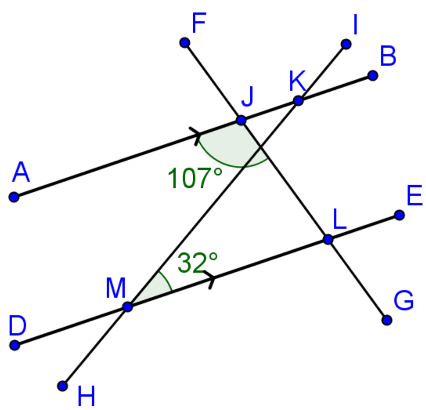
Florida Virtual School

Geometry End-of-Course Assessment Practice Test

For multiple choice items, circle the correct response. For fill-in response items, write your answer in the box provided, placing one digit in each box and no spaces between digits.

MA.912.G.1.3

1. In the figure below, what is the measure of ∠BKM?



Line segments AB and DE are parallel, and line segment HI is a transversal.

Therefore, ∠BKM and ∠KML are same-side interior angles. Since same-side interior angles are supplementary, m∡BKM + m∡KML = 180°.

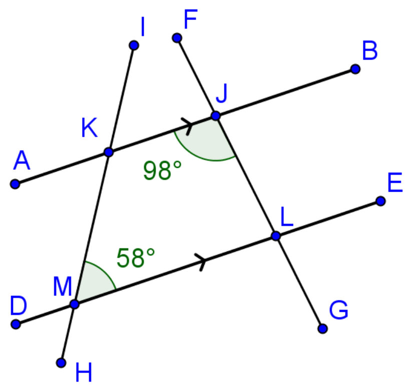
m∠BKM + m∠KML = 180° Set up the equation.
m∠BKM + 32° = 180° Substitute 32° for the measure of ∡KML.
m∠BKM = 148° Subtract 32° from both sides of the equation.

Answer: 148

1	4	8				

MA.912.G.1.3

2. In the figure below, what is the measure of ∠MKJ?



A. 58˚
B. 82˚
C. 98˚
D. 122˚*

Line segments AB and DE are parallel, and line segment HI is a transversal.

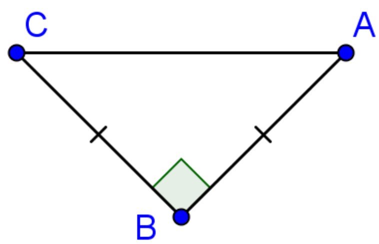
Therefore, ∠MKJ and ∠KML are same-side interior angles. Since same-side interior angles are supplementary, m∡MKJ + m∡KML = 180°.

m∠MKJ + m∠KML = 180° Set up the equation.
m∠MKJ + 58° = 180° Substitute 58° for the measure of ∡KML.
m∡MKJ = 122° Subtract 58 from both sides.

Answer: Choice D

MA.912.G.4.1

3. What is the most accurate name for the triangle below?



A. Right scalene
B. Obtuse isosceles
C. Right isosceles*
D. Acute scalene

Since segments CB and AB are congruent and AC is not, this triangle is an isosceles triangle. The markings of ∠B show that it is equal to 90˚. So, the triangle is a right isosceles triangle.

Answer: Choice C

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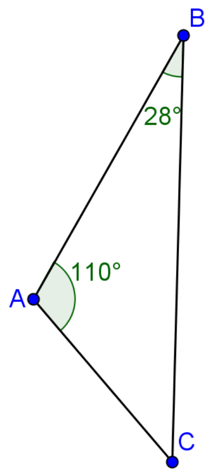
MA.912.G.4.1

4. What type of triangle is shown below?



A. Equiangular
B. Right isosceles
C. Acute scalene
D. Obtuse scalene*

Using the Triangle Sums theorem, determine the measure of the third angle.
$m\angle A + m\angle B + m\angle C = 180°$
$110 + 28 + m\angle C = 180°$
$m\angle C = 42°$

Since no angles are congruent, none of the sides are congruent. Therefore, the triangle is scalene. Since one angle, ∠A, is greater than 90˚, the most accurate name for the triangle is obtuse scalene.

Answer: Choice D

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MA.912.G.1.1

5. $\overline{PR}$ has an endpoint at (25, -5) and a midpoint of (18, -1). What is the value of the x-coordinate of the other endpoint?

Use the midpoint formula to determine the coordinates of the endpoint.

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) = (x, y)$$

$$\left(\frac{25 + x_2}{2}, \frac{-5 + y_2}{2}\right) = (18, -1)$$

$\frac{25 + x_2}{2} = 18$	Set the expression for the x-coordinate equal to the value of the x-coordinate of the midpoint.	$\frac{-5 + y_2}{2} = -1$	Set the expression for the y-coordinate equal to the value of the y-coordinate of the midpoint.
$25 + x_2 = 36$	Multiply both sides of the equation by 2.	$-5 + y_2 = -2$	Multiply both sides of the equation by 2.
$x_2 = 11$	Subtract 25 from both sides of the equation.	$y_2 = 3$	Add 5 to both sides of the equation.

The coordinate (11, 3) represents the other endpoint. Since the question only asks you for the x-coordinate of the other endpoint, the answer is 11.

Answer: 11

1	1					

MA.912.G.1.1

6. $\overline{TV}$ has endpoints at (2, 10) and (18, -18). What is the approximate length of the segment?

A. 29.00
B. 32.25*
C. 47.92
D. 49.07

Use the distance formula to determine the length of the segment. Substitute the coordinates of point T, (2, 10), for (x_1, y_1) and the coordinates of point V for (x_2, y_2). Then, simplify.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(18-2)^2 + (-18-10)^2}$$

$$d = \sqrt{(16)^2 + (-28)^2}$$

$$d = \sqrt{(256) + (784)}$$

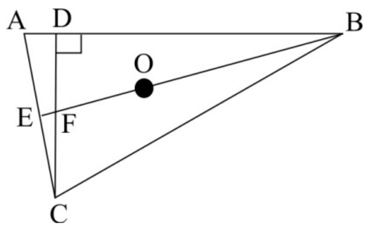
$$d = \sqrt{1040}$$

$$d \approx 32.25$$

Answer: Choice B

MA.912.G.4.2

7. Look at the triangle ABC. O is the centroid.



Which statement is always correct about triangle ABC?

A. Segments BO and OE are congruent.
B. Segments DF and AE are congruent.
C. Segments CD and BE are congruent.
D. Segments AE and EC are congruent. *

A centroid is created by constructing the medians on each side of the triangle. A median bisects the side of a triangle. Since point O is the centroid and lies on segment EB, segment EB bisects side AC. Therefore, AE and EC are congruent.

Answer: Choice D

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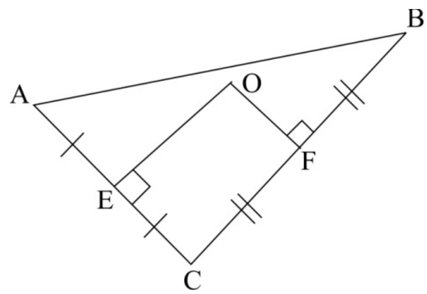
MA.912.G.4.2

8. Point O is the circumcenter of the triangle ABC shown below.



Which segment passes through point O for all lengths of sides of the triangle?

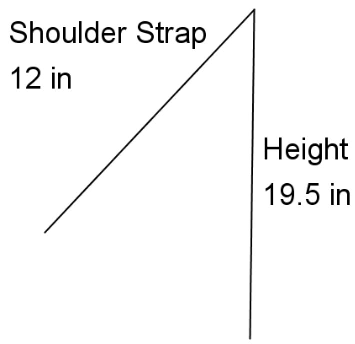
A. angle bisector of angle ABC
B. perpendicular bisector of side AB*
C. a line segment drawn from vertex C to bisect side AB
D. a line segment drawn from vertex A to cut side BC at right angles

A circumcenter represents the point of intersection between the three perpendicular bisectors of a triangle. Segments EO and FO are perpendicular bisectors that intersect at point O. Therefore, the only possible segment that will meet all conditions of the question is a perpendicular bisector of side AB.

Answer: Choice B

MA.912.G.4.7

9. Rebecca is designing a backpack and needs to determine the length of the adjustable strap that connects the shoulder strap to the backpack. The height of the backpack is 19.5 inches, and the shoulder strap is 12 inches.



Which is *not* a possible length for the connecting adjustable strap?

A. 7 in*
B. 10 in
C. 15 in
D. 22 in

The Triangle Inequality Theorem states that the sum of the lengths of any two sides of a triangle must be greater than the length of the remaining side.
The corollary states that adding and subtracting the sides will give you the range of the third side.
$19.5 + 12 = 31.5$
$19.5 - 12 = 7.5$
Therefore, the range of the side is:
$7.5 < x < 31.5$
The only number that is not within the range is 7 in.

