Rising Grade 10 Summer 26 Math Packet

1.

If two triangles are similar, which of the following is always true?

a) Their perimeters are equal

b) Their corresponding angles are equal

c) Their corresponding sides are equal

d) Their areas are equal

2.

Triangles ABC and DEF are similar. If AB = 6, AC = 9, and DE = 8, what is the length of DF?

a) 10

b) 12

c) 14

d) 15

3.

Two trapezoids are similar with a scale factor of 2:3. If the area of the smaller trapezoid is 32 square units, what is the area of the larger trapezoid?

a) 48

b) 54

c) 72

d) 96

4.

A map has a scale of 1 inch = 5 miles. If two cities are 3 inches apart on the map, what is the actual distance between the cities?

5.

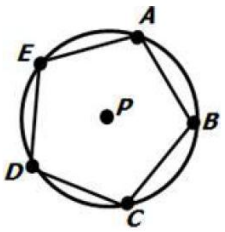
A triangle has sides measuring 5 cm, 7 cm, and 10 cm. A similar triangle has a shortest side of 15 cm. Find the lengths of the other two sides of the second triangle.

6.

A painting is 24 inches wide and 36 inches tall. A museum wants to create a similar poster that is 60 inches wide. What will be the height of the poster?

7.

Regular pentagon $ABCDE$ is inscribed in circle P.



What is the measure of arc CD?

A. 60°

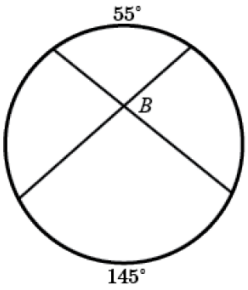
B. 36°

C. 108°

D. 72°

8.

Look at the figure.



What is the measure of $\angle B$?

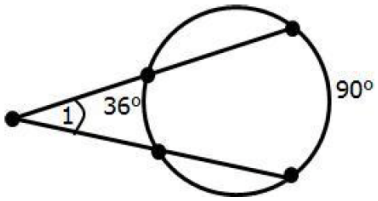
A. 27.5 °

B. 72.5 °

C. 80 °

D. 107 °

9.



What is the measure of $\angle 1$?

A. 63°

B. 18°

C. 27°

D. 54°

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10.

In a circle, an arc with a measure of 60° corresponds to how many radians?

- A) $\pi/2$
- B) $\pi/3$
- C) $\pi/4$
- D) $\pi/6$

11.

What is the measure of a central angle subtending an arc length of 8 cm in a circle with a radius of 4 cm?

- A) 2 radians
- B) 4 radians
- C) 6 radians
- D) 8 radians

12.

If a circle has a radius of 12 cm, what is the circumference?

- A) 12π cm
- B) 24π cm
- C) 36π cm
- D) 48π cm

13.

Find the length of an arc subtended by a central angle of 120° in a circle with a radius of 15 cm.

14.

Find the area of a sector in a circle with a radius of 12 cm and a central angle of 150°.

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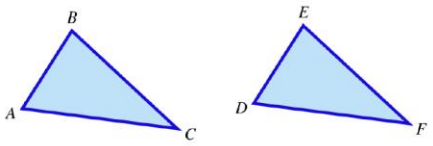
15.



For the two triangles given, $\angle C \cong \angle F$ and $\overline{BC} \cong \overline{EF}$. Which of the following is needed as one additional piece of information to prove $\triangle ABC \cong \triangle DEF$ using the Side-Angle-Side (SAS) congruence theorem?

A $\angle A \cong \angle D$

B $\angle B \cong \angle E$

C $\overline{AB} \cong \overline{DE}$

D $\overline{AC} \cong \overline{DF}$

16.

Starting Point	Ending Point
$(1,1)$	$(2,2)$
$(1,3)$	$(2,6)$
$(3,1)$	$(4,2)$
$(3,3)$	$(4,6)$

A marching band director is designing a half-time show for an upcoming football game. The director is using a computer program that models band members as points in the coordinate plane. The program uses transformations to simulate the movement of the band members. For one part of the show, four band members form a shape and are transitioned to form a new shape at a different location. The table gives the starting point and ending point coordinates of the four band members. Which of the following transformations, T, maps the starting point coordinates (x, y) of each band member to the correct corresponding ending point coordinates?

A $T(x,y) = \left(x-1, \frac{1}{2}y\right)$

B $T(x,y) = (x+1, y+3)$

C $T(x,y) = (x+1, 2y)$

D $T(x,y) = (2x, y+1)$

17.

