NAME: _____

FSA Geometry EOC Practice #2

Circles, Geometric Measurement, and Geometric Properties with Equations

38% of the EOC

Geometry EOC FSA Mathematics Reference Sheet

Customary Conversions
1 foot = 12 inches
1 yard = 3 feet
1 mile = 5,280 feet
1 mile = 1,760 yards

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts

1 pound = 16 ounces
1 ton = 2,000 pounds

Metric Conversions
1 meter = 100 centimeters
1 meter = 1000 millimeters
1 kilometer = 1000 meters

1 liter = 1000 milliliters

1 gram = 1000 milligrams
1 kilogram = 1000 grams

Time Conversions
1 minute = 60 seconds
1 hour = 60 minutes
1 day = 24 hours
1 year = 365 days
1 year = 52 weeks

Geometry EOC FSA Mathematics Reference Sheet

Formulas

$$\sin A^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos A^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\tan A^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

$$V = Bh$$

$$V = \frac{1}{3}Bh$$

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

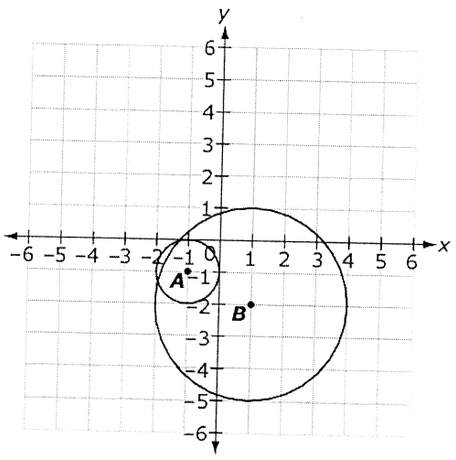
$y = mx + b$, where m = slope and b = y-intercept

$y - y_1 = m(x - x_1)$, where m = slope and (x_1, y_1) is a point on the line

Sample Item MAFS 9.12.G-C.1.1 | Item Type: Equation Editor

1

Circle A has a center at $(-1, -1)$, and circle B has a center at $(1, -2)$.



Logan performs two transformations on circle A to show that circle A is similar to circle B. One of the transformations is centered at $(-1, -1)$.

What are the transformations?

$(x, y) \rightarrow$ (,)

$(x, y) \rightarrow$ (,)

2

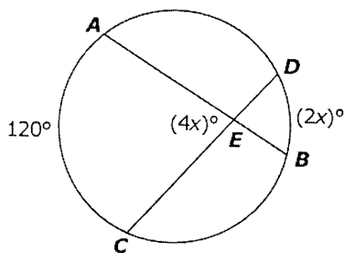
Which method is valid for proving that two circles are similar?

A. Calculate the ratio of degrees to the area for each circle and show that they are equal.
B. Calculate the ratio of degrees to the radius for each circle and show that they are equal.
C. Calculate the ratio of the area to the diameter for each circle and show that they are equal.
D. Calculate the ratio of radius to circumference for each circle and show that they are equal.

Sample Item MAFS.912.G-C.1.2 | Equation Editor

3

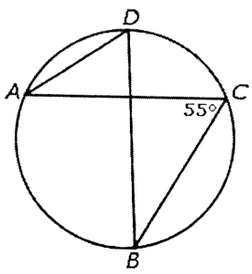
In the diagram shown, chords AB and CD intersect at E. The measure of $\overset{\frown}{AC}$ is 120°, the measure of $\overset{\frown}{DB}$ is $(2x)°$, and the measure of $\angle AEC$ is $(4x)°$.



What is the degree measure of $\angle AED$?

4

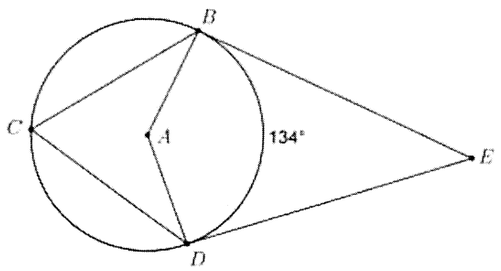
If $m\angle C = 55°$, then what is $m\angle D$?