Answer: Choice A

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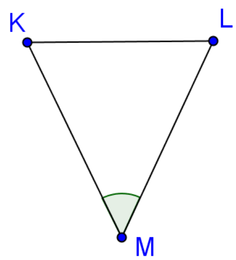
MA.912.G.4.7

10. Ruthann is buying a home, and the plot of land is triangular. She would like to have a long property line along the street. The given angle, ∡M, is opposite the road side of the plot of land.



The following are angle measures of ∡M for four different properties that Ruthann may choose from.

Plot A: 65˚
Plot B: 89˚
Plot C: 68˚
Plot D: 103˚

Which property has the longest property line on the street?

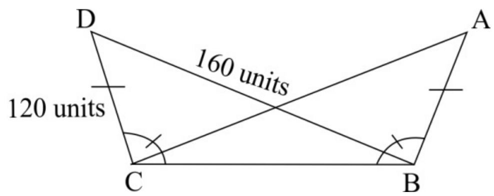
A. Plot A
B. Plot B
C. Plot C
D. Plot D*

Using the Hinge Theorem, the side of the triangle across from the largest angle will be the longest side. Therefore, you can use the Hinge Theorem to state that Plot D will have the largest property line along the street since it has the largest angle.

Answer: Choice D

MA.912.G.4.4

11. The figure below shows the length of side DC equal to 120 units and the length of side DB equal to 160 units.



What is the length of segment AC?

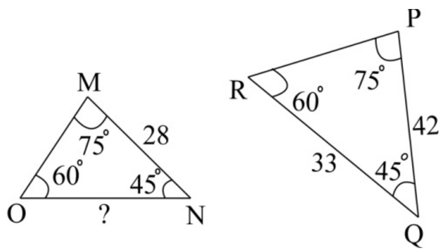
A. 120 units
B. 160 units*
C. 240 units
D. 320 units

Using SAS, you can prove that the two triangles, BCD and CBA, are congruent. Sides DC and AB are congruent while angles B and C are also congruent. Side BC is the same for both triangles; therefore, by the reflexive property of equality, these sides are congruent. Since corresponding parts of congruent triangles are congruent (CPCTC), side AC is equal to 160 units.

Answer: Choice B

MA.912.G.4.4

12.Triangle MNO and triangle PQR are similar.



What is the length, in units, of segment NO?

A.14
B.19
C.22*
D.26

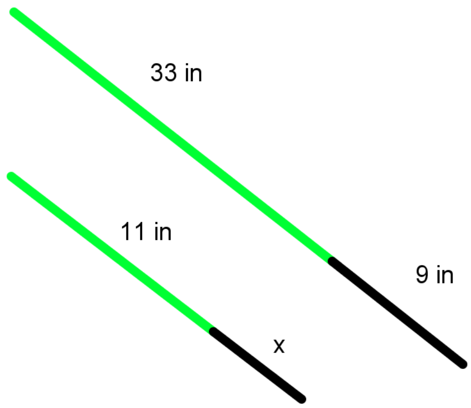
Since you know these triangles are similar, set up a proportion to determine the length of side NO.

$\frac{QR}{NO} = \frac{PQ}{MN}$	Set up the proportion.
$\frac{33}{NO} = \frac{42}{28}$	Substitute the given lengths for the appropriate sides.
33(28) = 42(NO)	Cross multiply.
924 = 42(NO)	Multiply 33 by 28.
22 = NO	Divide both sides of the equation of 42

Answer: Choice C

MA.912.G.4.5

13. Ben has a toy light saber, and he wants to construct one proportionally smaller than his. The light on his is 33 in, and the handle is 9 in.



If the light on the smaller version is 11 in, how long should the handle be?

A. 3 in*
B. 4 in
C. 4.5 in
D. 6 in

If the new light saber is proportionally smaller, then set up a proportion to find the missing length.

$\frac{33}{11} = \frac{9}{x}$ Set up the proportion.

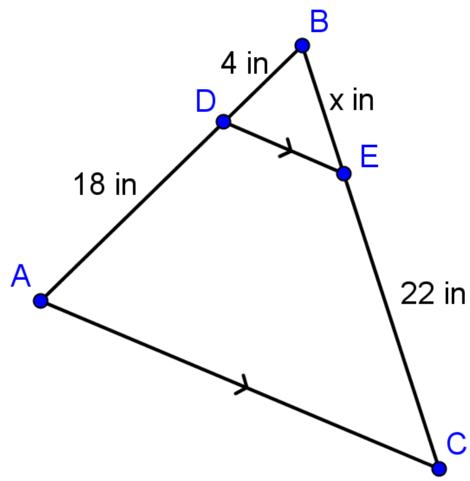
$99 = 33x$ Cross multiply.

$3 = x$ Divide both sides of the equation by 33.

Answer: Choice A

MA.912.G.4.5

14. In the triangle below, what is the approximate value of x?



A. 4 in
B. 4.5 in
C. 4.9 in*
D. 5.1 in

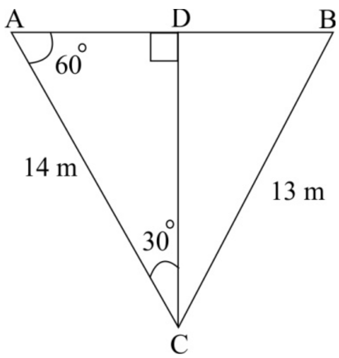
Since segment DE is parallel to segment AC, the portions of the sides of △BDE and △BAC are proportional. Set up the proportion to determine the length of the missing side. Be sure to set up the proportion of the sides of the whole triangle to the smaller triangle. Note that DA, not BA, is 18 inches. To find BA, add the lengths of segments BD and DA (4 in + 18 in = 22 in). Similarly, to find the length of BC, add the lengths of segments BE and EC (x + 22).

$\frac{BD}{BA} = \frac{BE}{BC}$	Set up the proportion
$\frac{4}{22} = \frac{x}{x+22}$	Substitute the appropriate lengths into the proportion.
$4(x + 22) = 22x$	Cross multiply.
$4x + 88 = 22x$	Distribute.
$88 = 18x$	Subtract 4x from both sides of the equation.
4.9 in $\approx x$	Divide both sides of the equation by 18.

Answer: Choice C

MA.912.G.5.4

15. Look at the figure shown below.



What is the length of Segment AB to the nearest tenth of a meter?

Use properties of a 30°-60°-90° triangle to find the lengths of segments AD and DC. Because AC represents the hypotenuse of right triangle ADC, its length will be twice that of the side opposite the 30° angle, side AD. Dividing 14 meters by 2 results in 7 meters, which is the length of AD. Multiply this length by $\sqrt{3}$ to find the length of CD, which is opposite the 60° angle. DC is $7\sqrt{3}$ meters. Now, apply the Pythagorean Theorem to right triangle BDC to find the length of DB.

$(DB)^2 + (DC)^2 = (CB)^2$	Set up the Pythagorean Theorem.
$(DB)^2 + \left(7\sqrt{3}\right)^2 = 13^2$	Substitute the given segment lengths into the equation.
$(DB)^2 + 147 = 169$	Square the given segment lengths.
$(DB)^2 = 22$	Subtract 147 from both sides of the equation.
$DB \approx 4.7$ meters	Take the square root of each side of the equation.

Now, add the lengths of segments AD and DB to find the length of segment AB.

AD + DB = AB
7 m + 4.7 m = AB
11.7 m = AB

Answer: 11.7

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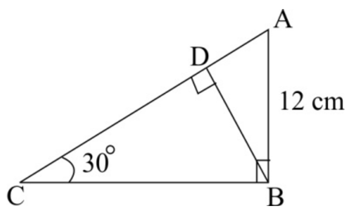
MA.912.G.5.3

16. Look at the figure.



What is the length of side AD?

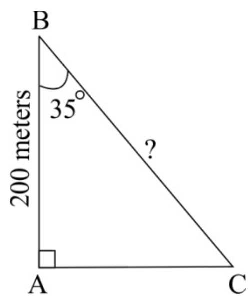
A. 6 cm*
B. 8.5 cm
C. 10.4 cm
D. 12 cm

Because ∡C measures 30° and ∡ABC measures 90°, ∡A must be 60°. The measure of ∡ADB is 90°, and since m∡A is 60°, m∡ABD must be 30°. Since segment AB is the hypotenuse of triangle ADB, which is a 30°-60°-90° triangle, and segment AD is the side opposite a 30° angle, segment AD will be half the length of segment AB. So, 12 ÷ 2 = 6 cm.

Answer: Choice A

MA.912.T.2.1

17. Look at the figure.



What is the distance, in meters, between point B and point C?