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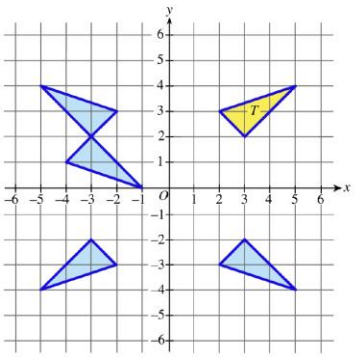
Triangle T is the preimage of a sequence of transformations consisting of a clockwise rotation of 180° about the origin followed by a reflection about the y-axis. Which blue triangle represents the image of triangle T under the sequence of transformations?

Select the blue triangle that represents the image of triangle T.



18.

Which of the following statements about the graph of the circle with the equation $(x+2)^2+(y-1)^2=25$ is correct?

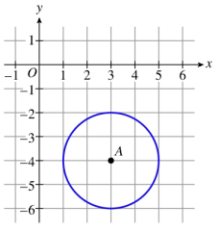
A $(-2,1)$ lies on the circle because it is the center of the circle.

B $(3,-4)$ lies on the circle because $(3+2)^2=25$ and $(-4-1)^2=25$.

C $(-5,-3)$ lies on the circle because $(-5+2)^2+(-3-1)^2=25$.

D $(3,4)$ lies on the circle because $3^2+4^2=25$.

19.



The figure shows a circle with center A graphed in the coordinate plane. Which of the following is an equation of the circle?

A $(x-3)^2+(y+4)^2=2$

B $(x-3)^2+(y+4)^2=4$

C $(x+4)^2+(y-3)^2=2$

D $(x+4)^2+(y-3)^2=4$

20.

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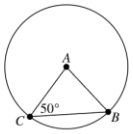


The figure shows a circle with center A. What is the measure of arc BC?

A 40°

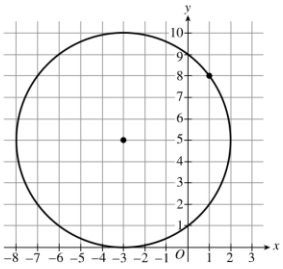
B 50°

C 80°

D 160°

21.

In the given coordinate plane, a circle with center $(-3, 5)$ passes through the point $(1, 8)$.



Which of the following best describes how to construct a line that is tangent to the circle at the point $(1, 8)$?

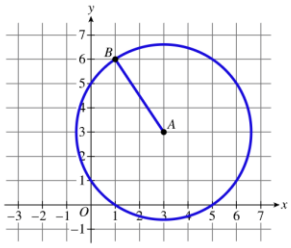
A Using a straightedge and a compass, construct a line passing through the point $(1, 8)$ that is perpendicular to the line containing the points $(-3, 5)$ and $(1, 8)$.

B Using a straightedge and a compass, construct a line passing through the point $(-3, 5)$ that is perpendicular to the line containing the points $(-3, 5)$ and $(1, 8)$.

C Using a straightedge and a compass, construct a line passing through the point $(1, 8)$ that is parallel to the line containing the points $(0, 0)$ and $(-3, 5)$.

D Using a straightedge and a compass, construct a line passing through the point $(-3, 5)$ that is parallel to the line containing the points $(0, 0)$ and $(1, 8)$.

22.



The circle with center A and radius $\overline{AB}$ is shown in the xy-plane. The circle has equation $(x-3)^2+(y-3)^2=13$. Which of the following is the equation of the tangent line to the circle at point B?

A $y=\frac{2}{3}x+\frac{16}{3}$

B $y=\frac{2}{3}x+5$

C $y=\frac{3}{2}x+\frac{9}{2}$

D $y=-\frac{3}{2}x+\frac{15}{2}$

23.

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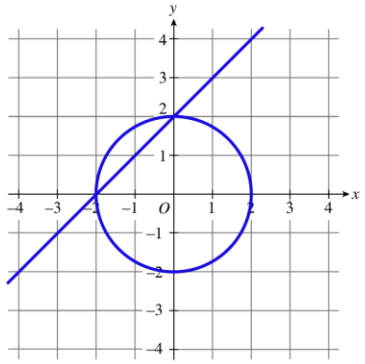


A circle and a line are shown in the given xy-plane. Which of the following systems of equations can be solved to verify that the point $(0, 2)$ is one of the points of intersection?