A. 27.5°
B. 35°
C. 55°
D. 110°

Use circle A below to answer the following questions. Assume points B, C, and D lie on the circle, segments $\overline{BE}$ and $\overline{DE}$ are tangent to circle A at points B and D, respectively, and the measure of $\widehat{BD}$ is $134°$.

5) Identify the type of angle represented by $\angle BAD$, $\angle BCD$, and $\angle BED$ in the diagram and then determine each angle measure. Justify your calculations by showing your work.

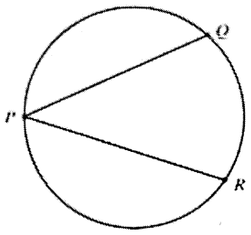


a. $\angle BAD$:
$m\angle BAD =$

b. $\angle BCD$:
$m\angle BCD =$

c. $\angle BED$:
$m\angle BED =$

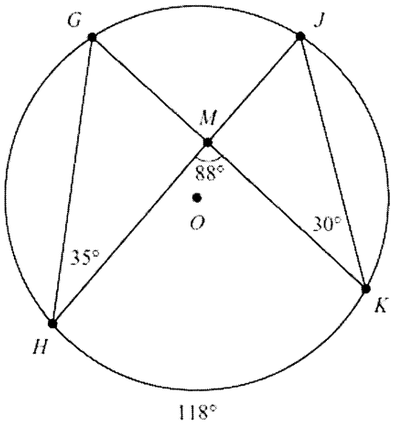
6) In this circle, $\boldsymbol{mQR = 72°}$.



What is m∠QPR?

A. 18°
B. 24°
C. 36°
D. 72°

7) Use the diagram to the right to answer the question.



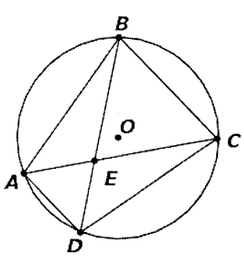
What is wrong with the information given in the diagram?

A. $\overline{HJ}$ should pass through the center of the circle.
B. The length of $\overline{GH}$ should be equal to the length of $\overline{JK}$.
C. The measure of $\angle GHM$ should be equal to the measure of $\angle JKM$.
D. The measure of $\angle HMK$ should be equal to half the measure of HK

8)

Sample Item G-C.1.3	Item Type GRID – Hot Spot (on Ed!)

Trapezoid $ABCD$ is inscribed in circle O. Diagonals $\overline{BD}$ and $\overline{AC}$ meet at point E and $\overline{AD}$ is parallel to $\overline{BC}$, as shown.



Select the angles and value that make a true statement about trapezoid $ABCD$.

Write your answers in the boxes.

$m\angle$ [ ] = [ ] − $m\angle$ [ ]

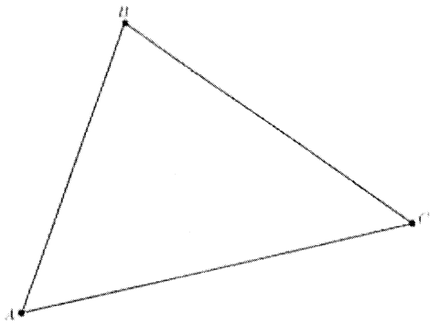
ABC	90°	ABC
ABE	180°	ABE
ADC		ADC
ADE		ADE
CEB		CEB
EAD		EAD

Pick From these choices

Inscribed Circle Construction

9) Use a compass and straightedge to construct a circle inscribed in the triangle.

Part A



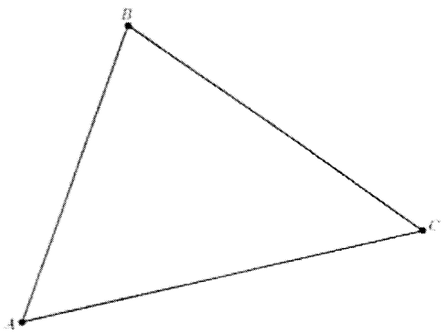
Part B What did you construct to locate the center of your inscribed circle?

