2017 Summer Math Packet

for students who have completed Pre-Algebra

Congratulations, you made it through your math class this year! Your fabulous prize will be an even more challenging and interesting math class for next year. Yay!

Here is a packet to do over the summer to keep your math skills sharp, because we want you to be ready for your new math class in the fall. The packet is 30 pages long, and summer is about 10 weeks long. So you should be completing about 3 pages a week in order to stay on track.

Complete your summer packet on separate paper without using a calculator, and remember to show all of your work. Do not do the whole packet right away, or you will forget some of the concepts before the fall. Do not leave the packet until the end of the summer, or you will have forgotten some of the concepts.

You have learned how to do everything in this packet at some point during the year, there is nothing new. Use your notes to help you with the packet. If you get completely stuck, then give one of us a call.

Bring the packet with you to your new math class in the fall. You will have a quiz during the first week of class to make sure you have done the packet and are ready for your new math class. Your math teacher might even give you extra credit for your summer math packet. Who doesn't love extra credit?

Have a wonderful and slightly mathematical summer!

The MSA Math Department

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Things You Should Know:

Conversions:

100 centimeters = 1 meter
12 inches = 1 foot
3 feet = 1 yard
8 ounces = 1 cup
2 cups = 1 pint
2 pints = 1 quart
4 quarts = 1 gallon

Formulas:

Area of squares and rectangles : $A = l \cdot w$

Volume of rectangular prisms : $V = l \cdot w \cdot h$

Fractions:

To find a common denominator, find the least common multiple of the denominators in the problem.

Order of Operations:

P : Parenthesis

E : Exponents

MD : Multiplication OR Division (from left to right)

AS : Addition OR Subtraction (from left to right)

Decimals:

Line up decimals when adding and subtracting.
Count decimal places when multiplying.

Order of Operations

Simplify each expression.

$260 - (2 \cdot 4)^2 - 9$	$2[3^2 + 2(5 - 1)]$	$10 + (6 \div 2)^3 - 4$	$6^2 + 2[5^2 + (2 \cdot 3)]$
$6(2 + 3) - 3^3$	$5^2 + 3[2(5 + 4)^4 - 2]$	$(2 \cdot 5)^2 - 10$	$8^2 - 2[4 - 2(2)]$
$2^4 + 14 \cdot 2 \div 4$	$9^2 \div 3^3 \cdot (8 - 5)^2$	$\frac{(5 + 3)^2}{6 - 2}$	$4^3 - 2(9)$
$2^3 + 2(3 \cdot 4)$	$40 \div 2^2 \cdot (4 - 2)^3$	$(16 - 4)^2 \cdot 4 + 3^2$	$10^2 - 2[2(3 \cdot 2)]$

GCF & LCM

Find the GCF and/or LCM.

Find the GCF. 44 & 14	Find the GCF and LCM. 5 & 8 GCF : _____ LCM : _____	Find the GCF. 20 & 15
Find the GCF and LCM. 4 & 6 GCF : _____ LCM : _____	Find the GCF. 30 & 40	Find the GCF and LCM. 16 & 6 GCF : _____ LCM : _____
Find the LCM. 4, 21, 24	Find the GCF and LCM. 12 & 4 GCF : _____ LCM : _____	Find the LCM. 3 & 5
Find the GCF and LCM. 30 & 6 GCF : _____ LCM : _____	Find the LCM. 4, 21, 24	Find the GCF and LCM. 6 & 12 GCF : _____ LCM : _____

POWERS OF TEN

What is the relationship between the exponent in $4.3 \cdot 10^3$ and 4,300?	What is the relationship between the exponent in $8.2 \div 10^2$ and 0.082?	What is the relationship between the exponent in $5 \cdot 10^6$ and 5,000,000?
Complete the pattern: $4.2 \cdot 10 = 4.2 \cdot 10^{\square} =$ _____ $4.2 \cdot 10 \cdot 10 = 4.2 \cdot 10^{\square} =$ _____ $4.2 \cdot 10 \cdot 10 \cdot 10 = 4.2 \cdot 10^{\square} =$ _____		Is the multiplication sentence below true? Explain. $5.3 \cdot 10^4 = 530{,}000$
If $6 \cdot 3 = 18$, then $600 \cdot 3 = ?$	$53.2 \cdot$ _____ $= 532{,}000$	If $400 \cdot 5 = 2{,}000$, then $400 \cdot 500 = ?$
Solve: $7.95 \cdot 10^3$	Solve: $6{,}000{,}000 \div 10^3$	Solve: $4.02 \cdot 10^2$
Solve: $7.95 \div 10^3$	Solve: $6{,}000{,}000 \cdot 10^3$	If $4 \cdot 2 = 2{,}000$, then $2{,}000 \cdot 40 = ?$

SIMPLIFYING EXPRESSIONS

Place grouping symbols in each equation to make it true.