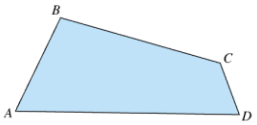
A $\begin{cases} x^2 + y^2 = 4 \\ y = x + 2 \end{cases}$

B $\begin{cases} (x+2)^2 + (y-2)^2 = 0 \\ y - 2 = 2(x+2) \end{cases}$

C $\begin{cases} x^2 + y^2 = 2 \\ x + y = 2 \end{cases}$

D $\begin{cases} (x-2)^2 + (y+2)^2 = 4 \\ y = x - 2 \end{cases}$

24.



The given quadrilateral $ABCD$ has an area of 40 square inches. This quadrilateral is the preimage of a dilation with a scale factor of $\frac{1}{2}$. What is the area of $A\prime B\prime C\prime D\prime$, the image of $ABCD$, in square inches, under the transformation?

A 10 square inches

B 20 square inches

C 80 square inches

D 160 square inches

25.

Sonequa has two containers, one in the shape of a cylinder and the other in the shape of a cone. The two containers have equal radii and equal heights. She investigated the relationship between the volumes of the cone and the cylinder by transferring water between the two containers. Which of the following claims is most likely to be supported using the results of Sonequa's investigation?

A The volume of a cylinder is two times the volume of a cone when the two containers have equal radii and equal heights, because one full cylinder of water completely and exactly filled the cone two times.

B The volume of a cylinder is three times the volume of a cone when the two containers have equal radii and equal heights, because one full cylinder of water completely and exactly filled the cone three times.

C The volume of a cylinder is two times the volume of a cone when the two containers have equal radii and equal heights, because two full cylinders of water completely and exactly filled the cone one time.

D The volume of a cylinder is three times the volume of a cone when the two containers have equal radii and equal heights, because three full cylinders of water completely and exactly filled the cone one time.

26.

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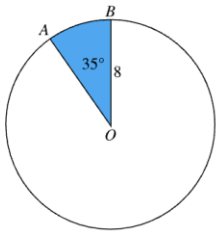


Sector AOB is in a circle with center O and a radius of 8 units, where $m\angle AOB = 35^\circ$, as shown in the figure. Which of the following is closest to the area, in square units, of the shaded region?

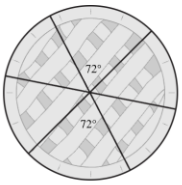
A 5 square units

B 20 square units

C 126 square units

D $2{,}068$ square units

27.



Francisco used a 9-inch diameter pie dish to bake his favorite cherry pie. He cut it into 6 unequal slices, as shown in the figure. He wanted a larger slice for himself. The two slices that are cut larger than the other four slices each have a central angle that measures 72°. Which of t following is closest to the area, in square inches, of Franciso's larger slice of pie?

A 13 square inches

B 25 square inches

C 51 square inches

D 64 square inches

28.

Which of the following statements is true for a sphere?

A A sphere is the set of all points in space equidistant from a line segment called the radius.

B A sphere is the set of all points in space equidistant from a point called the center.

C A sphere is the set of all points in a plane equidistant from a line segment called the radius.

D A sphere is the set of all points in a plane equidistant from a point called the center.

29.

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Ganymede, one of the moons of Jupiter, can be modeled by a sphere with a diameter of approximately $5{,}268$ kilometers. The Moon of Earth, by comparison, can be modeled by a sphere with a diameter of approximately $3{,}475$ kilometers. The volume of Ganymede is approximately how many times the volume of Earth's Moon?

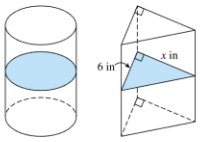
A 1.2

B 1.5

C 2.3

D 3.5

30.



The right circular cylinder and triangular prism with their cross sections drawn in the figure shown have the same volume and the same height. The area of the cross-sectional disc pictured in the cylinder is 9π square inches. Given that the length of one of the sides of the triangular prism is 6 inches, what is the length x, in inches, of the indicated side of the triangular prism?

A $\frac{3}{4}\pi$

B $\frac{3}{2}\pi$

C 3π

D 18π

31.

The official size of the spherical basketball used by the National Basketball Association (NBA) is 74.9 cm in circumference. While preparing for a game, a team manager finds a basketball that has a circumference of only 72.0 cm. Which of the following is closest to the additional volume of air, in cubic centimeters, that must be added to the ball in order to make it the official size?

A $45\ \text{cm}^3$

B $135\ \text{cm}^3$

C $593\ \text{cm}^3$

D $790\ \text{cm}^3$

32.