Part C . What is the name of the point of concurrency that serves as the center of your inscribed circle?

10) Circumscribed Circle Construction

Use a compass and straightedge to construct a circle circumscribed about the triangle.

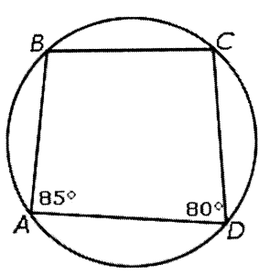
Part A



Part B What did you construct to locate the center of your circumscribed circle?

Part C What is the name of the point of concurrency that serves as the center of your circumscribed circle?

11) Quadrilateral ABCD is inscribed in a circle as shown in the diagram below.



If $m\angle A = 85°$ and $m\angle D = 80°$, what is the $m\angle B$?

A. 80°
B. 85°
C. 95°
D. 100°

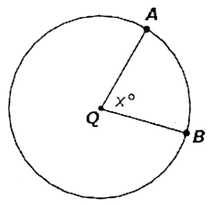
12) Which statement is valid when a circumscribed circle of an obtuse triangle is constructed?

A. The longest side of the triangle lies on the diameter of the circle.
B. The circle is drawn inside the triangle touching all 3 sides.
C. The center of the circle is in the interior of the triangle.
D. The vertices of the triangle lie on the circle.

Sample Item G-C.2.5	Item Type
	Equation Editor

13

Circle Q has a radius r with a central angle $\angle AQB$ that measures $x°$, as shown.

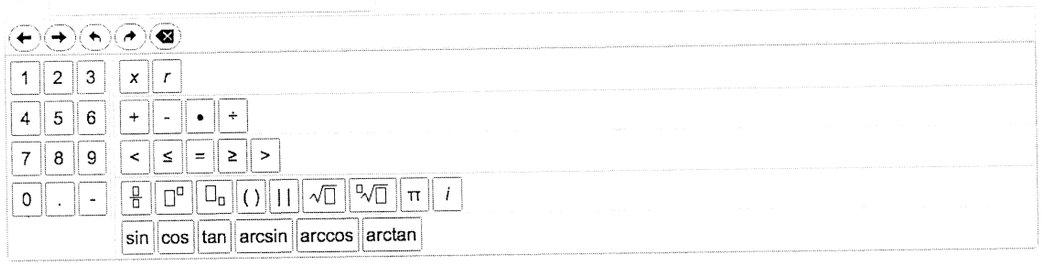


A. Create an expression using r and x that can be used to find the length of $\overset{\frown}{AB}$, in degrees.

B. Then, create an expression that could be used to find the length of $\overset{\frown}{AB}$, in degrees, if circle Q were dilated by a scale factor of 3.7.

A.

B.



14

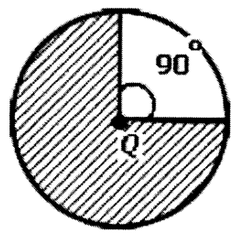
What is the area of the shaded sector, given circle Q has a diameter of 10?

A. $18\frac{3}{4}\pi$ square units

B. 25π square units

C. $56\frac{1}{4}\pi$ square units

D. 75π square units



15

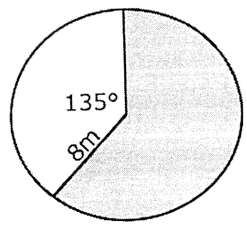
What is the area of the shaded sector?

A. 5π square meters

B. 10π square meters

C. 24π square meters

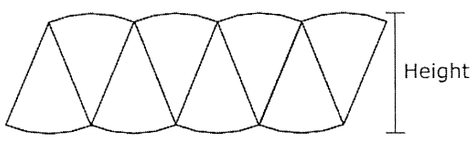
D. 40π square meters



Sample Item GMO.1.1	Item Type
	Multiselect

16

Alejandro cut a circle with circumference C and radius r into 8 congruent sectors and used them to make the figure shown.