$20 - 13 - 8 = 15$	$2 \cdot 3 + 5 - 9 = 7$	$2 + 3 \cdot 6 - 4 = 10$	$36 \div 12 + 6 \cdot 4 = 8$
$4 \cdot 2 + 3 - 3 = 17$	$6 - 4 \div 2 + 3 \cdot 4 = 13$	$6 + 3 \cdot 4 - 1 = 27$	$20 \div 4 \cdot 2 + 3 = 25$
$20 \div 2 \cdot 2 + 6 = 11$	$8 + 3 \cdot 2 = 22$	$14 - 6 \div 3 + 2 = 10$	$4 \cdot 8 + 2 + 2 = 42$
$50 - 6 \cdot 2 + 3 = 20$	$18 - 12 \div 3 + 3 = 17$	$2 + 3 \cdot 10 - 5 = 25$	$15 - 2 \cdot 3 + 1 = 8$

SIMPLIFYING EXPRESSIONS

Simplify each expression using the order of operations.

$60 - (2 \cdot 4) - 9$	$2[3 + 2(5 - 1)]$	$10 + (6 \div 2) - 4$	$6 + 2[5 + (2 \cdot 3)]$
$6(2 + 3) - 3(8 - 2)$	$15 + 3[2(5 + 4) - 2]$	$2(5) - 10$	$18 - 2[14 - 3(2)]$
$2 + 14 \cdot 2 \div 4$	$81 \div 27 \cdot (8 - 5)$	$\frac{15 + 30}{6 - 1}$	$24 - 2(9)$
$4 + 2(3 \cdot 4)$	$40 \div 4 \cdot (3 - 2)$	$(16 - 4) \cdot 4 + 3$	$120 - 5[2(3 \cdot 2) - 2]$

WRITING EXPRESSIONS

Write an expression to represent each verbal phrase.

Subtract 9 and 2, then multiply by 4.	Divide 8 by 2 and then add 1.	Triple 4 and then add 6.
Add 2 and 8 and then multiply by 2.	Double 6 and then divide by 3.	Add 4, 6 and 13.
Subtract 9 and 2 and add 5.	4 plus the product of 2 and 7.	The sum of 6 times 5 and 9 minus 2.
8 less than the quotient of 20 and 5.	The product of 4 and triple the number 2.	Multiply 5 and 7 and then divide by 5.
The difference of four times four and six.	4 more than the difference of 10 and 2.	20 divided by the product of 2 and 4.

WRITING EXPRESSIONS

Write an expression to represent each real world situation. Don't solve!

You pay $1.25 per pound for 3 pounds of apples.	Emma weighs 38 pounds. Gavin weighs 10 pounds less.	Four friends split a $20 dinner bill.
There are 15 kids on a bus. 6 more get on.	You have $13 on a gift card and spend $9.50.	It takes 100 days to build a house. 3 weeks have passed.
You buy 5 DVDs for $15 each.	Bill used a $10 bill to pay for a $4.65 cup of coffee.	Nina left a $12 tip on a $42.60 lunch bill.
There were 325 students in 6th grade last year. There are 40 less this year.	A soccer team raised $4,250 for charity last year. This year they raised $575 more.	Tim pays a moving company $50 per hour. They help him move for 9 hours.

Ordering Rational Numbers

Put the given numbers in order.