A piece of ice in the shape of a cube with an edge length of 2 inches is placed into an empty glass in the shape of a right circular cylinder with a diameter of 3 inches. Assuming that the volume of the solid ice cube is equal to the volume of the water from the melted ice, which of the following is closest to the height, in inches, of the water in the glass when the ice cube melts?

A 0.3 inch

B 1.1 inches

C 2.1 inches

D 3.4 inches

33.

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A right cylinder has a diameter of 6 inches and a volume of $72\pi \text{ in}^3$. Which of the following gives the height, h, in inches, of the cylinder?

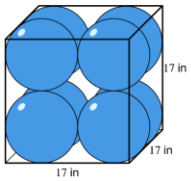
A $h = \frac{72\pi}{36\pi} = 2$

B $h = \frac{72\pi}{12\pi} = 6$

C $h = \frac{72\pi}{9\pi} = 8$

D $h = \frac{72\pi}{6\pi} = 12$

34.



A bowling ball manufacturer ships 8 bowling balls in a cubic box with edge length 17 inches, as shown. The bowling balls that are packaged are all the same size and are tangent to each other and the sides of the box. To secure the bowling balls and prevent any damage during shipping, finely shredded paper is blown into all of the space not that is not taken up by the bowling balls. Which of the following is closest to the total volume, in cubic inches, of finely shredded paper that will be needed to completely fill the box of bowling balls to prepare for shipping?

A 2,341

B 2,572

C 4,591

D 4,913

35.

A fish tank is in the shape of a right prism with a regular hexagonal base with side length ℓ. The volume of the fish tank is given by the formula $V = \frac{3\sqrt{3}}{2}\ell^2 h$. Which of the following expressions gives the area of the hexagonal base?

A $\frac{3\sqrt{3}}{2}$

B $\frac{3\sqrt{3}}{2}\ell^2$

C ℓ^2

D $\ell^2 h$

36.

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Which of the following data sets has the smallest standard deviation and provides correct reasoning as to why it has the smallest standard deviation?

A $\{-2, -1, 0, 1, 2\}$ because the distribution of values is symmetrical around zero.

B $\{99.8, 99.9, 100, 100.1, 100.2\}$ because the range of values is clustered very close to the mean.

C $\{9, 9.5, 10, 10.5, 11\}$ because the difference between successive values is constant.

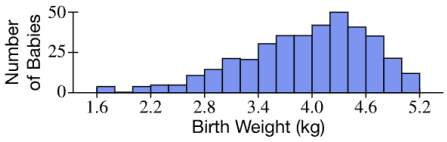
D $\{80, 93, 100, 110, 118\}$ because the sample mean is equal to the true mean of the population.

37.

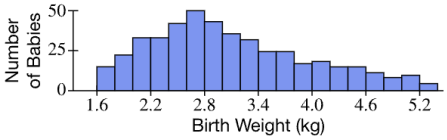
The birthweights of newborn babies in Danaville are approximately normally distributed with a mean of 3.4 kilograms (kg) and a standard deviation of $0.6\ kg$.

Which of the following would likely be a histogram of a random sample of birthweights?

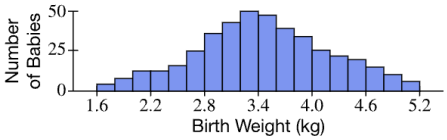
A



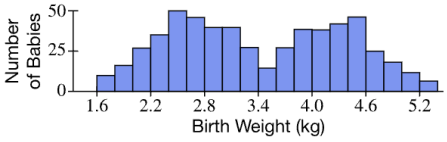
B



C



D



38.

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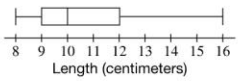
A scientist collected data from 15 fish from a particular river. The given data set shows the lengths, in centimeters, of the 15 different fish that were caught and released by the scientist.

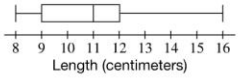
8, 9, 9, 9, 9, 10, 10, 10, 11, 12, 12, 12, 13, 15, 16

In order to help determine if the river habitat is healthy, the scientist created a boxplot to examine the middle and the spread of the fish lengths. Which of the following boxplots correctly represents the scientist's data?

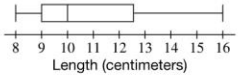
A



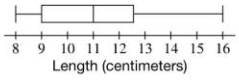
B



C



D



39.

A company sells containers of whole-grain oats to retailers. The distribution of the mass of oats in the containers is approximately normal with a mean of 454 grams and a standard deviation of 7 grams. The company will not distribute any containers of oats with a mass greater or less than 2 standard deviations from the mean. If 100 containers of oats are selected at random at the company, approximately how many containers will likely NOT be distributed to retailers?