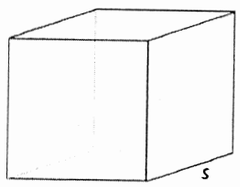
Alejandro noticed that the figure was very close to the shape of a parallelogram.

Select all the statements that apply to the figure.

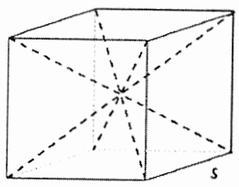
- ☐ The height of the parallelogram is approximately equal to the circle's diameter.
- ☐ The area of the parallelogram is approximately $\frac{1}{2}Cr$.
- ☐ The length of the parallelogram is approximately equal to the circle's circumference.
- ☐ The radius of the circle is approximately equal to the height of the parallelogram.
- ☐ The area of the parallelogram is approximately $8\left(\frac{45}{360}\pi r^2\right)$.

17

Sasha derived the formula for the volume of a square pyramid. She started by dividing a cube into 6 identical square pyramids. The top vertex of each pyramid meets at the central point in the cube, with the cube's diagonals as the edges.



cube



cube cut into 6 pyramids

one pyramid

$V =$ *the volume of a pyramid;* $s =$ *side length of base,* $h =$ *height of pyramid*

The steps of Sasha's work are shown.

- Step 1: $6V = s^3$
- Step 2: $V = \frac{1}{3}s^3$

Maggie also derived the formula for volume of a square pyramid.

- Maggie's result is $V = \frac{1}{3}s^2h$.

The formulas derived by Sasha and Maggie can both be used to correctly calculate the volume of a square pyramid. What are the best next steps for Sasha to take to prove that either formula can be used to find the volume of a square pyramid?

A.

step 3	$2h = s$
step 4	$V = \frac{1}{6}(2h)^3$
step 5	$V = \frac{1}{3}8h^3$

B.

step 3	$2h = s$
step 4	$V = \frac{1}{6}s^2(s)$
step 5	$V = \frac{1}{6}s^2(2h)$

C.

step 3	$2s = h$
step 4	$s = \frac{1}{2}h$
step 5	$V = \frac{1}{6}s^2(s)$
step 6	$V = \frac{1}{6}s^2\left(\frac{1}{2}h\right)$

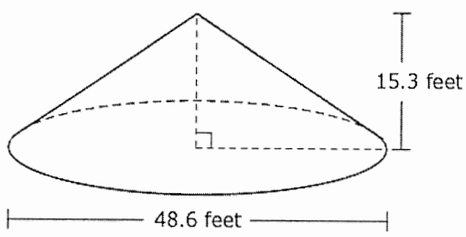
D.

step 3	$2s = h$
step 4	$s = \frac{1}{2}h$
step 5	$V = \frac{1}{6}\left(\frac{1}{2}h\right)^3$
step 6	$V = \frac{1}{6}\left(\frac{1}{8}\right)h^3$

18

Sample Item GM01.3	Item Type
	Equation Editor

As phosphate is mined, it moves along a conveyor belt, falling off of the end of the belt into the shape of a right circular cone, as shown.



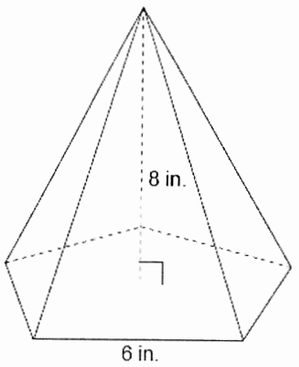
A shorter conveyor belt also has phosphate falling off of the end into the shape of a right circular cone. The height of the second pile of phosphate is 3.6 feet shorter than the height of the first. The volume of both piles is the same.

To the nearest tenth of a foot, what is the diameter of the second pile of phosphate?

1 2 3
4 5 6
7 8 9

19

This right pentagonal pyramid has a height of 8 inches and a base area of 61.94 square inches. To the nearest hundredth, what is the volume of the pyramid?