A. 200 cos 35˚
B. 200 tan 35˚
C. $\dfrac{200}{\cos 35°}$ *
D. $\dfrac{200}{\sin 35°}$

You are given the measure of ∡B and the length of its adjacent side AB, which is 200 m. You are looking for the length of the hypotenuse. So, use a trigonometric function that has the adjacent and hypotenuse. This leaves cosine and secant.

Using angle B, you can determine that the length of BC, or x, can be expressed in terms of cos 35˚.
Cosine is equal to the adjacent side over the hypotenuse.

$\cos 35^\circ = \dfrac{200}{x}$ Set up the trigonometric ratio.

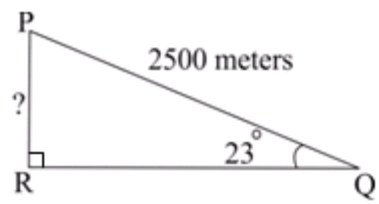
$x(\cos 35^\circ) = 200$ Multiply both sides of the equation by x.

$x = \dfrac{200}{\cos 35^\circ}$ Divide both sides of the equation by the cosine of 35°.

Answer: Choice C

MA.912.T.2.1

18. Look at the ramp PQ.



Find the height of the ramp, PR, in meters.

A. 2500 sec 23°
B. 2500 csc 23°
C. $\dfrac{2500}{\cot 23°}$
D. $\dfrac{2500}{\csc 23°}$ *

You are given the measure of ∡Q and the length of hypotenuse PQ as 2500 meters. You are looking for the length of the side opposite ∡Q, which is PR. This means that the sine or cosecant should be used. Because none of the answer choices are written in terms of sine, the correct answer must be in terms of cosecant.

The cosecant is written with the hypotenuse over the opposite side.

$\csc 23° = \dfrac{2500}{x}$	Set up the trigonometric ratio.
$x(\csc 23°) = 2500$	Multiply both sides of the equation by x.
$x = \dfrac{2500}{\csc 23°}$	Divide both sides of the equation by the cosecant of 23°.

Answer: Choice D

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MA.912.G.3.1

19.Look at the chart.

Name of quadrilateral	X	Has all interior angles equal
Square	Yes	Yes
Rectangle	No	Yes

Which title best represents X?

A. Has all sides equal*
B. Has all angles equal to 180°
C. Has adjacent sides unequal in length
D. Has sum of all interior angles equal to 360°

The question is asking which trait includes squares but not rectangles. Examine each answer choice to make your conclusion.

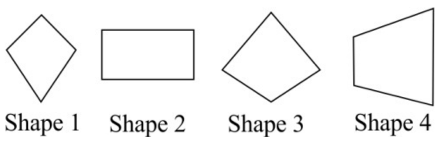
A. Has all sides equal*
Squares have all equal sides, but rectangles do not.
B. Has all angles equal to 180°
No quadrilateral has all angles equal to 180˚, so this cannot be true.
C. Has adjacent sides unequal in length
A rectangle has unequal adjacent sides, but a square does not.
D. Has sum of all interior angles equal to 360°
All quadrilaterals have interior angles equal to 360˚, so this would be true for both a square and a rectangle.

Therefore, the only correct answer can be A.

Answer: Choice A

MA.912.G.3.1

20. Look at the shapes shown below.



Which statement is true?

A. Shapes 1 and 3 are kites if their diagonals intersect at right angles. *
B. Shapes 2 and 4 are trapezoids if they have at least two pairs of parallel sides.
C. All the shapes are parallelograms if they have four sides and one pair of parallel sides.
D. Shapes 1, 2, and 3 are parallelograms if they have two pairs of sides of the same length.

Consider each of the statements.

A. Shapes 1 and 3 are kites if their diagonals intersect at right angles. *
This is true because the diagonals of a kite are perpendicular to one another.
B. Shapes 2 and 4 are trapezoids if they have at least two pairs of parallel sides.
A trapezoid has at least one pair of parallel sides, not two.
C. All the shapes are parallelograms if they have four sides and one pair of parallel sides.
Parallelograms must have four sides and two pairs of parallel sides, not just one.
D. Shapes 1, 2, and 3 are parallelograms if they have all sides congruent.
Only two types of parallelograms, a square and a rhombus, have all sides congruent.

Answer: Choice A

MA.912.G.3.2

21. When comparing a square and a rectangle, one major difference is:

A. Squares must have four 90˚ angles. Rectangles do not have to have all 90˚ angles.
B. Squares have two sets of equal sides. Rectangles have only one set of parallel sides.
C. Squares have four equal sides. Rectangles have two pairs of equal opposite sides.*
D. Squares have diagonals that bisect each other. Rectangles have diagonals that are perpendicular.

The question is asking for a major difference between squares and rectangles. Examine each answer choice to make your conclusion.

Choice A. Squares must have four 90˚ angles. Rectangles do not have to have all 90˚ angles.
This is incorrect because rectangles must also have 90˚ angles.
Choice B. Squares have two sets of equal sides. Rectangles have only one set of parallel sides.
This is incorrect because squares have four equal sides, and rectangles have two sets of parallel sides.
Choice C. Squares have four equal sides. Rectangles have two pairs of equal opposite sides.*
This is the correct statement.
Choice D. Squares have diagonals that bisect each other. Rectangles have diagonals that are perpendicular.
Squares do have diagonals that bisect, but rectangles do not have diagonals that are perpendicular.

Answer: Choice C

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MA.912.G.3.2

22. When comparing a trapezoid and a kite, one similarity is:

A. They both have congruent diagonals.
B. They both have at least one set of parallel sides.
C. They both have four congruent sides.
D. They both have four sides.*

The question is asking for a similarity between trapezoids and kites. Examine each answer choice to make your conclusion.

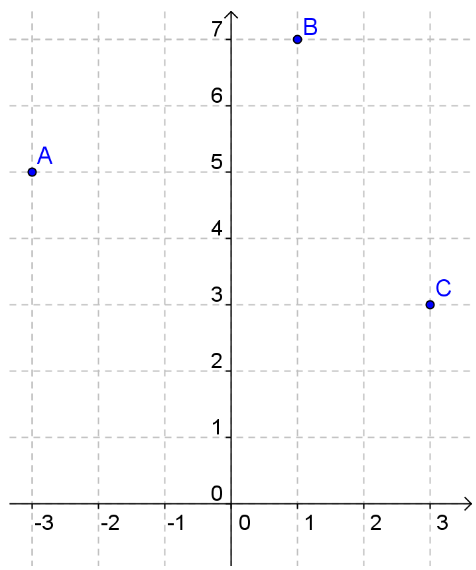
Choice A. They both have congruent diagonals.
Neither kites nor trapezoids have congruent diagonals.
Choice B. They both have at least one set of parallel sides.
Trapezoids have one set of parallel sides, but kites do not have any parallel sides.
Choice C. They both have four congruent sides.
Neither kites nor trapezoids have four congruent sides.
Choice D. They both have four sides.
This is the only correct response.

Answer: Choice D

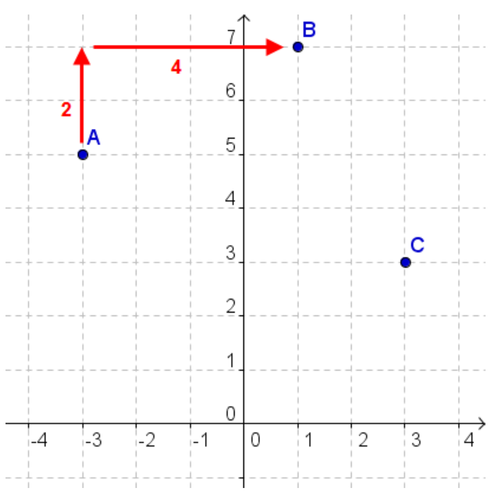
MA.912.G.3.3

23. The coordinates of the three vertices of a square ABCD are A (-3, 5), B (1, 7), and C (3, 3). What are the coordinates of vertex D?

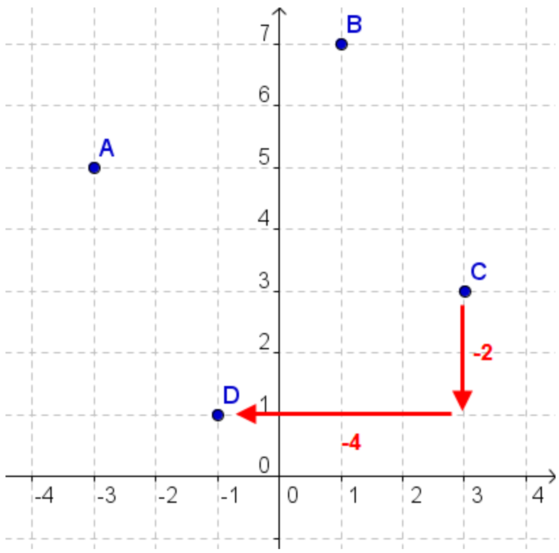
A. (-4, 2)
B. (-2, 1)
C. (-1, 1)*
D. (-4, -2)



Since this figure will be a square, its opposite sides will be parallel and its adjacent sides will be perpendicular. Parallel segments have slopes that are identical to one another. So count the rise over run between points A and B to find the slope of AB.