A 50

B 7

C 5

D 1

40.

The owner of a coffee shop collected receipts from all orders placed during a one-hour period. For each receipt, the owner recorded the payment method used and if the receipt was $20 or less or more than $20. The following table shows the frequencies of the results.

	Payment Method			
	Cash	Credit/Debit Card	Phone App	**Total**
Receipt of $20 or less	8	10	10	
Receipt of more than $20	15	25	32	
Total				100

If a receipt collected during the one-hour period is to be selected at random, what is the probability that the receipt was paid with cash?

Enter your answer as a value between 0 and 1 rounded to two decimal places (e.g., 0.13).

41.

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The owner of a coffee shop collected receipts from all orders placed during a one-hour period. For each receipt, the owner recorded the payment method used and if the receipt was $20 or less or more than $20. The following table shows the frequencies of the results.

	Payment Method			
	Cash	Credit/Debit Card	Phone App	**Total**
Receipt of $20 or less	8	10	10	
Receipt of more than $20	15	25	32	
Total				100

The owner selected a receipt at random from those of more than $20. Which of the following is the probability that the selected receipt was for an order that was paid using a phone app?

A 0.32

B 0.42

C 0.44

D 0.72

42.

Two fair number cubes have faces labeled with the numbers 1 through 6. The two cubes will be rolled simultaneously. What is the probability that at least one of the cubes will have the face labeled 5 showing and that the sum of the showing faces will be greater than 8?

A $\frac{3}{36}$

B $\frac{5}{36}$

C $\frac{10}{36}$

D $\frac{11}{36}$

43.

A writer for the school newspaper surveyed 209 students from various grade levels and asked the following question.

"Should the school have a dress code?"

The results are summarized in the table.

	Response			
Grade Level	**Yes**	**No**	**No Opinion**	**Total**
Freshman	11	33	7	51
Sophomore	23	14	9	46
Junior	22	13	14	49
Senior	10	19	34	63
Total	66	79	64	209

If a student who was surveyed is to be chosen at random, what is the probability that the student chosen is a sophomore, given that the student responded "Yes" to the survey question?

A $\frac{23}{46}$

B $\frac{23}{66}$

C $\frac{66}{209}$

D $\frac{46}{209}$

44.

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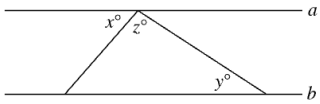


In the given figure, lines a and b are parallel. Which of the following equations must be true?

A $x + y = 180$

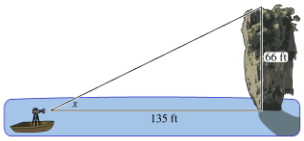
B $x + z = 180$

C $2x + y = 180$

D $x + y + z = 180$

45.

Ko Tapu is a vertical limestone rock located off the coast of Thailand. Peter sets up a camera in a boat to shoot some footage of the top of Ko Tapu. The horizontal distance from the camera to a point at the base of the rock is 135 feet, and the vertical distance from the point at the base of the rock to a point at the top of the rock is 66 feet, as shown in the figure.



What is the measure of the angle of elevation, to the nearest degree, that Peter should set the camera so he can video the top of the rock?

A $26°$

B $29°$

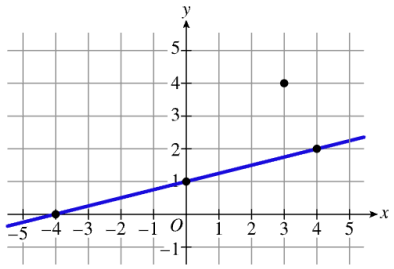
C $61°$

D $64°$

46.

Rising Grade 10 Summer 26 Math Packet

A line and the point $(3,4)$ are graphed in the coordinate plane.



What is the equation of the line that passes through the point $(3, 4)$ and is parallel to the line shown?

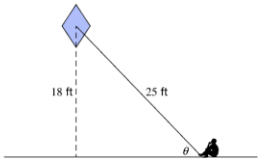
A $y = \frac{1}{4}x + 3$

B $y = \frac{1}{4}x + \frac{13}{4}$

C $y = 4x + 3$

D $y = 4x + \frac{13}{4}$

47.



Neerali is flying a kite while sitting in a park, and she lets out 25 feet of string. The middle of the kite is 18 feet from the ground. Let θ represent the angle of elevation that the middle of the kite makes with the ground, as shown in the figure. Which of the following is closest to the value of θ, in radians?