A. 80.00 cubic inches
B. 165.17 cubic inches
C. 240.00 cubic inches
D. 495.52 cubic inches

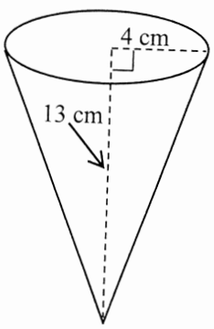
20

Snow Cones

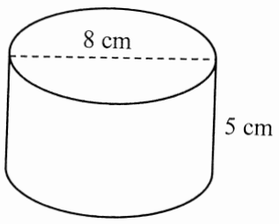
Jennifer loves snow cones and wants to get the most for her money. There are two vendors at the fair selling snow cones for the same price. If the two containers are completely filled and then leveled off across their tops, which will hold the most? If necessary, round off to the nearest cubic centimeter.

Justify your response by showing and/or explaining your work.

Traditional Snow Cone



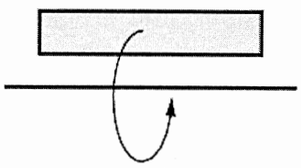
Snow Cone in a Cup



21

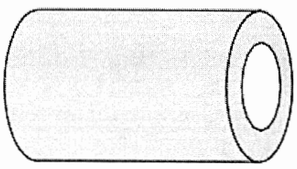
Sample Item GMD2.4	Item Type
	Multiple Choice

A rectangle and a horizontal line segment are shown.



What is the resulting object when the rectangle is rotated around the horizontal line segment?

Ⓐ



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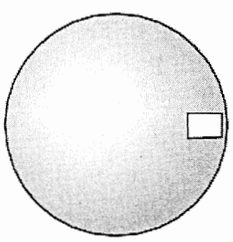

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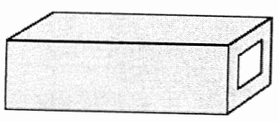

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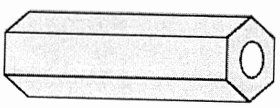


22

An isosceles right triangle is placed on a coordinate grid. One of its legs is on the x-axis and the other on the y-axis. Which describes the shape created when the triangle is rotated about the $x - axis$?

A. Cone
B. Cylinder
C. Pyramid
D. Sphere

23

Sample Item GPE 2, 2	Item Type
	Editing Task Choice (or EoC)

Johnny wants to find the equation of a circle with center (3, −4) and a radius of 7. He uses the argument shown.

There are three highlights in the argument to show missing words or phrases. For each highlight, ~~click on~~ write the word or phrase that correctly fills in the blank.

Johnny's Argument

Let (x, y) be any point on the circle. Then, the horizontal distance from (x, y) to the center is ___?___. The vertical distance from (x, y) to the center is ___?___. The total distance from (x, y) to the center is the radius of the circle, 7. The ___?___ can now be used to create an equation that shows the relationship between the horizontal, vertical, and total distance of (x, y) to the center of the circle.

24

A circle has this equation.

$$x^2 + y^2 + 4x - 10y = 7$$

What are the center and radius of the circle?

A. center: (2, −5)
   radius: 6
B. center: (−2, 5)
   radius: 6
C. center: (2, −5)
   radius: 36
D. center: (−2, 5)
   radius: 36

25

What is the radius of the circle described by the equation $(x - 2)^2 + (y + 3)^2 = 25$?

A. 4
B. 5
C. 25
D. 625

26

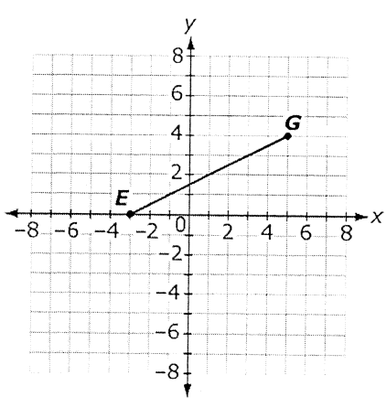
What is the equation of a circle with radius 3 and center $(3, 0)$?