To reach point B from point A, you will "rise" 2 and "run" to the right 4. Therefore, the slope is $\frac{2}{4}$. The opposite segment will be segment CD and will have the same slope. So, count down 2 and left 4 to find point D.



Point D is at (-1, 1).

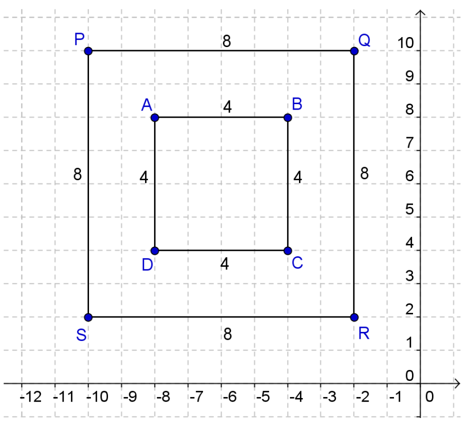
Answer: Choice C

MA.912.G.3.3

24. The coordinates of the vertices of quadrilateral ABCD are A (-8, 8), B (-4, 8), C (-4, 4), D (-8, 4). The coordinates of the vertices of quadrilateral PQRS are P (-10, 10), Q (-2, 10), R (-2, 2), S (-10, 2). Which statement is correct?

A. Quadrilateral ABCD is similar to quadrilateral PQRS.*
B. Both the quadrilaterals have all sides unequal in length.
C. Quadrilateral ABCD is congruent to quadrilateral PQRS.
D. The diagonals of neither quadrilateral are congruent.

Using the points given, determine the lengths of the sides of each quadrilateral to evaluate the relationship. Notice that the points have similar x and y values, so the distance will be just counting units and not using the distance formula.

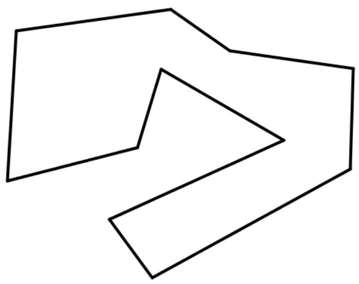


Adjacent sides are perpendicular since these sides are vertical and horizontal. That means that the segments meet at 90˚ angles. Therefore, the quadrilaterals are similar.

Answer: Choice A

MA.912.G.2.1

25. Look at the figure below.



What type of polygon is shown?

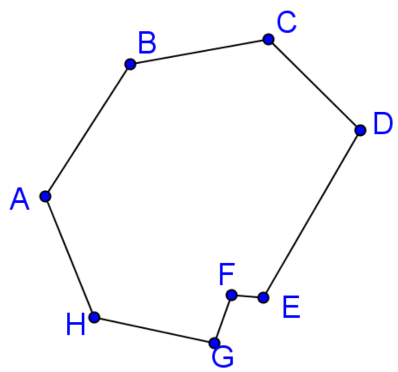
A. Convex nonagon
B. Concave nonagon
C. Convex hendecagon
D. Concave hendecagon*

The figure is concave because a line cannot be drawn between any two point on the figure's interior while also lying completely within the figure. Counting the sides, there are 11, which means it is a hendecagon.

Answer: Choice D

MA.912.G.2.1

26. Athena described the figure below as a convex, irregular octagon.



Is she correct?

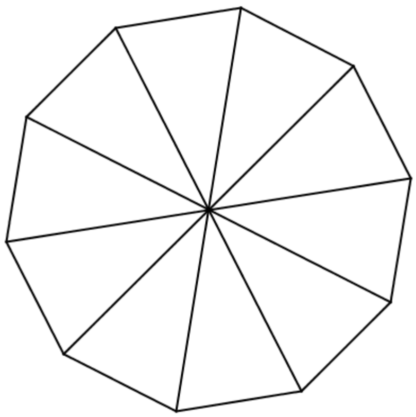
A. Yes.
B. No, it is a heptagon.
C. No, it is concave. *
D. No, it is regular.

Since the figure has a portion that prevents a segment from lying completely within the figure, it is a concave figure, not a convex figure.

Answer: Choice C

MA.912.G.2.2

27. A regular decagon is shown with isosceles triangles drawn within.



What is one way you could find the measure of the exterior angle of the figure?

A. Add all the angles in the triangle together to get 180˚.
B. Add the base angles of the isosceles triangle together to determine the measure of the exterior angle.
C. Find the measure of the non-base angle of the isosceles triangle that is congruent to the exterior angle. *
D. Subtract the base angles of the triangles from the interior angle measure.

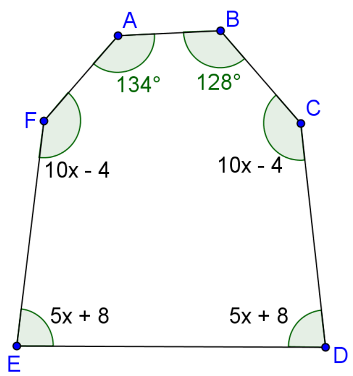
All of these triangles are congruent to one another by SSS. The two sides on the polygon's interior are congruent by definition of an isosceles triangle. The bases are congruent because this is a regular polygon. Therefore, by CPCTC, all non-base angles must be congruent. To find their angle measures, divide 360° (the degree of a full circle) by 10 (the number of triangles), which is 36°.

To find the exterior angle of a regular polygon, you divide 360° by the number of sides, in this case 10, which is also 36°. Therefore, the measure of the non-base angle of the isosceles triangle is congruent to the exterior angle.

Answer: Choice C

MA.912.G.2.2

28. Look at the figure below.



What is the measure of Angle F?

Since this is a hexagon, the sum of the interior angles is equal to 180(n – 2), where n = 6.
180(6 – 2) = 720˚.
Add all of the angles together, and set the sum equal to 720. Then, solve for x.

$2(10x - 4) + 2(5x + 8) + 134 + 128 = 720$	Set up the equation.
$20x – 8 + 10x + 16 + 134 + 128 = 720$	Distribute.
$30x + 270 = 720$	Combine like terms.
$30x = 450$	Subtract 270 from both sides of the equation.
$x = 15$	Divide both sides of the equation by 30.

Substitute 15 for x in the expression representing the measure of angle F, and simplify.
$10x – 4$
$10(15) – 4$
$150 – 4$
146

Answer: 146

1	4	6				

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MA.912.G.2.4

29. The vertices of pentagon LMPQR are at L(4, -2), M(5, -2), P(8, -5), Q(6, -7), R(2, -4). The coordinates of the pentagon after two translations are L_1(-5, -1), M_1(-4, -1), P_1(-1, -4), Q_1(-3, -6), R_1(-7, -3). How was LMPQR translated to create $L_1M_1P_1Q_1R_1$?

A. To the left by 9 units and 1 unit up*
B. To the right by 9 units and 1 unit up
C. To the left by 1 unit and 9 units up
D. To the right by 1 unit and 9 units up

To determine the translations, find the change from an original point to the corresponding translated point. As an example, look at L to L_1.

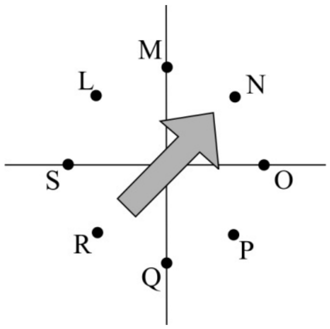
L (4, -2) to L_1(-5, -1)
To get from 4 to -5, you have to subtract 9. To get from -2 to -1, you have to add one.
(x – 9, y + 1)

Therefore, pentagon LMPQR was translated left 9 units and up 1 unit.

Answer: Choice A

MA.912.G.2.4

30. The figure shows the initial position of an arrow used in a board game. Points L, M, N, O, P, Q, R, S represent locations on the board game.



Between which two letters will the arrow point after rotating 185 degrees counterclockwise about its center?

A. between R and Q*
B. between R and S
C. between Q and P
D. between S and L

Half of a full rotation is 180°. 185˚ is more than a straight line or 5˚ more than half a full rotation. Therefore, the arrow would point between the R and Q since R would be halfway and 5˚ more counterclockwise would put the arrow between R and Q. Remember, counterclockwise means rotating to the left, and clockwise means rotating to the right.