A 0.80 radian

B 0.77 radian

C 0.72 radian

D 0.62 radian

48.

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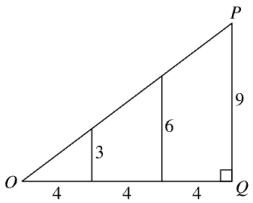
Right triangle OPQ is shown. There are two line segments drawn parallel to side $\overline{PQ}$ that form three similar right triangles.



Which TWO of the following expressions are equal to $\tan(\angle POQ)$?

A $\frac{3}{4}$

B $\frac{3+6}{4+4}$

C $\frac{3+6+9}{4+4+4}$

D $\frac{6}{4+4}$

E $\frac{6+9}{4+4+4}$

49.

A farmer has a rectangular field measuring 150 meters by 80 meters. He wants to fence the entire field and then place grass on the entire surface inside the fence.

- How many meters of fencing does he need?
- How many square meters of grass seed does he need to cover the field?

50.

A park is in the shape of a trapezoid with bases measuring 25 meters and 15 meters and a height of 12 meters. The park management wants to add grass on the entire surface. Find the total area that needs grass.

51.

Gina keeps all her spare keys in a box under her bed. Recently, Gina decided the box was becoming unmanageable, as none of the keys were labeled. She set about labeling them with colored stickers that indicated what each key opened.
The probability that a key opens the front door of the house is 0.9, the probability that it is labeled with a blue sticker is 0.7, and the probability that it opens the front door of the house and is labeled with a blue sticker is 0.6.
What is the probability that a randomly chosen key opens the front door of the house or is labeled with a blue sticker?
Write your answer as a whole number, decimal, or simplified fraction.

52

A gate agent looked over a list of passengers on recent flights. The list contained the passengers' Frequent Flyer status as well as the number of bags they checked.
The probability that a passenger has 0 checked bags is 0.17, the probability that a passenger has bronze status is 0.78, and the probability that a passenger has 0 checked bags or bronze status is 0.93.
What is the probability that a randomly chosen passenger has 0 checked bags and bronze status?
Write your answer as a whole number, decimal, or simplified fraction.

53

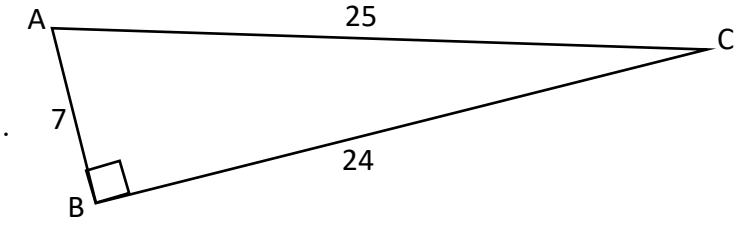
In an experiment, the probability that event *A* occurs is $\frac{5}{7}$, the probability that event *B* occurs is $\frac{3}{7}$, and the probability that events *A* and *B* both occur is $\frac{3}{8}$. What is the probability that *A* occurs given that *B* occurs? *Simplify any fractions.*

54

In an experiment, the probability that event *B* occurs is $\frac{5}{6}$,
and the probability that event *A* occurs given that event *B* occurs is $\frac{1}{9}$ What is the probability that events *A* and *B* both occur?
Simplify any fractions.

55

Match the following trigonometric ratios with the correct equation for the triangle shown below.



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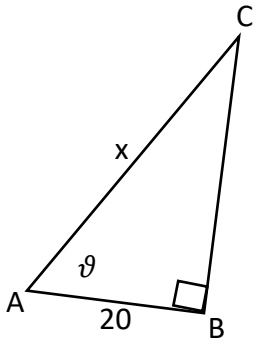
56

In the gure below. $\overline{AC}$ represents a support wire x feet long. The wire is attached to a tower at C and to the ground at A. the distance between A and B, which is at the base of the tower, is 20 feet. The angle at A has measure which of the following must be true?



a) $\cos \partial = \frac{20}{x}$

b) $\sin \partial = \frac{20}{x}$

c) $\sin \partial = \frac{x}{20}$

d) $\tan \partial = \frac{20}{x}$

e) $\sin \partial = \frac{x}{20}$

57

Consider the following quadratic equations given in the rst column. Identify whether the roots of the given quadratic equations are imaginary or real.

Quadratic Equation	Imaginary roots	Real roots
$x^2 + 2x + 5 = 0$		
$x^2 + 6x - 7 = 0$		
$x^2 + 5x + 6 = 0$		

58

Select of the following quadratic equations would open up (or have a minimum) there may be more than one.

