Key

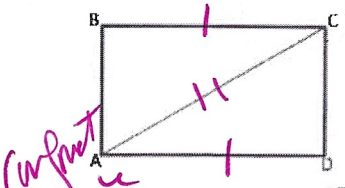
GEOMETRY BEST INSTRUCTIONAL ITEMS (FROM ITEM SPECS) 2022-2023

(1)

Instructional Items

Instructional Item 1

Use rectangle $ABCD$ to fill in the blanks.



In a rectangle opposite sides are ___ which means $\overline{BC} \cong \overline{DA}$. Triangles ABC and CDA can be proven congruent by Hypotenuse-Leg because ___ is the hypotenuse for both triangles.

SSS
SAS
ASA
AAS

(2)

Instructional Items

Instructional Item 1

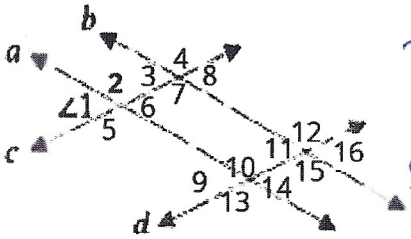
What value of x will make M the midpoint of $\overline{PQ}$ if $PM = 3x - 1$ and $PQ = 5x + 3$?

Instructional Item 2

Two lines intersect at point P. If the measures of a pair of vertical angles are $(2x - 7)^\circ$ and $(x + 13)^\circ$, determine x and the measures of the other two angles?

Instructional Item 3

Based on the figure below. complete a proof to prove that $\angle 1 \cong 16$ given that $a \parallel b$ and $c \parallel d$.



STATEMENTS	REASONS
1) Line A is parallel to Line B and Line C is parallel to Line D	1)
2) $\angle 1 \cong \angle 9$	2)
3) $\angle 9 \cong \angle 14$	3)
4) $\angle 14 \cong \angle 16$	4)
5)	5)

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Instructional Items

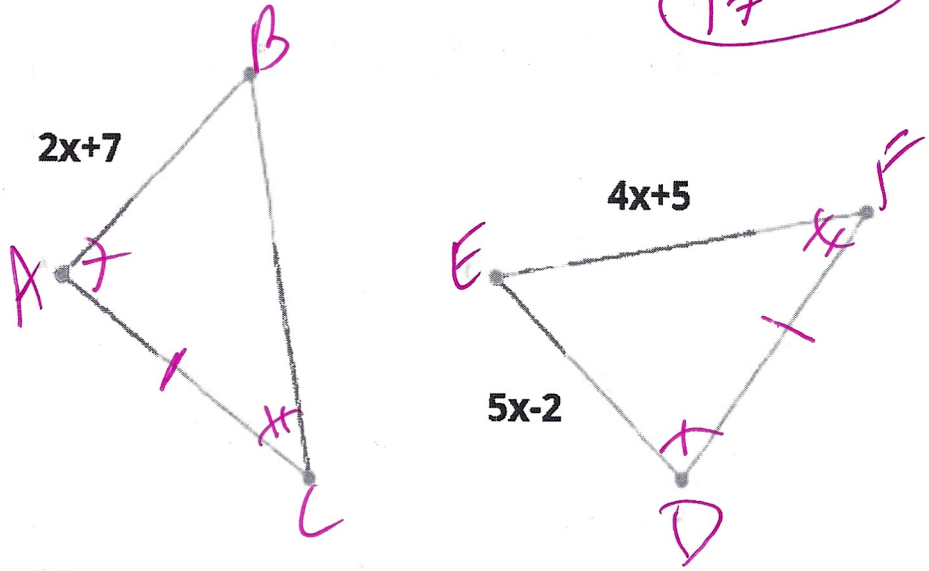
Instructional Item 1

Triangles ABC and DEF are shown where $\angle A \cong \angle D$, $\angle C \cong \angle F$ and ~~$\overline{AC} \cong \overline{DF}$~~.

Part A. Determine whether the triangles are congruent.

Part B. If the triangles are congruent, find EF, in units.

Yes ASA 7



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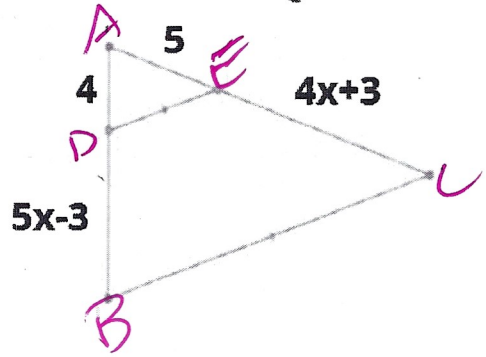
Instructional Item 2

If ΔADE and ΔABC are similar, what is the length of $\overline{AC}$, in units? 20



A 5,1
B 3,1
C 2,2
D +3,+4

3,-2
1,-2
0,-1
1,1

E
6,3
4,0

F
4,2
2,-1

Instructional Items

Instructional Item 1

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Perform the following sequence of transformations on the polygon $ABCDEF$ on the coordinate plane.