Answer: Choice A

MA.912.G.2.3

31. Rectangles A and B are similar rectangles. The length of the diagonal of Rectangle A is 13 inches, and the length of the diagonal of Rectangle B is 6.5 inches.

What could be the length and width of both Rectangle A and Rectangle B?

A. Rectangle A: 5 in x 12 in, Rectangle B: 2.5 in x 6 in*
B. Rectangle A: 4 in x 10 in, Rectangle B: 3 in x 7 in
C. Rectangle A: 7 in x 11 in, Rectangle B: 2 in x 5 in
D. Rectangle A: 6.5 in x 14 in, Rectangle B: 3.5 in x 8 in

The diagonal of rectangle B is half the length of the diagonal of rectangle A. Therefore, the sides of rectangle B will also be half the length of the sides of rectangle A because they are similar figures. Answer choice A is the only pair of rectangles where the sides of rectangle B are half of rectangle A.

Answer: Choice A

MA.912.G.2.3

32. Brennan is making a poster for the drama club's new production. It is a regular pentagon with side lengths of 12 inches. The school wants to put up a giant replica of the poster during athletic events. If the length of each side is 8 times the original, how many times larger is the area of the replica than the area of the original?

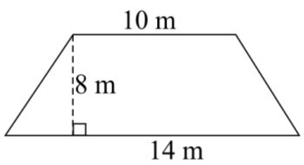
The scale factor between the poster and its replica is 8. Square this scale factor to find the ratio between the areas of the similar figures. 8^2 equals 64. Therefore, the area of the replica will be 64 times the area of the poster.

Answer: 64

6	4					

MA.912.G.2.5/MA.912.G.2.7

33. The toddler section in a park is in the shape of a trapezoid. The parallel sides of the section measure 10 m and 14 m. The distance between the parallel sides is 8 m, as shown below.



The section was remodeled to have an area that was 96 square units more than the original area. What change in the dimensions of the trapezoid was made to create the remodeled section?

A. The height was doubled.*
B. The height was multiplied by four.
C. The length of the parallel sides and the height were doubled.
D. The length of the parallel sides and the height were multiplied by four.

The area of a trapezoid is represented by the formula $A = \frac{1}{2}(b_1 + b_2)h$.

Determine the area of the original trapezoid.

$A = \frac{1}{2}(10 + 14)(8)$

$A = \frac{1}{2}(24)(8)$

A = 96 units

Since the new area is twice the size of the original, multiplying the height by 2 would satisfy the requirements.

Answer: Choice A

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MA.912.G.2.5/MA.912.G.2.7

34. The right triangular flag of a sports club was designed to have a base length of 4 ft and height of 6 ft. For a sports event, the club made a new flag by doubling the base and height of the flag. The area of the new flag is ______ times larger than the original flag.

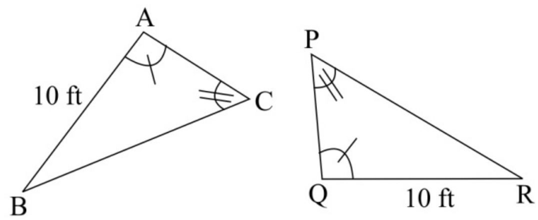
The scale factor between the original and new flag is 2. Squaring this scale factor will tell you the ratio between the areas of the flags. 2^2 is 4, making the new flag 4 times larger than the original flag.

Answer: 4

4						

MA.912.G.4.4

35. Gina has designed two triangular flower beds, as shown below.



Which statement is true for the two flower beds?

A. They have different areas.
B. They have the same perimeter.*
C. The length of side BC is equal to 10 feet.
D. The length of side PQ is equal to 10 feet.

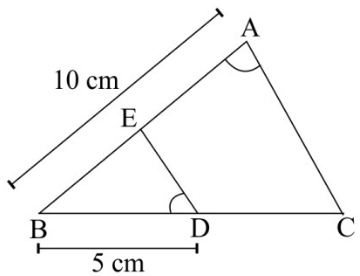
Based on the figure, the two flower beds are congruent by Angle-Angle-Side.

A. They have different areas.
If the flower beds are congruent, then they have congruent areas.
B. They have the same perimeter.*
Congruent figures have identical perimeters.
C. The length of side BC is equal to 10 feet.
Since angles A and C are not congruent, the sides opposite these angles cannot be congruent.
D. The length of side PQ is equal to 10 feet.
There is not enough information to determine this.

Answer: Choice B

MA.912.G.4.4

36. Look at the figure.



Angle A is congruent to angle BDE. If the area of triangle ABC is 240 cm^2, the area of triangle BDE is ______cm^2.

It was given that ∡A ≅ ∡BDE. Since ∡B is a shared angle between △DBE and △ABC, these two triangles are similar by the Angle-Angle Similarity Postulate. Triangle DBE has a side length half that of its corresponding side in triangle ABC. Therefore, the scale factor between these similar figures is $\frac{1}{2}$. Square this scale factor to find the ratio between their areas:

$\left(\frac{1}{2}\right)^2 = \left(\frac{1}{4}\right)$. Multiply 240 cm^2, the area of △ABC, by $\frac{1}{4}$ to find the area of △DBE (or BDE as it is defined in the question).

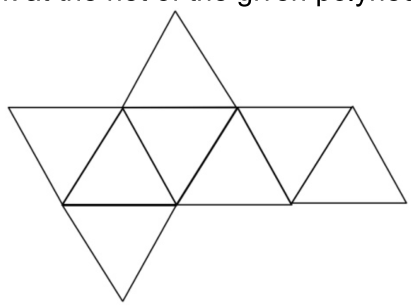
$240\ cm^2 \bullet \frac{1}{4} = 60\ cm^2$

Answer: 60

6	0					

MA.912.G.7.1/ MA.912.G.7.2

37. Look at the net of the given polyhedron.



The sum of the number of edges and vertices of the polyhedron is ________.

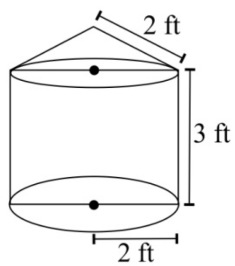
The number of edges is 12, and the number of vertices is 6.

Answer: 18

1	8					

MA.912.G.7.5

38. Gina stores her toys in a container that has a cylindrical body and a conical lid, as shown below.



Gina's Toy Storage

She wants to cover the entire exterior portion of the container with paper. How much paper, in square feet, would Gina need?

A. 16π
B. 20π*
C. 24π
D. 28π

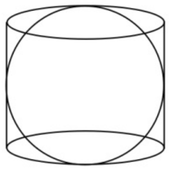
Determine the surface area of the figure using the surface area formula for a cylinder minus one of its circular bases ($S.A._{cylinder} = 2\pi rh + 2\pi r^2 - \pi r^2$) and the surface area formula for a cone minus its circular base ($S.A._{cone} = \pi r l + \pi r^2 - \pi r^2$). Then, add the two together. One circular base from the cylinder and the circular base from the cone are being subtracted because this is a shared base that does not appear on the exterior of this container.

$S.A._{cylinder} = 2\pi rh + 2\pi r^2 - \pi r^2$	$S.A._{cone} = \pi r l + \pi r^2 - \pi r^2$
$S.A._{cylinder} = 2\pi rh + \pi r^2$	$S.A._{cone} = \pi r l$
$S.A._{cylinder} = 2\pi(2)(3) + \pi(2)^2$	$S.A._{cone} = \pi(2)(2)$
$S.A._{cylinder} = 2\pi(2)(3) + \pi(4)$	$S.A._{cone} = 4\pi$
$S.A._{cylinder} = 12\pi + 4\pi$	
$S.A._{cylinder} = 16\pi$	
$S.A._{cylinder} + S.A._{cone} = S.A._{container}$ $16\pi + 4\pi = S.A._{container}$ $20\pi = S.A._{container}$	

Answer: Choice B

MA.912.G.7.5

39. A ball of diameter 20 cm fits exactly inside a cylindrical container, as shown below.



The maximum volume of liquid that can be poured into the cylindrical container when empty is _________ cm^3. Use 3.14 for π.

The height of the cylindrical container is 20 cm, and its width is 20 cm, which means the radius of the cylinder is 10 cm. Substitute these values into the formula for the volume of a cylinder and solve.

$V = \pi r^2 h$

$V = (3.14)(10)^2(20)$

$V = 6280$

Answer: 6,280

6	2	8	0			

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MA.912.G.7.6

40. The volume of two similar solids is 1331 m^3 and 729 m^3. The surface area of the larger solid is 605 m^2. What is the surface area, in square meters, of the smaller solid?