A) $f(x) = 2(x - 2)^2 - 3$

B) $f(x) = 2(x - 4)^2 + 3$

C) f(x) = (x - 2) (x + 3)

D) f(x) = $2x^2 - 8x + 5$

E) f(x) = $x^2 - 2x + 5$

59

Solve the following quadratic equations by factoring, talking the square roots, completing the square, or using the quadratic formula.

a) $(x - 4)^2 - 4 = 21$

b) $5x^2 - 4x - 4 = 0$

c) $x^2 + 4x + 20 = 10$

60

Which of the following represents the vertex of the quadratic function ?

a) (2,0) b) (3,0) c) (4,0) d) (2,4) e) (3, -1)

61

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What is the equation, in slope intercept form, of the line parallel to y = 5x + 2 that passes through the point with coordinates (- 2, 1)?

Y =

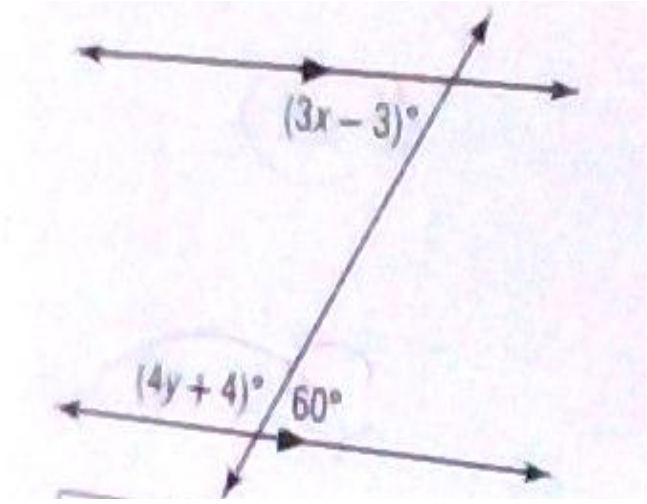
62

A line passes through (5, - 9) and is perpendicular to the graph of y = $\frac{1}{3}x - 1$.
What equation represents the line in slope-intercept form ?

m =

63

Find the measure of x and y



X =	
Y =	

64

Use the distance formula to answer the question:

What is the distance between (5, 9), (- 7, - 7) ?

65

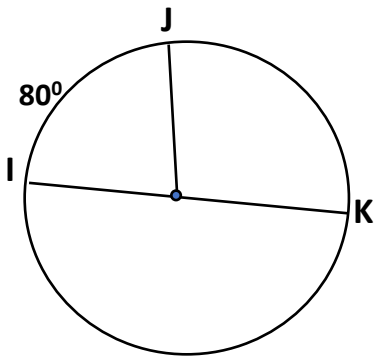
What is the distance between the points (2, 10) and (- 4, 2) in the xy – plane ?

A) 6 B) 8 C) 10 D) 14 E) 18

66

What is the measure, in degrees, of arc JKI ?

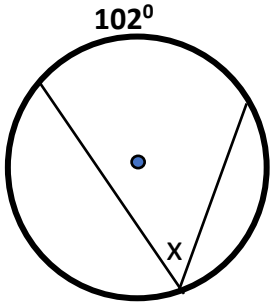
m$\overset{\frown}{JKI}$



m$\overset{\frown}{JKI}$ =

67

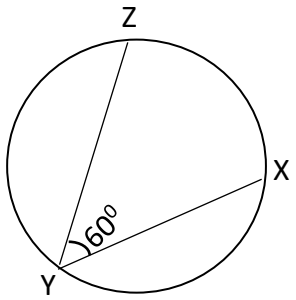
Circles Arc Measure, central Angle and inscribed Angle. What is the value of x in the diagram?



x =

68

Angle Y is inscribed in the circle below.

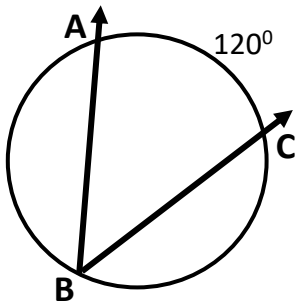


What is the measure of arc XZ ?