A. $x^2 + y^2 - 6x = 0$
B. $x^2 + y^2 + 6x = 0$
C. $x^2 + y^2 - 6x + 6 = 0$
D. $x^2 + y^2 - 6y + 6 = 0$

27

Sample Item GPE 2.4	Item Type
	Editing Task Choice (or EoC!)

One diagonal of square *EFGH* is shown on the coordinate grid.

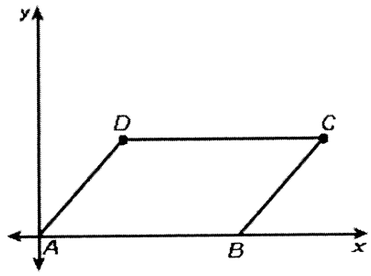


There are two highlights in the sentence to show which word or phrase may be incorrect. For each highlight, ~~click~~ write the word or phrase that is correct.

The location of point *F* could be ___?___ because diagonals of a square are congruent and ___?___.

28

The diagram shows quadrilateral ABCD.



Which of the following would prove that ABCD is a parallelogram?

A. Slope of $\overline{AD}$ = Slope of $\overline{BC}$
   Length of $\overline{AD}$ = Length of $\overline{BC}$
B. Slope of $\overline{AD}$ = Slope of $\overline{BC}$
   Length of $\overline{AB}$ = Length of $\overline{AD}$
C. Length of $\overline{AD}$ = Length of $\overline{BC}$ = Length of $\overline{DC}$
D. Length of $\overline{AD}$ = Length of $\overline{BC}$ = Length of $\overline{AB}$

29

Jillian and Tammy are considering a quadrilateral $ABCD$. Their task is to prove is a square.

- Jillian says, "We just need to show that the slope of $\overline{AB}$ equals the slope of $\overline{CD}$ and the slope of $\overline{BC}$ equals the slope $\overline{AD}$."
- Tammy says, "We should show that $AC = BD$ and that $(slope\ of\ \overline{AC}) \times (slope\ of\ \overline{BD}) = -1$."

Whose method of proof is valid?

A. Only Jillian's is valid.
B. Only Tammy's is valid.
C. Both are valid.
D. Neither is valid.

30

Sample Item GPE2.5	Item Type
The equation for line A is shown. $y = -\frac{2}{3}x - 4$ Line A and line B are perpendicular, and the point $(-2,1)$ lies on line B. Write an equation for line B. 1 2 3 x y 4 5 6 + - • ÷ 7 8 9 < ≤ = ≥ > 0 . - $\frac{\square}{\square}$ $\square^{\square}$ $\square_{\square}$ ( ) | | $\sqrt{\square}$ $\sqrt[\square]{\square}$ π i sin cos tan arcsin arccos arctan	Equation Editor

31

Which statement is true about the two lines whose equations are given below?

$$3x - 5y = -3$$

$$-2x + y = -8$$

A. The lines are perpendicular.
B. The lines are parallel.
C. The lines coincide.
D. The lines intersect, but are not perpendicular.

Sample Item GPE 2.6	Item Type Equation Editor

32

Points A, B, and C are collinear and $AB{:}AC = \frac{2}{5}$. Point A is located at $(-3, 6)$, point B is located at (n, q), and point C is located at $(-3, -4)$.

What are the values of n and q?

