

PRECALCULUS/TRIGONOMETRY

SUMMER PACKET

CONWELL-EGAN CATHOLIC HIGH SCHOOL



This summer assignment is a review and exploration of key skills that are necessary for success in your mathematics course as well as future high school mathematics courses.

All summer packets are due on the Friday of the first full week of school.

ALGEBRA REVIEW

For a science experiment, Sarah counts the number of breaths needed for her to blow up a beach ball. She will then find the volume of the beach ball in cubic centimeters and divide by the number of breaths to find the average volume of air per breath.	
a. Her beach ball has a radius of 9 inches. First she converts the radius to centimeters using the formula $C = 2.54I$, where C is the length in centimeters and I is the same length in inches. How many centimeters are there in 9 inches?	b. The volume of a sphere is given by the formula $V = \frac{4}{3}\pi r^2$, where V is the volume of the sphere and r is its radius. What is the volume of the beach ball in cubic centimeters? (Use 3.14 for π .)
c. Sarah takes 40 breaths to blow up the beach ball. What is the average volume of air per breath?	d. What is the unit of measure for the answer to part c?

Solve each equation. Check your solution. Do NOT use a calculator!			
$\frac{2}{3}x = \frac{1}{2}$	$4.5 + 2x = 8.7$	$\frac{5}{2}x = 98 - n$	$ x + 9 = \frac{3}{4}$
Solve each equation or formula for the specified variable.			
$a = 3b - c$, for b	$\frac{3pq}{r} = 12$, for q	$2xy = x + 7$, for x	$3(2j - k) - 108$, for j

Find each value if $f(x) = -2x + 4$		Find each value if $g(x) = x^3 - x$	
$f(12) =$	$f(2b - 3) =$	$g(-2) =$	$g(7c) =$

Solve using substitution method.	Solve using the elimination method.
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How much of a 10% saline solution should be mixed with a 20% saline solution to obtain 1000 milliliters of a 12% saline solution?

Let s = the number of milliliters of 10% saline solution.

Let t = the number of milliliters of 20% saline solution.

	10% saline	20% saline	12% saline
Total milliliters	s	t	1000
Milliliters of saline	$0.10s$	$0.20t$	$0.12(1000)$

Write an equation for the Total milliliters.

Write an equation for the milliliters of saline.

Solve the system.

During a canoeing trip, it takes Raymond 4 hours to paddle 12 miles upstream. It take him 3 hours to make the return trip paddling downstream. Find the speed of the canoe in still water.

Let c = the rate of the canoe in still water.

Let w = the rate of the water current.

	r	t	d
Against the Current	$c - w$	4	12
With the Current	$c + w$	3	12

Write an equation for the trip upstream.

Write an equation for the trip downstream.

Solve the system.

Solve each problem by using the square root property. Round answers to the nearest hundredth as needed.

$$4x^2 + 64 = 0$$

$$6x^2 - 72 = 0$$

$$-2x^2 - 80 = 0$$

Factor completely.

$$x^2 + 4x - 12$$

$$6 - 5x - x^2$$

$$2x^2 + 2x - 60$$

$$-10x^4 - 15x^2$$

$$9x^2 + 30x + 25$$

$$9x^2 - 4$$

$27x^3 - 8$	$2mn - 2mv - 2sn + 2sv$	$x^5 - 7x^4 + 12x^3$

Perform the indicated operation. Express all solutions as a simplified fraction.		
$\frac{2x}{5} - \frac{x}{3}$	$\frac{b-a}{a^2b} + \frac{a+b}{ab^2}$	$\frac{2-a^2}{a^2+a} + \frac{3a+4}{3a+3}$

Perform the indicated operation. Express all solutions as a simplified fraction.		
$\frac{1 - \frac{1}{2}}{2 + \frac{1}{4}}$	$\frac{1 + \frac{1}{z}}{z + 1}$	$\frac{5 + \frac{1}{m} - \frac{6}{m^2}}{\frac{2}{m} - \frac{2}{m^2}}$

Solve each problem by factoring. Round answers to the nearest hundredth as needed.