A. 81
B. 121
C. 305
D. 405*

The ratio of the volumes between two similar solids is the scale factor between their dimensions cubed. Therefore, if you take the cube root of each volume, you will know the scale factor between their dimensions.

$\sqrt[3]{1331} = 11$

$\sqrt[3]{729} = 9$

The scale factor between the two solids is 11:9. Squaring this scale factor will tell you the ratio between their surface areas: $11^2:9^2 \rightarrow$ 121:81. Set up a proportion to solve for the missing surface area.

$\frac{605}{x} = \frac{121}{81}$	Set up the proportion.
(605)(81) = 121x	Cross multiply
49,005 = 121x	Multiply 605 by 81.
405 = x	Divide both sides of the equation by 121.

The surface area of the smaller solid is 405 square meters.

Answer: Choice D

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MA.912.G.7.6

41. Jake has two similar cylindrical pipes. The radius of the first cylindrical pipe is 5 cm. The circumference of the second cylindrical pipe is 20π cm. The volume of the second cylindrical pipe is how many times greater than the volume of the first cylindrical pipe?

A. 3
B. 4
C. 5
D. 8*

If the circumference of the second pipe is 20π, its radius must be 10 cm since the formula for circumference is $C = 2\pi r$. The scale factor between the two similar pipes is 2 since the second pipe is twice as large as the first. To find the ratio between the volume of these two pipes, cube the scale factor of 2: $2^3 = 8$. The volume of the second cylindrical pipe is 8 times greater than the volume of the first cylindrical pipe.

Answer: Choice D

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MA.912.G.7.7

42. A sandpit in the shape of a rectangular prism has length 7 feet, width 5 feet, and height 1.75 feet. It is filled to the brim with sand. Joe puts this sand into a second sandpit having the same shape but a larger base. He needs 17.5 cubic feet of sand to fill the extra space inside the second sandpit. If the height of the two sandpits is the same, what are the dimensions of the base of the second sandpit?

A. 5 feet x 2 feet
B. 10 feet x 7 feet
C. 9 feet x 5 feet*
D. 20 feet x 25 feet

The volume of the first sandpit is found by substituting the given values into the formula for the volume of a rectangular prism: V = lwh.

$V = 7 \bullet 5 \bullet 1.75$

$V = 61.25$

The second sandpit has the same height but a larger base than the first sandpit. The volume of the second sandpit must be 17.5 more than the volume of the first, so set up the volume equation accordingly.

$V = lwh$

$(61.25 + 17.5) = lw(1.75)$

$78.75 = lw(1.75)$

Divide both sides of the equation by 1.75.

$45 = lw$

The dimensions of the length and width must have a product of 45. The only answer choice that meets this requirement is option C: 9 feet x 5 feet.

$V = 9 \bullet 5 \bullet 1.75$

$V = 78.75$

Answer: Choice C

MA.912.G.7.7

43. If a spherical ball is enlarged so that its surface area is 9 times greater than its original surface area, then the original radius was multiplied by __________.

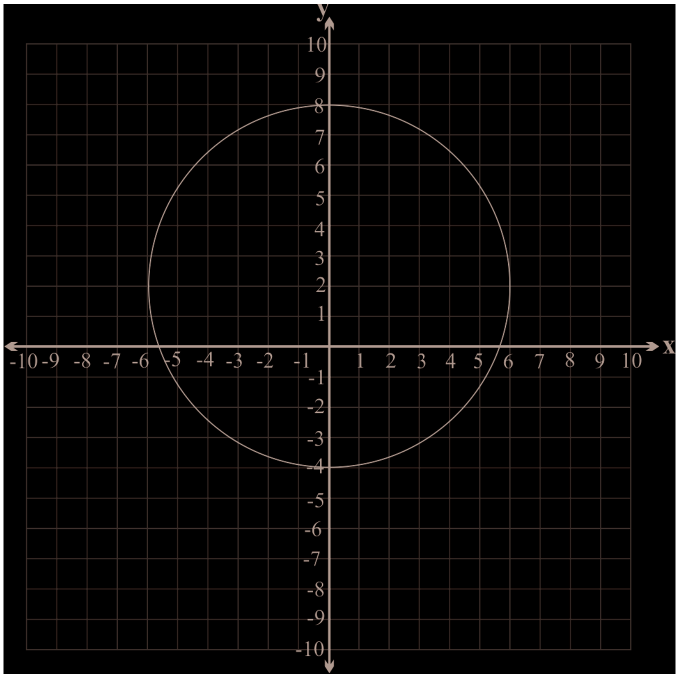
The scale factor between two similar solids is squared in order to find the ratio between the surface areas of these solids. Therefore, if you take the square root of the ratio between their surface areas, you will find the scale factor between their original dimensions. $\sqrt{9}$ = 3.

Answer: 3

3						

MA.912.G.6.6/ MA.912.G.6.7

44. Look at the circle shown below.



What is the equation of the circle?

A. $x^2 + (y - 2)^2 = 36$*
B. $x^2 + (y - 2)^2 = 6$
C. $(x - 2)^2 + y^2 = 36$
D. $(x - 2)^2 + y^2 = 6$

Determine the center of the circle by finding the midpoint between the endpoints of a diameter. One option is the segment created between the endpoints of (0, 8) and (0, -4). The distance between these points is 12, and the midpoint is (0, 2). The midpoint of a diameter is the center of the circle so (0, 2) is the center of this circle. Since the diameter is 12, the radius must be 6. Substitute these values into the equation for a circle: $(x - h)^2 + (y - k)^2 = r^2$ where (h, k) represents the center and r represents the radius.

$(x - h)^2 + (y - k)^2 = r^2$
$(x - 0)^2 + (y - 2)^2 = 6^2$
$x^2 + (y - 2)^2 = 36$

Answer: Choice A

MA.912.G.6.6/ MA.912.G.6.7

45. The equation of a circle is shown below.

$(x - 5)^2 + (y + 2)^2 = 64$

The radius of the circle is ________ units.

Based on the equation of a circle, $(x - h)^2 + (y - k)^2 = r^2$, where (h, k) represents the center of the circle and r is the radius, the radius of the circle is $\sqrt{64}$ or 8.

Answer: 8

8						

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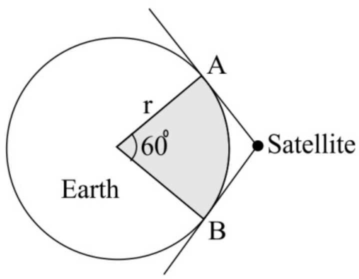
MA.912.G.6.5/MA.912.G.6.2/MA.912.G.6.4

46. A satellite sends signals from space to the regions that lie within the shaded portion of the Earth, as shown below.



If the radius of Earth is approximately 6000 kilometers, the part of Earth that receives signals from the satellite has an area of ______ square kilometers. Use 3.14 for π.

The area of a sector is found by the equation Area of Sector = $\frac{a}{360}(\pi r^2)$, where a is the measure of the central angle and r is the length of the radius. Substitute the given values into this formula and solve.

Area of Sector = $\frac{a}{360}(\pi r^2)$

Area of Sector = $\frac{60}{360}(\pi 6000^2)$

Area of Sector = $\frac{1}{6}(\pi 36{,}000{,}000)$

Area of Sector = π6,000,000

Area of Sector = (3.14)(6,000,000)

Area of Sector = 18,840,000

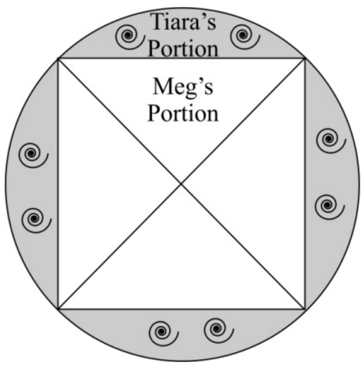
Answer: 18,840,000

1	8	8	4	0	0	0	0

MA.912.G.6.5/MA.912.G.6.2/MA.912.G.6.4

47. Tiara bought a cylindrical shaped cake with a base area of 64 square inches. The image below is a top view of the cake. The shaded portion represents the chocolate flavored icing and the white square portion represents the vanilla flavored icing.

Tiara cuts out a piece of cake with chocolate icing for herself and a piece of cake with vanilla icing for Meg, as shown below.



Assuming the icing only appears on top of the cake, about how much more icing did Meg get than Tiara? Use 3.14 for π.

A. 4.4 in^2*
B. 6.8 in^2
C. 10.2 in^2
D. 12.2 in^2

First, find the radius of the cake by applying the formula for the area of a circle: $A = \pi r^2$. Remember, do not round until the very end.