- Rotate 180° counterclockwise about the origin. $(-x,-y)$
- Then. translate horizontally 2 units to the left and vertically 3 units down.

$(x-2, y-3)$

A(-5,-1)

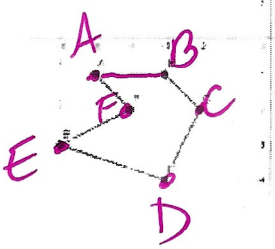
E(-6,-3)

F(-4,-2)

B(-3,-1)

C(-2,-2)

D(-3,-4)



Instructional Item 2

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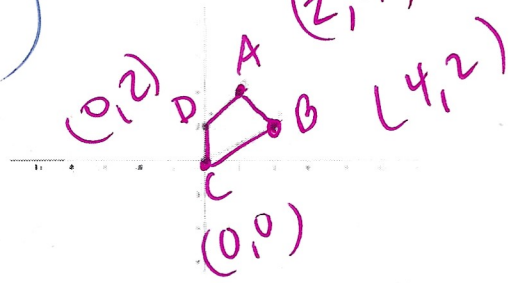
Draw the resulting figure after quadrilateral $ABCD$ is transformed using $(x, y) \rightarrow (-x, y-3)$.

$(x, y-3)$

Count coordinates



A -2,1

B -4,-1

C 0,-3

D 0,-1

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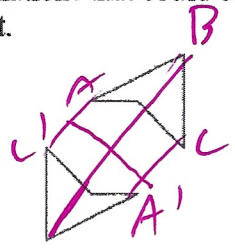
Instructional Items

Instructional Item 1

Describe the sequence of transformations that could be used to prove that the two quadrilaterals shown are congruent.



reflection
translation
180° rotation

Reflect over BB'

or over m/p units

$C'A' = AC$

Instructional Items

Instructional Item 1

Given J (−4,2) and (2,1). find the coordinates of point M on $\overline{JK}$ that partitions the segment into the ratio 1: 2.

Instructional Items

Instructional Item 1

Which of the following polygons are cross-sections that are parallel or perpendicular to the base of a regular pentagonal pyramid? Select all that apply.

a. Triangle
b. Parallelogram
c. Trapezoid
d. Pentagon
e. Hexagon
f. Octagon

Instructional Items

Instructional Item 1

The perfume Eau de Matimatica is packaged in a triangular prism bottle. The dimensions of the travel size are $\frac{1}{3}$ the dimensions of the standard bottle. How does the volume of the standard bottle compare to the travel size?

Instructional Items

Instructional Item 1

Which real-world object could be used describe the figure generated by rotating a rectangle about a line that is parallel to a side but not touching the rectangle?

a. A doughnut
b. A piece of plastic tubing
c. An ice cream cone
d. A shoebox
e. An egg

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angle bisector

Which construction is shown? Number the correct order of the construction #1-6.

Without changing the compasses setting repeat for the other leg so that the two arcs cross.

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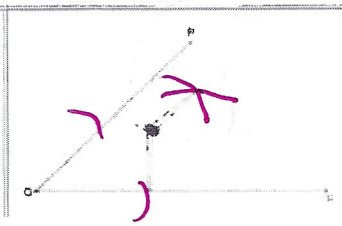
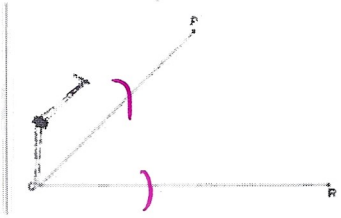


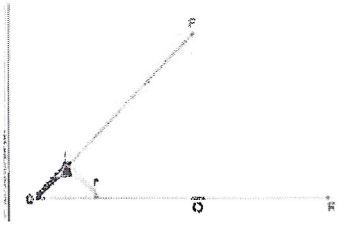
Without changing the compasses' width, draw an arc across each leg of the angle.

3



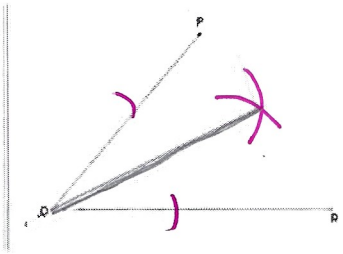
Place the compasses' point on the angle's vertex Q.

1



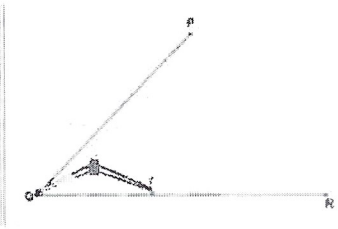
Using a straightedge or ruler, draw a line from the vertex to the point where the arcs cross

6



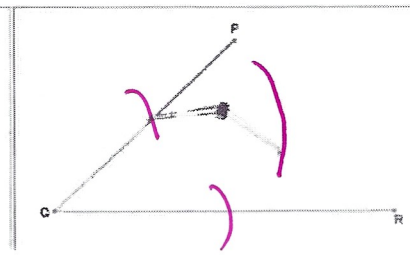
Adjust the compasses to a medium wide setting. The exact width is not important

2



Place the compasses on the point where one arc crosses a leg and draw an arc in the interior of the angle.

