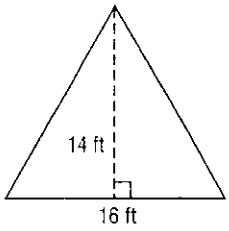
5. 

6. 

Find the area of each figure. Round to the nearest tenth.

7. 

8. 

9. 

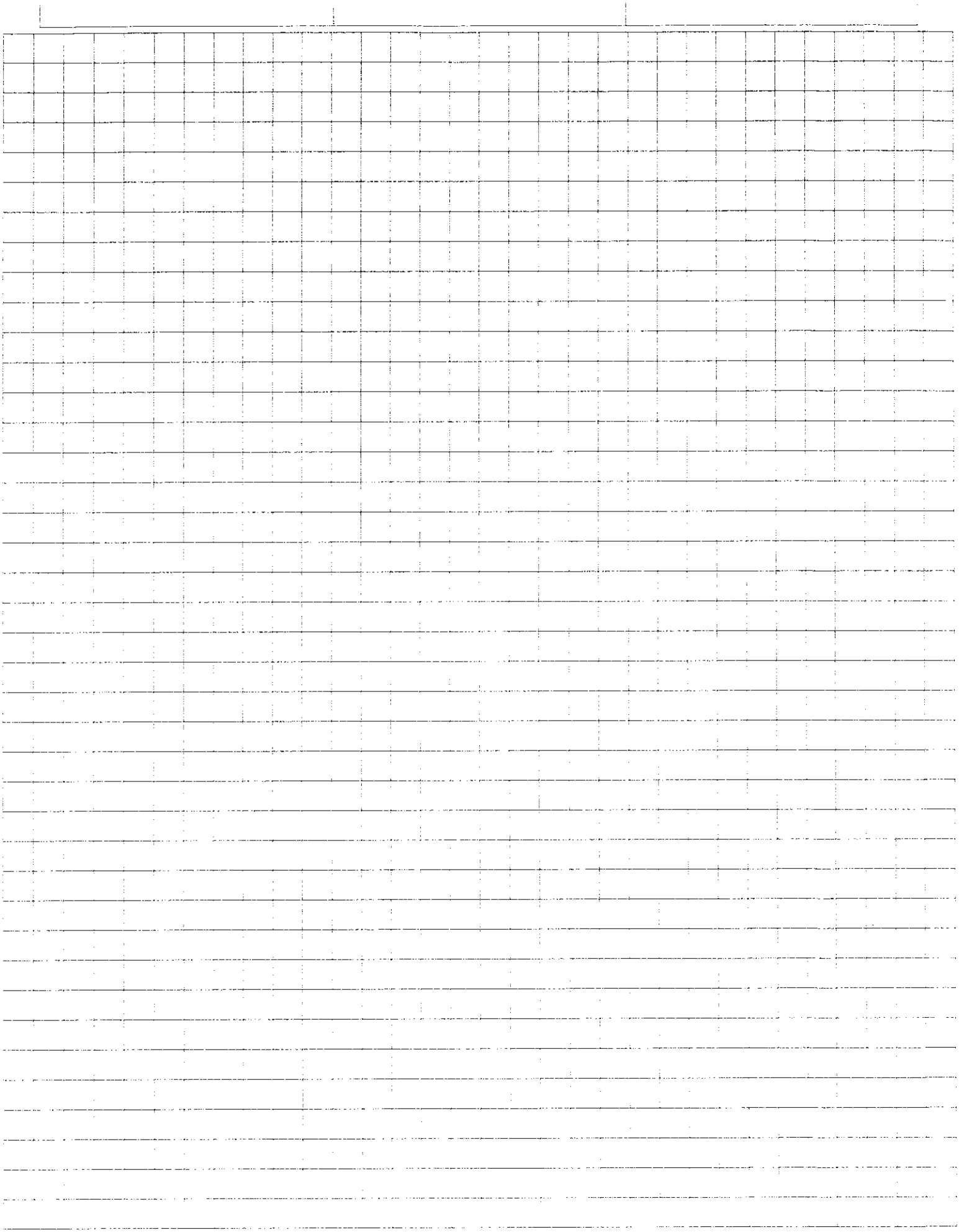
COORDINATE GEOMETRY Graph each figure with the given vertices and identify the figure. Find the perimeter and area of the figure.