$x^2 - 9x = 0$	$6 = -5x + x^2$	$3x^2 - 5x - 9 = x^2 + 3$
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Solve each problem by using the quadratic formula. Round answers to the nearest hundredth as needed.		
$x^2 - 3x + 2 = 0$	$6 = -5x + x^2$	$3x^2 - 13x - 10 = 0$

Solve each equation by completing the square. Round to three decimal places if necessary.	
$x^2 + 10x = -9$	$4x^2 = 24 + 4x$

Simplify each of the following.			
$\sqrt{32}$	$\sqrt{60} \cdot \sqrt{105}$	$\sqrt{\frac{11}{9}}$	$\frac{2}{\sqrt{3}}$

Use the diagram at the right to find each measure.

$$\widehat{CD} =$$

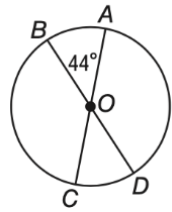
Name all diameters.

$$\widehat{ADB} =$$

Name all radii.

$$m\angle AOD =$$

Name the circle.



Find the length of $\widehat{AB}$ and $\widehat{ABD}$. Express your solution in terms of π and as a decimal accurate to 3 decimal places.

Find each value.

The circumference of a circle with a diameter of 22.9 cm.

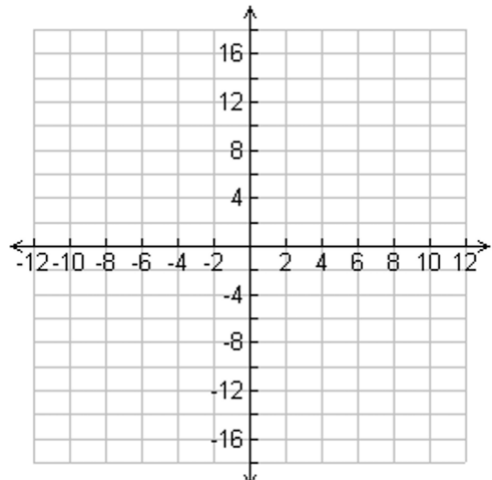
Find the radius of a circle with a circumference of 32π .

Find the exact area of a circle with a diameter of 32 mm.

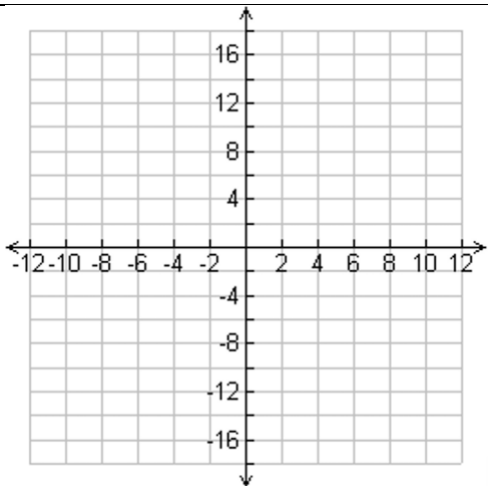
A square has a perimeter of 12 cm. Find the length of the diagonal.

Use the distance and/or midpoint formulas to answer each exercise.

Circle Q has a diameter $\overline{AB}$. If A is at $(-3, -5)$ and B is at $(7, 11)$, find the coordinates of the center of the circle? Then find the exact circumference and exact area of the circle.



Quadrilateral $RSTV$ has vertices $R(-4, 6)$, $S(4, 5)$, $T(6, 3)$, and $V(5, -8)$. Find the perimeter of the quadrilateral.



Use the rules for complementary and supplementary angles to complete each exercise.

Angles E and F are complementary. If $m\angle E = x - 10$ and $m\angle F = x + 2$, find the measure of each angle.

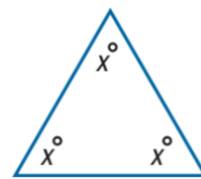
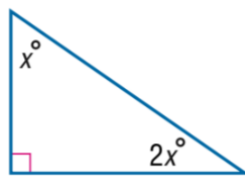
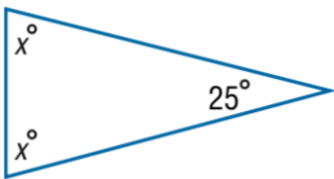
What is the measure of $\angle J$ if $\angle J$ and $\angle K$ are supplementary and the measure of $\angle K$ is 12 degrees more than twice $\angle J$.

Find the missing measure in each triangle with the given angle measures.

The measures of the three angles of a triangle are x° , 80° , 20.5° .