Put the following numbers in order from least to greatest. $0.3, 0.13, 0.32, 0.303$	Put the following numbers in order from greatest to least. $6.05, 6.007, 6.5, 6.25$
Put the following numbers in order from greatest to least. $8.2, 0.82, \frac{4}{5}, 0.08$	Put the following numbers in order from least to greatest. $^{-}3\frac{1}{2}, 2\frac{1}{2}, 2\frac{10}{11}, ^{-}2\frac{1}{2}$
Put the following numbers in order from least to greatest. $^{-}5.2, 5.04, ^{-}5.42, ^{-}5, 5.14$	Put the following numbers in order from least to greatest. $^{-}2, 2.2, ^{-}2.2, ^{-}2.02, 2$
Put the following numbers in order from greatest to least. $\frac{^{-}2}{5}, 2.5, ^{-}0.42, ^{-}2.2, 0.22$	Put the following numbers in order from greatest to least. $\frac{1}{5}, 0.02, \frac{11}{50}, 0.022$

MULTIPLYING DECIMALS

Find each product.

3.2 • 4.6	8.9 • 4.1	6.2 • 3.9	8.2 • 0.4
6.12 • 4.3	9.86 • 0.2	4.32 • 0.15	62.3 • 1.4
5.82 • 1.6	13.45 • 2.2	20.04 • 8.4	50.4 • 0.22

Veronica ran 2.5 times around a 4.62 mile course. How far did she run?	A car drove 5 times around a 3.67 mile track. How far did it travel?

DIVIDING DECIMALS

Find each quotient.

13.2 ÷ 6	9.4 ÷ 2	8.3 ÷ 5	29.2 ÷ 4
25.2 ÷ 5	6.4 ÷ 8	10.35 ÷ 9	30.4 ÷ 8
A 32.34 inch piece of ribbon is cut into 6 pieces. How long is each piece?		A 14.24 pound bag of cheese is split among 5 pizzas. How much chees is on each pizza?	
An 8.2 pound bag of candy is shared equally among 10 teachers. How much candy did each teacher get?		A 6.5 foot long piece of wood is cut into 5 sections. How long is each section?	

decimal word problems

Read each problem carefully.

Emma is 7.8 years old. She is 1.2 times older than Gavin. How old is Gavin?	Eileen had $2.47 left on her lunch account. She spent $1.86 today. How much money is now left on her account?
Hank ran 1.6 miles on Monday, 2.08 miles on Tuesday and 3.65 miles on Wednesday. How many miles did he run over the three days?	Christina bought 4.2 pounds of bananas for $0.49 per pound. How much did she spend on bananas?
Four people split a $46.80 prize equally. How much does each person get?	Sam and Peter went fishing. Sam caught 12.67 pounds of fish and Sam caught 9.29 pounds of fish. They gave away 2.75 pounds. What is the weight of the fish they have left?
Mr. Johnson purchased 4 pieces of wood for $1.99 each and 6 pieces for $3.85 each. How much did he spend on wood?	Emilio makes $12.75 per hour. How much does he make for working 8.8 hours?

fraction word problems

Read each problem carefully.

$\frac{1}{2}$ of $\frac{4}{7}$ of a pizza was eaten. The next day, $\frac{1}{2}$ of what was left was eaten. How much is left of the original pizza?	Erin brought $8\frac{1}{2}$ pounds of ham to a party. Ryan brought an additional $2\frac{3}{5}$ pounds. How much ham was brought to the party?
Yvette ran $4\frac{7}{8}$ miles. Greg ran $1\frac{7}{10}$ miles. How much further did Yvette run?	A recipe calls for $5\frac{1}{3}$ cups of sugar. How much sugar will be needed if the recipe is quadrupled?
Betty is making $4\frac{1}{2}$ dozen cookies. She needs $1\frac{7}{8}$ cups of chocolate chips are for one dozen cookies. How many cups of chocolate chips does Betty need?	A fish tank holds $12\frac{3}{5}$ gallons of water. The fish tank is filled $\frac{7}{8}$ of the way. How much water is in the fish tank?
Liz drank $\frac{10}{12}$ of a gallon of water yesterday and $1\frac{1}{3}$ gallons today. How much water has Liz consumed over the last two days?	There are 40 students in an art club. $\frac{2}{5}$ of the students are females. How many students in the art club are females?