10. $A(3, 5)$, $B(3, 1)$, $C(0, 1)$

11. $Q(-3, 2)$, $R(1, 2)$, $S(1, -4)$, $T(-3, -4)$

12. $G(-4, 1)$, $H(4, 1)$, $I(0, -2)$

13. $K(-4, -2)$, $L(-1, 2)$, $M(8, 2)$, $N(5, -2)$



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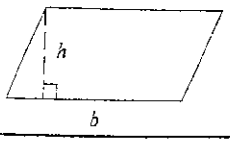
Mathematics Reference Sheet

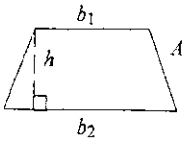
Parallelogram



P = sum of all sides

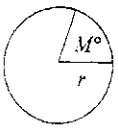
$A = bh$

Trapezoid



$A = \frac{h(b_1 + b_2)}{2}$

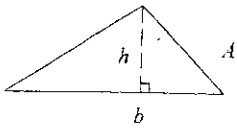
Arc and Sector



Arc Length = $\left(\frac{M}{360}\right) \times 2\pi r$

Sector area = $\left(\frac{M}{360}\right) \times \pi r^2$

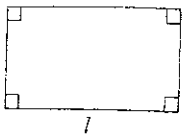
Triangle



P = sum of all sides

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

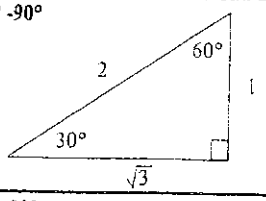
Rectangle



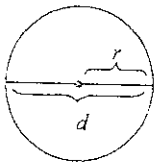
$P = 2l + 2w$

$A = lw$

30° -60° -90°



Circle



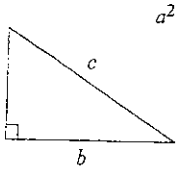
$C = 2\pi r$

$C = \pi d$

$A = \pi r^2$

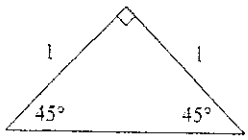
$\pi \approx 3.14$

Pythagorean Theorem

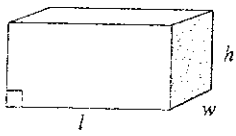


$a^2 + b^2 = c^2$

45° -45° -90°



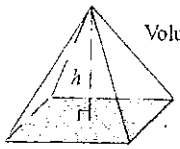
Rectangular Solid



Volume = lwh

Surface area = $2lw + 2lh + 2wh$

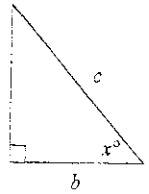
Pyramid



B = *area of base (shaded)*

Volume = $\frac{Bh}{3}$

Trigonometric Ratios

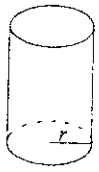


$\sin x° = \frac{a}{c}$

$\cos x° = \frac{b}{c}$

$\tan x° = \frac{a}{b}$

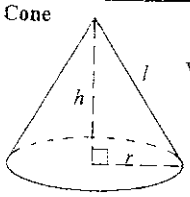
Cylinder



Volume = $\pi r^2 h$

Surface area = $2\pi rh + 2\pi r^2$

Cone

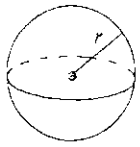


l = slant height

Volume = $\frac{\pi r^2 h}{3}$

Surface area = $\pi rl + \pi r^2$

Sphere



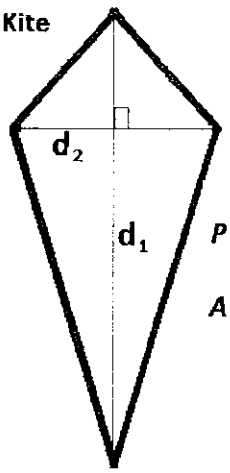
Volume = $\frac{4\pi r^3}{3}$

Surface area = $4\pi r^2$

Miscellaneous Formulas

Area of an equilateral triangle	$A = \frac{s^2\sqrt{3}}{4}$ s = length of a side
Distance	rate × time
Interest	principal × rate × time in years
Sum of the angles of a polygon having n sides	$(n-2)180°$
Distance between points on a coordinate plane	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
Midpoint	$\left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2}\right)$
Slope of a nonvertical line (where $x_2 \neq x_1$)	$m = \frac{y_2 - y_1}{x_2 - x_1}$
Slope intercept (where m = slope, b = intercept)	$y = mx + b$
Last term of an arithmetic series	$a_n = a + (n-1)d$
Last term of a geometric series (where $n \geq 1$)	$a_n = ar^{n-1}$
Quadratic formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Area of a square	$A = s^2$
Volume of a cube	$V = s^3$
Area of a regular polygon	$A = \frac{1}{2}ap$ a = apothem, p = perimeter

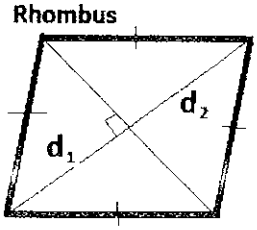
Kite



P = sum of all sides

$A = \frac{1}{2} \cdot d_1 \cdot d_2$

Rhombus



P = sum of all sides

$A = \frac{1}{2} \cdot d_1 \cdot d_2$