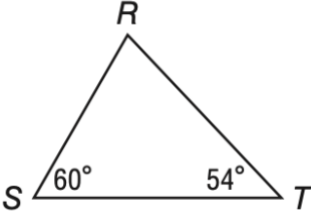
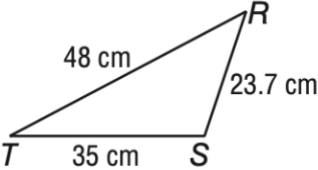
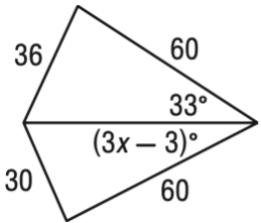
In $\triangle ABC$, $\angle A$ is 5.6° more than $\angle B$ and $\angle C$ is 25.4° less than twice $m\angle B$. What is the measure of $\angle B$?

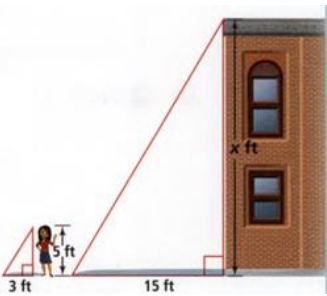
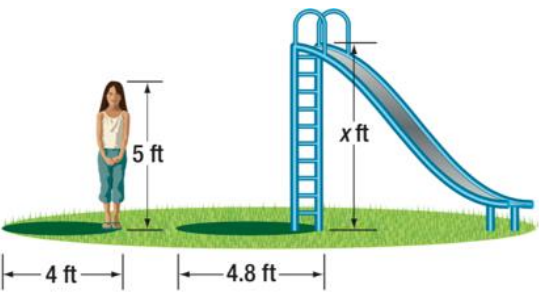
Find the missing measure in each triangle with the given angle measures.



List the sides from largest to smallest.

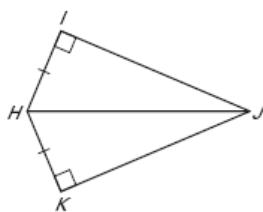
List the angles from smallest to largest.

	
Find the value of x. 	Draw and label $\triangle ABC$ with an exterior angle at $\angle C$. If $m\angle A + m\angle B = 8.72 - 2.15x$ and the exterior angle measures $1.03x - 4$, what is the value of x?
Is it possible to form a triangle with the given side lengths?	
3, 4, 6	6, 9, 15
0.5, 2.6, 3.2	

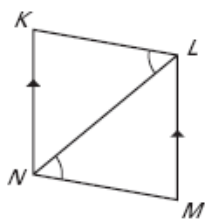
Write a proportion and solve for each missing value.	
The sun's rays strike the building and the woman at the same angle, forming the two similar triangles shown. How tall is the building? 	Ruth is at the park standing next to a slide. Ruth is 5 feet tall, and her shadow is 4 feet long. If the shadow of the slide is 4.8 feet long, what is the height of the slide. Assume the triangles are similar. 

Determine if there is enough information to prove the triangles congruent. Circle YES or NO. If the triangles are congruent state the theorem or postulate that proves the triangles congruent.

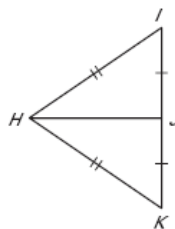
1.	2.	3.	4.
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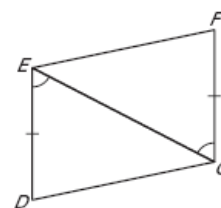
YES NO



YES NO

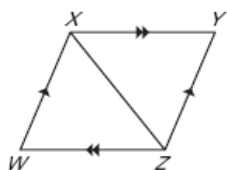


YES NO



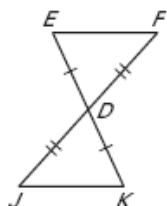
YES NO

5.



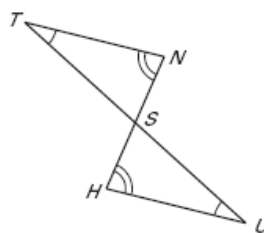
YES NO

6.



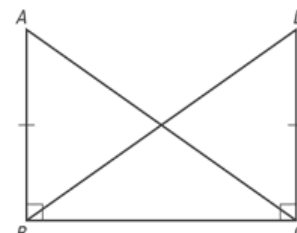
YES NO

7.



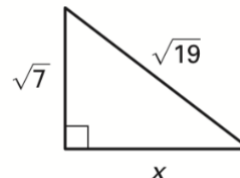
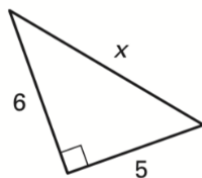
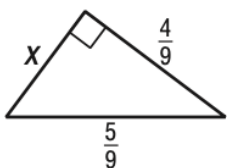
YES NO

8.



YES NO

Use the Pythagorean Theorem to find the value of x .



Find the value of x and y .