$A = \pi r^2$
$64 = (3.14)r^2$
$20.38216561 \approx r^2$
$4.514661184 \approx r$

Meg's piece of vanilla cake is in the shape of a triangle. The area of a triangle may be found by the formula $A = \frac{1}{2}bh$. The value of the radius represents both the base and height since this is a right triangle (the diagonals of a square are perpendicular and congruent).

$A = \frac{1}{2}bh$

$A \approx \frac{1}{2}(4.514661184)(4.514661184)$
$A \approx 10.1910828$

The area of Tiara's piece of chocolate cake may be found by subtracting the area of Meg's piece from the area of the sector, found by the formula $A = \frac{a}{360}(\pi r^2)$.

Area of sector = $\frac{a}{360}(\pi r^2)$

Area of sector = $\frac{90}{360}(64)$
Area of sector = 16

Tiara's Piece = Area of Sector – Meg's Piece

Tiara's Piece = 16 - 10.1910828
Tiara's Piece = 5.808917197

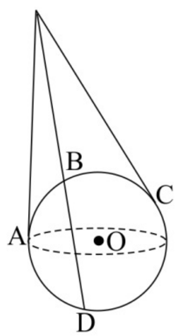
Finally, subtract Tiara's piece of cake from Meg's piece of cake to find the difference.

10.1910828 - 5.808917197
4.4

Answer: Choice A

MA.912.G.7.4

48. The figure below shows a sphere with its center at O. The points A, B, C, and D are on the surface of the sphere.



How many tangents to the sphere have been shown in the figure?

A. 0
B. 1
C. 2*
D. 3

There are 2 tangents shown. If B and D are both surface points, then line BD must intersect the sphere in more than one point, which contradicts the definition of a tangent.

Answer: Choice C

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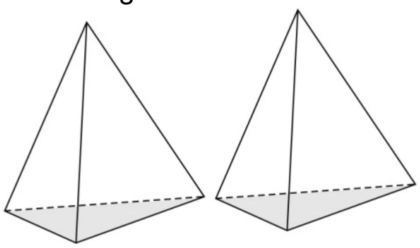
MA.912.G.7.5/MA.912.G.7.6

49. The figure below shows two congruent pyramids.



The base area of Pyramid 1 is 12 cm^2, and the height is 2 cm. Which expression can be used to calculate the volume, in cm^3, of Pyramid 2?

A. $\frac{1}{2} \times 12 \times 2$

B. $\frac{1}{3} \times 12 \times 2$ *

C. $\frac{1}{4} \times 12 \times 2$

D. $\frac{1}{6} \times 12 \times 2$

The volume of a pyramid is found by the formula V = $\frac{1}{3}$Bh, where B is the area of the base and h is the height.

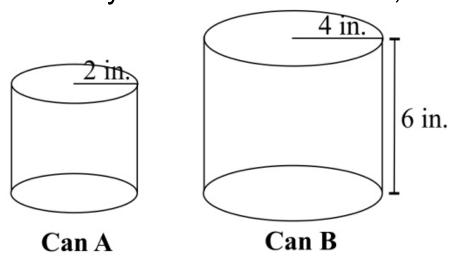
Since the two pyramids are congruent, their volumes will be identical. Substitute the values for pyramid 1 to find the volume of pyramid 2.

V = $\frac{1}{3}$ x 12 x 2

Answer: Choice B

MA.912.G.7.5/MA.912.G.7.6

50. Harry has two similar cans, as shown below.



The lateral surface area of Can A is ____square inches. Use 3.14 for π.

First, determine the scale factor between Can A and Can B. The radius of Can A is half of the radius of Can B. Therefore, the height of Can A would be half of 6, or 3.

Then, substitute the known values into the formula for the lateral area of a cylinder: LA = 2πrh.
LA = 2(3.14)(2)(3)
LA = 37.68

Answer: 37.68

3	7	.	6	8		

MA.912.D.6.2/MA.912.D.6.3

51. Read the statement shown below.

“If two supplementary angles are congruent, then they are right angles.”

Which of these is the contrapositive of the statement?

A. If two supplementary angles are right angles, then they are congruent.
B. If two supplementary angles are congruent, then they must be right angles.
C. If two supplementary angles are not right angles, then they are not congruent. *
D. If two supplementary angles are not congruent, then they are not right angles.

The contrapositive of a statement is the negative of both parts of the original statement. Therefore, the only answer is, “If two supplementary angles are not right angles, then they are not congruent.”

Answer: Choice C

MA.912.D.6.4

52. Which of these is a valid conclusion?

A. All sergeants clear a fitness test.
Harry has cleared a fitness test.
Therefore, Harry is a sergeant.

B. All sergeants clear a fitness test.
Harry has not cleared a fitness test.
Therefore, Harry is not a sergeant. *

C. All sergeants clear a fitness test.
Harry is a sergeant.
Therefore, Harry has not cleared a fitness test.

D. All sergeants clear a fitness test.
Harry is not a sergeant.
Therefore, Harry has not cleared a fitness test.

Consider each set of statements to determine which is a valid conclusion.

A. All sergeants clear a fitness test.
Harry has cleared a fitness test.
Therefore, Harry is a sergeant.

This is not logical because the original statement doesn't state that *only* sergeants clear a fitness test. Harry can clear the test and not be a sergeant.

B. All sergeants clear a fitness test.
Harry has not cleared a fitness test.
Therefore, Harry is not a sergeant. *

This is true based on the fact that all sergeants have cleared the test. If Harry has not cleared the fitness test, he cannot be a sergeant.

C. All sergeants clear a fitness test.
Harry is a sergeant.
Therefore, Harry has not cleared a fitness test.

If all sergeants clear a fitness test and Harry is a sergeant, then Harry *must have* cleared the test.

D. All sergeants clear a fitness test.
Harry is not a sergeant.
Therefore, Harry has not cleared a fitness test.

The original statement says nothing about non-sergeants passing the fitness test. Harry could have passed the test and still may not be a sergeant.

Answer: Choice B

MA.912.G.8.4

53. Read the statement shown below.

“All squares are parallelograms.”

Which of the following is a sufficient condition for the above statement to be true?

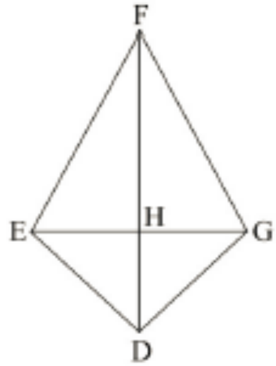
A. A square has equal diagonals.
B. A square has four right angles.
C. A square has its opposite sides parallel. *
D. A square has diagonals which intersect at right angles.

A. A square has equal diagonals.
Not all parallelograms have to have equal diagonals.
B. A square has four right angles.
Parallelograms do not have to have four right angles.
C. A square has its opposite sides parallel. *
This is the most basic definition of a parallelogram.
D. A square has diagonals which intersect at right angles.
Not all parallelograms have diagonals that meet at right angles.

Answer: Choice C

MA.912.G.8.4

54. Look at the quadrilateral EFGD.



Jason has listed the following conditions for Quadrilateral DEFG to be a kite.

1. DEFG is definitely a kite if the diagonals are perpendicular.
2. DEFG is definitely a kite if angle EFH is equal to GFH.
3. DEFG is definitely a kite if DE ≅ DG.
4. DEFG is definitely a kite if FE ≅ FG.
5. DEFG is definitely a kite if the longer diagonal bisects the shorter one.
6. DEFG is definitely a kite if angle DEF is equal to DGF.
7. DEFG is definitely a kite if DE is not congruent to FE.

Which conditions can be used together justify that DEFG is a kite?
A. Conditions 1, 3, and 6
B. Conditions 5 and 6
C. Conditions 1 and 6
D. Conditions 3, 4, and 7*

A. Conditions 1, 3, and 6
Conditions 1, 3, 6 are true of a square, and do not justify that DEFG is a kite.

B. Conditions 5 and 6
These definitions are true, but they could also describe a rhombus, so it does not definitively Prove DEFG is a kite.

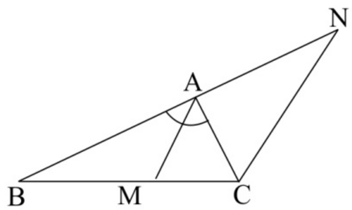
C. Conditions 1 and 3
While both of these are true, they could also be describing a square.

D. Conditions 3, 4, and 7*
This statement qualifies the figure as a kite, because while two pairs of adjacent sides are congruent, the pairs of adjacent sides are not congruent to each other.

Answer: Choice D

MA.912.G.4.6

55. In the figure shown below, segment AM bisects angle BAC, and NC is drawn parallel to AM.



Which triangle is similar to Triangle BAM?