Integers in the Real World

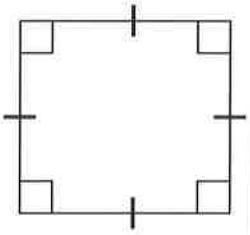
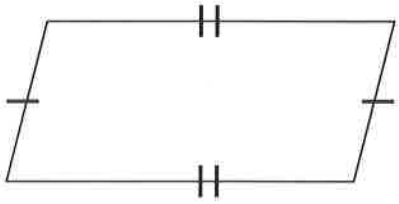
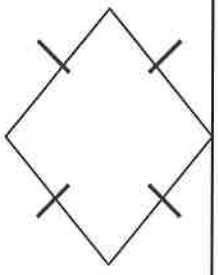
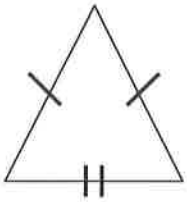
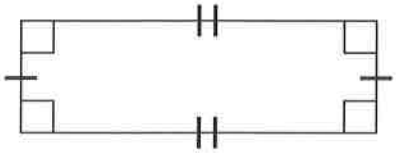
Write an integer to represent each situation.

A loss of 14 pounds.	A bird flying 42 feet in the air.	A fish swimming 23 feet below the surface of the water.	A drop of 30 degrees.
A dog is 2.3 pounds overweight.	Mr. Brown is $2,000 in debt.	A car is parked 52 feet down in an underground garage.	Brett climbed 11 feet up a ladder.
Workers dug down 15 feet to start building a home.	The price of a movie increased $2.50.	A coupon was used for $20 off.	A bank withdraw of $40.
A bank deposit of $240.	Barbara spent $65 on groceries.	A scuba diver ascended 10 feet.	The depth of snow went from 2 inches to 6 inches.

MEASUREMENT CONVERSIONS

How many quarts are in 9 gallons?	How many gallons are in 44 quarts?	How many cups are in 6 pints?
How many feet are in 3.5 yards?	How many centimeters are in 5 ½ meters?	How many quarts are in 2.5 gallons?
How many pints are in 4 quarts?	How many inches are in 2 ¾ yards?	How many centimeters are in 3 ½ meters?
How many meters are in 450 centimeters?	How many yards are in 38 inches?	How many gallons are in 10 quarts?
How many pints are in 4 gallons?	How many pints are in 40 ounces?	How many feet are in 2.4 yards?

CLASSIFYING SHAPES

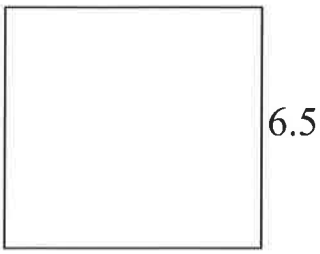
Is there a difference between a parallelogram and a trapezoid? Either explain in words or draw to prove your answer.	Is a rectangle also a square? Explain.	What shape has two pair of parallel lines? (There could be more than one correct answer).
Draw two regular polygons.	Identify the characteristics of a triangle.	What shape has two pair of parallel lines and four right angles? (There could be more than one correct answer).
Classify the shape below. Use all terms that correctly identify the shape. 	Classify the shape below. Use all terms that correctly identify the shape. 	Classify the shape below. Use all terms that correctly identify the shape. 
Classify the shape below. Use all terms that correctly identify the shape. 	Classify the shape below. Use all terms that correctly identify the shape. 	Classify the shape below. Use all terms that correctly identify the shape. 

AREA OF QUADRILATERALS

Find the area of each shape.

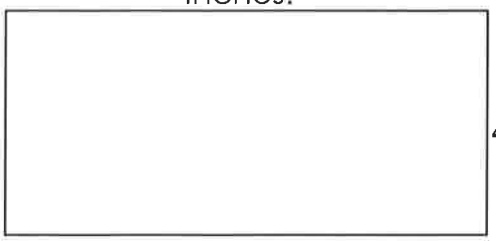
Inches:

Feet:

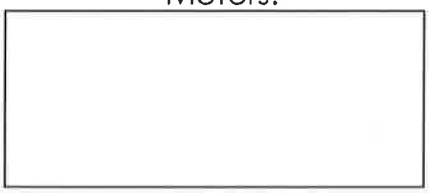


Centimeters:

Inches:

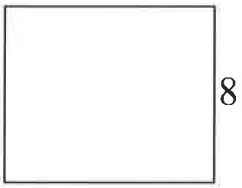


Meters:



Yards:

Inches:

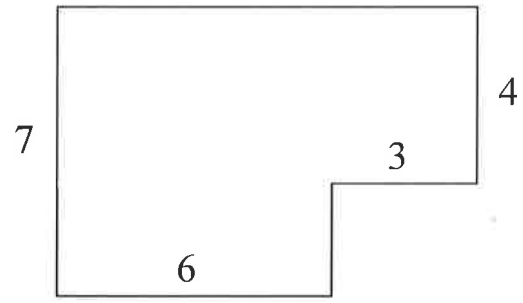


Feet:

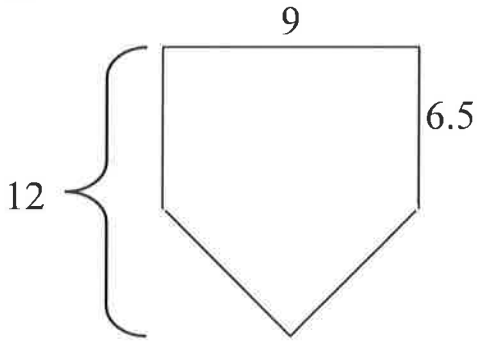
COMPOSITE AREA

Find the area of each figure.

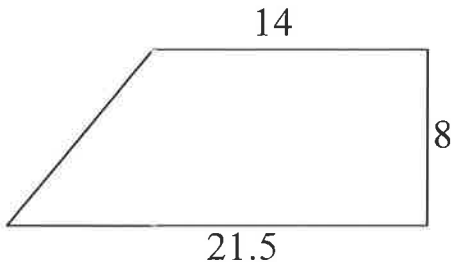
Inches:



Feet:



Centimeters:



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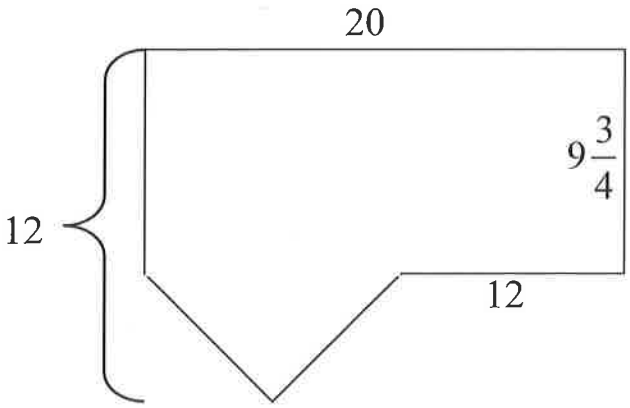

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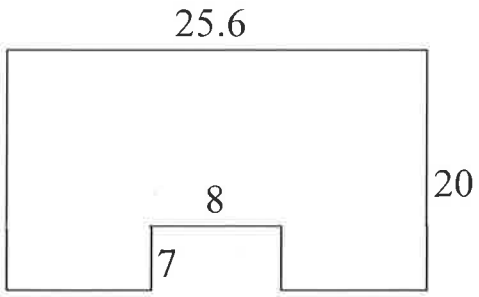

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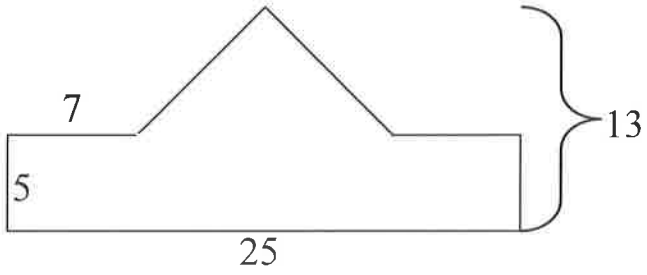
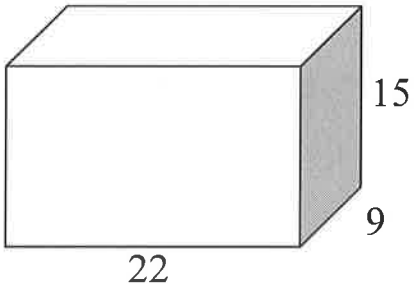


VOLUME

Find the volume of each figure.