$n =$

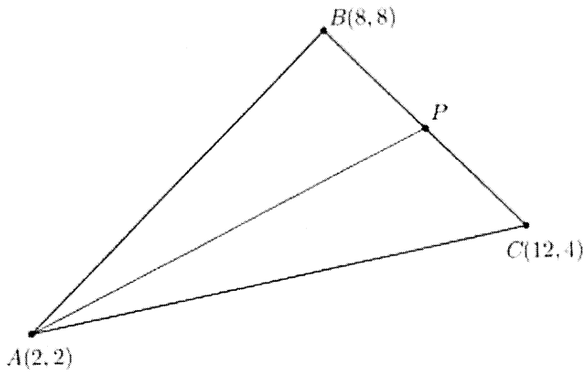
$q =$

1 2 3
4 5 6
7 8 9
0 . -

Centroid Coordinates

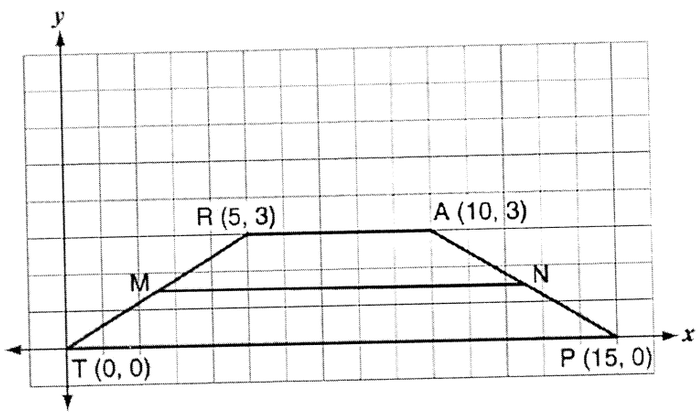
33

In ΔABC, $\overline{AP}$ is a median. Find the exact coordinates of a point, D, on $\overleftrightarrow{AP}$ so that $AD{:}\,DP = 2{:}\,1$. Show all of your work and explain your method and reasoning.



34

Trapezoid TRAP is shown below.



What is the length of midsegment $\overline{MN}$?

35

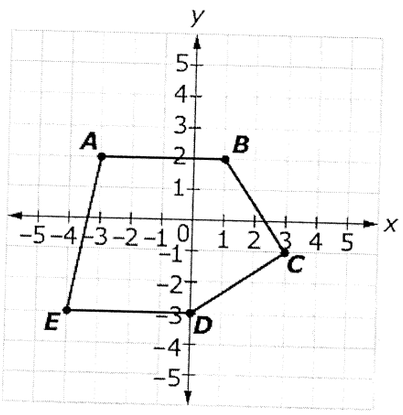
A city map is placed on a coordinate grid. The post office is located at the point $P(5, 35)$, the library is located at the point $L(15, 10)$, and the fire station is located at the point $F(9, 25)$. What is the ratio of the length of $\overline{PF}$ to the length of $\overline{LF}$?

A. $2{:}\,3$
B. $3{:}\,2$
C. $2{:}\,5$
D. $3{:}\,5$

36

Sample Item GPE 2.7	Item Type
	Equation Editor

Polygon *ABCDE* is shown on the coordinate grid.



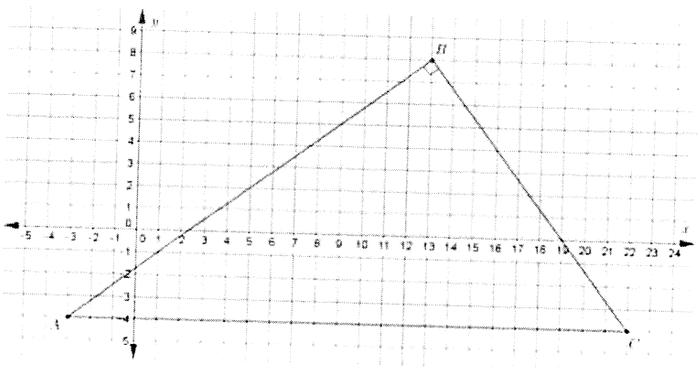
What is the perimeter, to the nearest hundredth of a unit, of polygon *ABCDE*?

1 2 3
4 5 6
7 8 9
0 . -

37 Perimeter and Area of a Right Triangle

Find the perimeter and the area of right triangle *ABC* with vertices *A*(-3, -4), *B*(13, 8) and *C*(22, -4). Show your work.

Perimeter _____ Area _____



38 Perimeter and Area of a Rectangle

Find the perimeter and the area of rectangle *ABCD* with vertices *A*(-1, -1), *B*(2, 3), *C*(10, -3) and *D*(7, -7). Show your work.

Perimeter _____ Area _____