A. Triangle BNC*
B. Triangle MAC
C. Triangle BAC
D. Triangle ACN

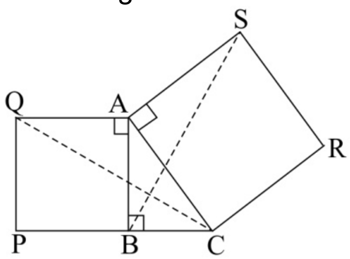
In order for two triangles to be similar, two pairs of corresponding angles must be congruent.

A. Triangle BNC*
$\angle BAM \cong \angle BNC$ by the Corresponding Angles Postulate
$\angle MBA \cong \angle CBN$ by the Reflexive Property
B. Triangle MAC
You know that $\angle BAM$ is congruent to $\angle MAC$, but you cannot prove any other pair of angles are congruent.
C. Triangle BAC
There are no angles that you can prove congruent to $\angle BAC$.
D. Triangle ACN
You don't know anything about the angles in this triangle, so you cannot find a similar triangle.

Answer: Choice A

MA.912.G.4.6

56. The figure below shows two squares ABPQ and ASRC.



Which angle is congruent to angle ACQ?

A. angle ASB*
B. angle SBA
C. angle CQA
D. angle BCQ

Notice that angle ACQ is part of triangle ACQ and that the dashed lines seem to create a congruent triangle, ASB. These triangles can be proven congruent by the SAS postulate. Sides QA and AB are corresponding congruent sides because they are two sides from the same square, ABPQ, and by definition of a square, all four sides are congruent. Sides AC and AS are also corresponding congruent sides by the same justification because they are two sides from square ASRC. Finally, the included corresponding angles, ACQ and ASB, are congruent because they both have the same sum of a 90° angle and shared angle BAC.

Answer: Choice A

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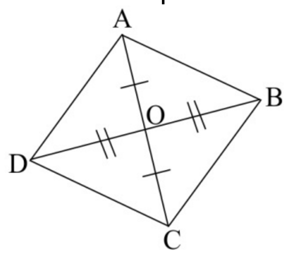
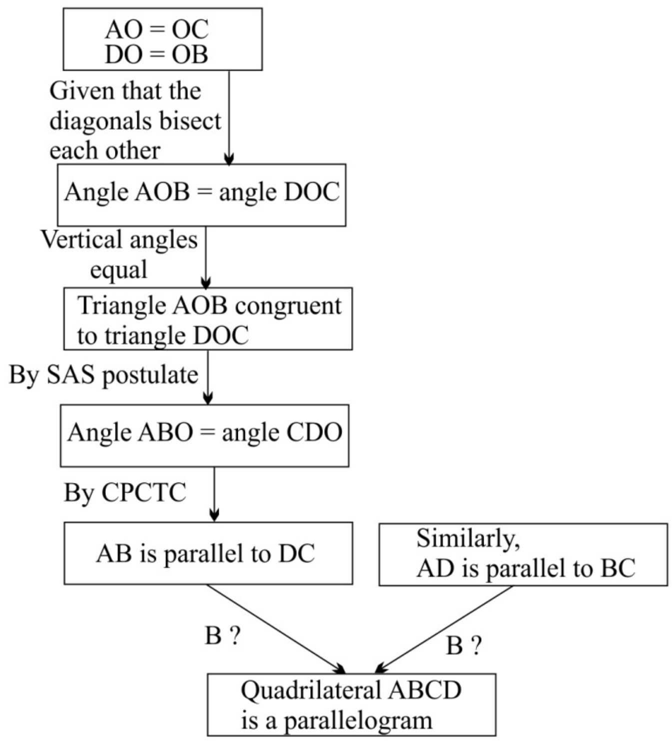
MA.912.G.3.4/MA.912.G.8.5

57. For the quadrilateral ABCD, the diagonals bisect each other.



The flowchart shown below is used to prove that quadrilateral ABCD is a parallelogram.



In the flowchart, what is justification B?

A. Alternate interior angles are congruent.*
B. Corresponding angles are congruent.
C. Corresponding parts of congruent triangles are congruent.
D. Reflexive property.

Since angles CDO and ABO are alternate interior angles that are congruent, line BD is a transversal that intersects two lines that must be parallel, AB and DC.

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Answer: Choice A

MA.912.G.3.4/MA.912.G.8.5

58. A (4, 4), B (7, 0), C (11, 3), and D (8, 7) are four points on the coordinate grid. Miranda and Pete joined the points using straight lines to draw a quadrilateral ABCD.

Miranda wrote the following statements to prove that “ABCD is a parallelogram that is not a rhombus.”

$$\text{slope of } AB = \frac{(4-0)}{(4-7)} = -\frac{4}{3}$$

$$\text{slope of } DC = \frac{(7-3)}{(8-11)} = -\frac{4}{3}$$

$$\text{slope of } BC = \frac{(0-3)}{(7-11)} = \frac{3}{4}$$

$$\text{slope of } AD = \frac{(4-7)}{(4-8)} = \frac{3}{4}$$

Pete wrote the following statements to prove that “ABCD is a rhombus.”

$$AB = \sqrt{(4-7)^2 + (4-0)^2} = \sqrt{25} = 5$$

$$BC = \sqrt{(7-11)^2 + (0-3)^2} = \sqrt{25} = 5$$

$$CD = \sqrt{(11-8)^2 + (3-7)^2} = \sqrt{25} = 5$$

$$DA = \sqrt{(8-4)^2 + (7-4)^2} = \sqrt{25} = 5$$

Which statement is correct?

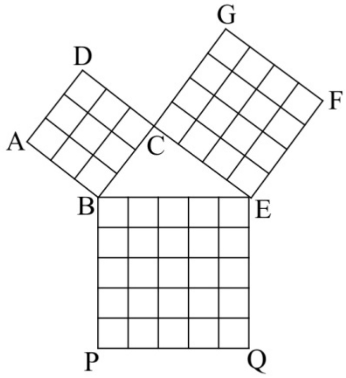
A. Miranda is incorrect because she has used the incorrect formula to calculate the slope of the lines.
B. Pete is correct because all the four sides of the quadrilateral ABCD are equal; therefore, it is a rhombus.*
C. Pete is incorrect because he has used the incorrect formula to find the distance between the points of the segments.
D. Miranda is correct because the slope of AB is equal to DC and slope of BC is equal to AD; therefore, it is a rhombus.

A. Miranda is incorrect because she has used the incorrect formula to calculate the slope of the lines.
Miranda calculated the slope accurately by dividing the difference in the y values by the difference in the x values.
B. Pete is correct because all the four sides of the quadrilateral ABCD are equal; therefore, it is a rhombus. *
Pete is correct.
C. Pete is incorrect because he has used the incorrect formula to find the distance between the points of the segments.
Pete accurately applied and calculated the distance formula.
D. Miranda is correct because the slope of AB is equal to DC and slope of BC is equal to AD; therefore, it is a rhombus.
Determining that opposite sides are parallel does prove that the figure is a parallelogram, but a rhombus is also a parallelogram. Miranda must find out if all sides are congruent to determine if the figure is or is not a rhombus.

Answer: Choice B

MA.912.G.5.1/MA.912.G.8.4

59. Look at the squares, ABCD, CEFG, and PQEB in the figure shown below.



Which fact can be best used to prove that $BC^2 + CE^2 = BE^2$?

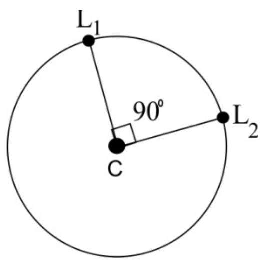
A. Area of PQEB is greater than the square of the area of ABCD.
B. Area of PQEB is greater than the square of the area of CEFG.
C. Area of PQEB is equal to the sum of the areas of CEFG and ABCD.*
D. Area of CEFG is equal to the sum of the areas of PQEB and ABCD.

This proves the definition of Pythagoreans Theorem, which is that the area of the square formed by squaring the length of one leg plus the area of the square formed by squaring the length of the other leg of a right triangle is equal to the area of the square formed by squaring the length of the hypotenuse.

Answer: Choice C

MA.912.G.5.1/ MA.912.G.8.4

60. The points L_1 and L_2 are located on the circumference of a circle having a diameter of 54 feet.



If C is the center of the circle, what is the distance from point L_1 to point L_2 along a straight line?

A. 18 feet
B. 27 feet
C. 32.24 feet
D. 38.18 feet*

If the diameter of the circle is 54, then the radius is 27. Use the Pythagorean Theorem to find the length of the hypotenuse, which represents the distance from point L_1 to L_2.

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

$27^2 + 27^2 = c^2$

$729 + 729 = c^2$

$1458 = c^2$

$\sqrt{1458} = \sqrt{c^2}$

$38.18 = c$

Answer: Choice D