A) 30^0 B) 60^0 C) 120^0 D) 300^0

69

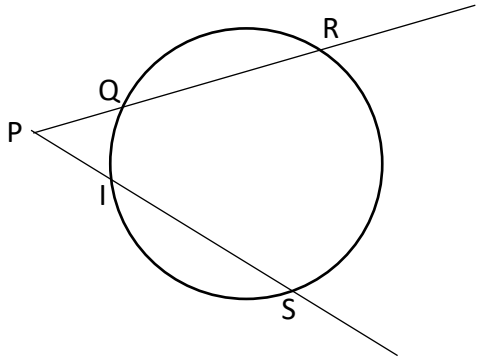
Angle ABC is inscribed in a circle as shown.



What is the measure, in degrees, of $< ABC$?

70

In the circle below, the measure of arc QT is 50^0 and the measure of angle P is 55^0

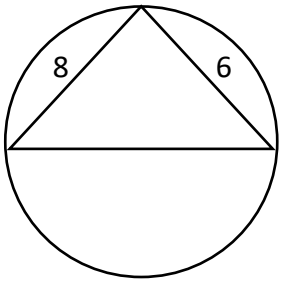


What is the measure of arc RS ?

A) 105^0 B) 135^0 C) 160^0 D) 175^0

71

This diagram shows a circle with an inscribed right triangle and some of its measurements, in units.



Based on the diagram, what is the circumference, in units, of the circle?

A) 5π B) 10π C) 14π D) 25π

72

Identify each part of the circle given the equation .

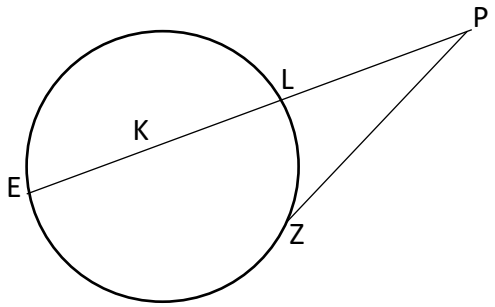
$(x - 6)^2 + (y - 9)^2 = 225$

Center :

Radius :

75

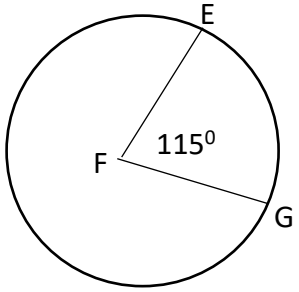
D In the diagram below of circle K, secant $\overline{PLKE}$ and tangent $\overline{PZ}$ are drawn from external point P.



If m $\overline{LZ} = 56^0$, determine and state the degree measure of angle P.

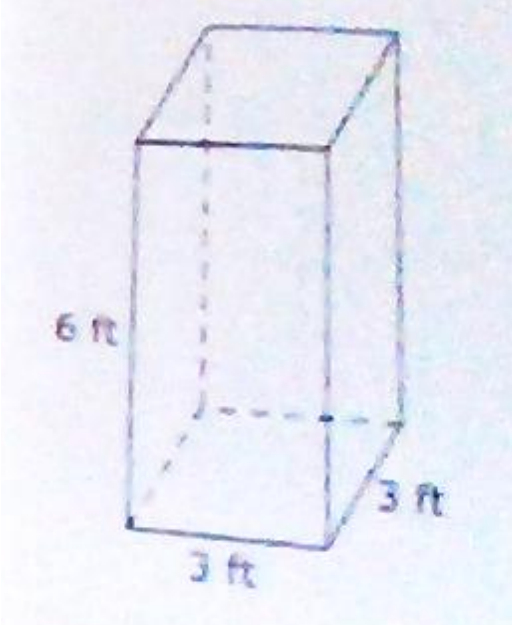
76

If EF = 28 ft, nd the arc length and sector area of the shaded portion of the circle. Round your answers to the nearest tenth.



77

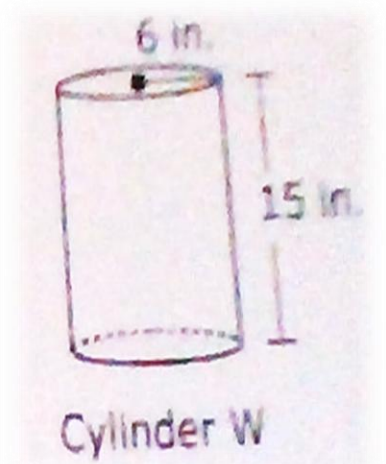
What is the volume a of the figure below?



A) $12ft^2$ B) $36ft^2$ C) $54ft^2$ D) $90ft^2$

78

Circular cylinder W and some of its dimensions are shown in this diagram.



What is the volume, to the nearest cubic inch, of cylinder W?
Enter your answer in the space provided. Enter only your answer.