4



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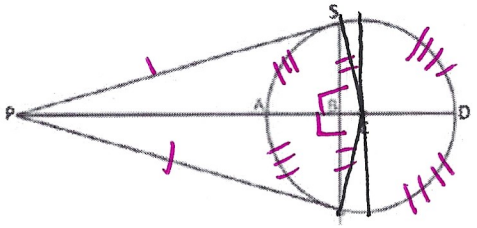
Draw markings on the figure below showing which segments are congruent. *Include tangents, secants, diameter, radius, and chord relationships.



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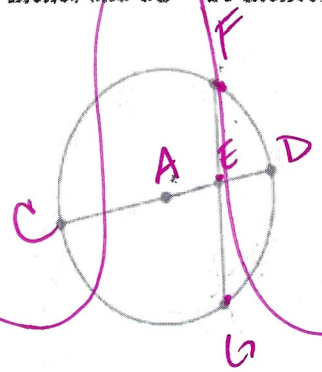
Instructional Task 2 (MTR.3.1)

In Circle A, $AE = DE$. $FE = 6$ inches and $GE = 10$ inches. What is the length of the radius of Circle A?



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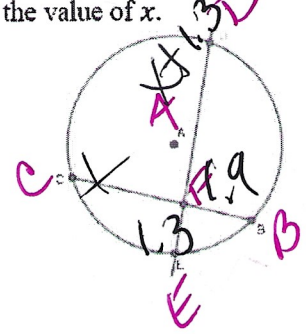
Instructional Items

Instructional Item 1

In Circle A, $\overline{DE}$ and $\overline{BC}$ intersect at point F. $FE = 1.3$ units, $BF = 1.9$ units, $FD = x + 1.3$ units and $CF = x$ units. Find the value of x.



$x = \frac{169}{60}$

$x = 2.82$

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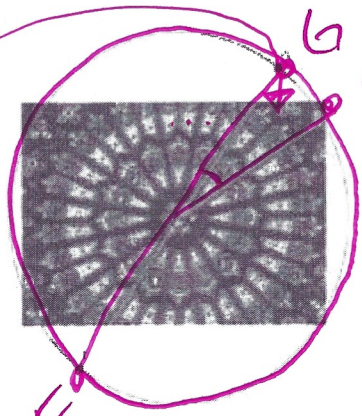
Instructional Items

$23 \div 2 = 11.5$ R

Instructional Item 1

The North Rose Window in the Rouen Cathedral in France has a diameter of 23 feet. The stained glass design is equally spaced about the center of the circle. What is the area of the sector bounded by arc GJ?



16 parts

360/16

22.5°

$a = \frac{x}{360} \cdot \pi r^2$

$\frac{22.5}{360} \cdot \pi r^2$

$\frac{22.5}{360} \cdot \pi (11.5)^2$

8.0268

8.27 ft ✓

or 25.97

32 ?

Instructional Items

Instructional Item 1

Given the equation $x^2 + 2x + y^2 - 4y + E = 0$, determine possible values of E such that the equation is an equation of a circle.

$E \leq 5$

$0 = -E + 4 + 1$

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Instructional Item 2

What is the equation of a circle centered at $(-1, 2)$, with a diameter of 2 units?

$\left(\frac{2}{2}\right)^2 \left(\frac{2}{2}\right)^2 = 1 \quad \left(\frac{4}{2}\right)^2 = 4 \quad (x+1)^2 + (y-2)^2 = 1$

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Instructional Item 3

What is the equation of the circle centered at $(-2, -5)$ and passing through $(5, 0)$?

$(x+2)^2 + (y+5)^2 = 74$?

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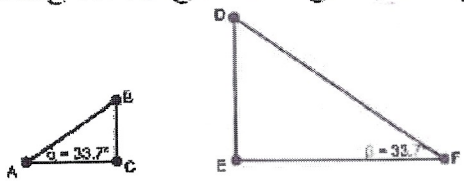
Instructional Item 2

Given the diagram below showing two right triangles, complete the following statements.



Statement A. $\sin 33.7° = \frac{BC}{AB}$

Statement B. $\sin 33.7° = \frac{DE}{DF}$

Statement C. $\frac{BC}{AC} = \frac{DE}{EF}$

Instructional Items

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Instructional Item 1

The logo of a local construction company contains an equilateral triangle. The height of the triangle is 10 units. What is the length of the measure of each side of the triangle? $\frac{20\sqrt{3}}{3}$

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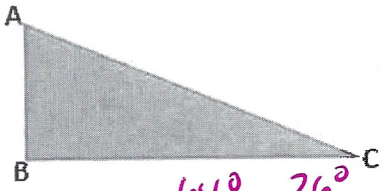
Instructional Item 2

The right triangle ABC is shown. Angle B is the right angle and the length of AB is 1.5 centimeters and the length of BC is 3.1 centimeters. 3.44



64° 26°

Part A. Determine the measure of angles A and C.

Part B. Determine the length of AC.

$\sqrt{11.86} = 3.44$