Inches



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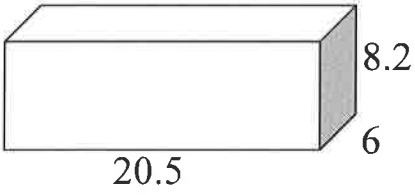
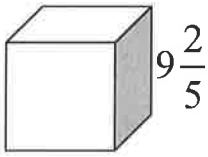


Centimeters



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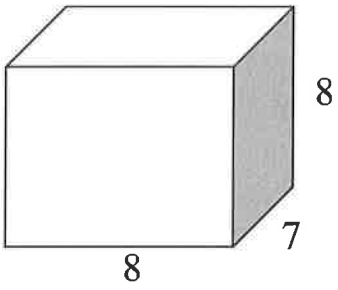

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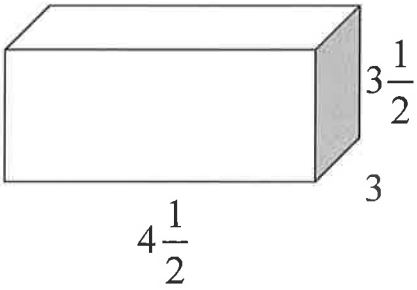

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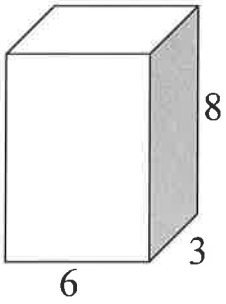
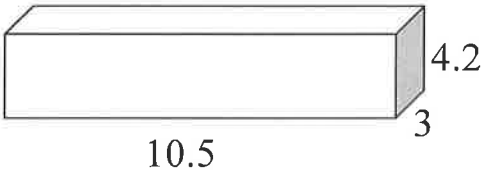
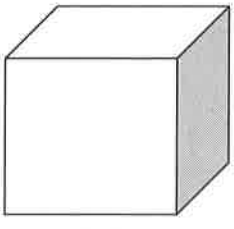


Centimeters



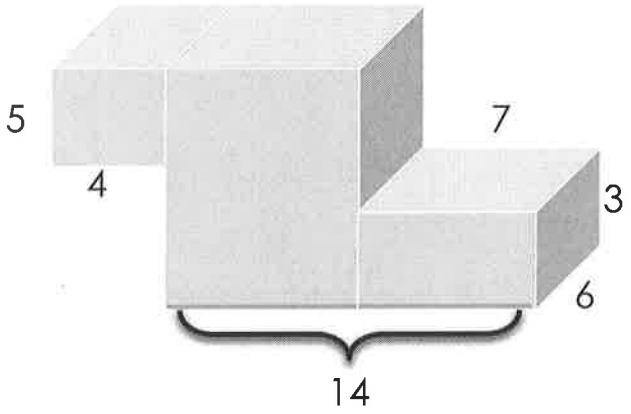
Inches



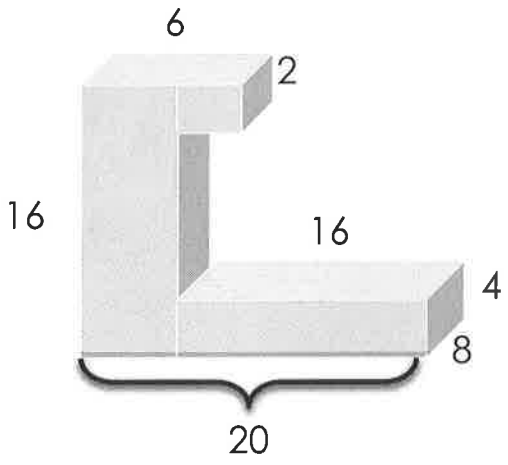
VOLUME

Find the volume of each composite shape.

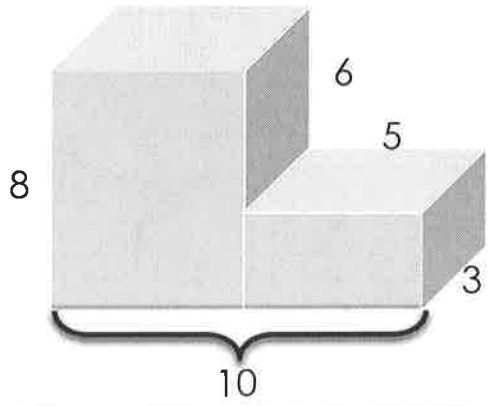
Inches



Feet



Centimeters



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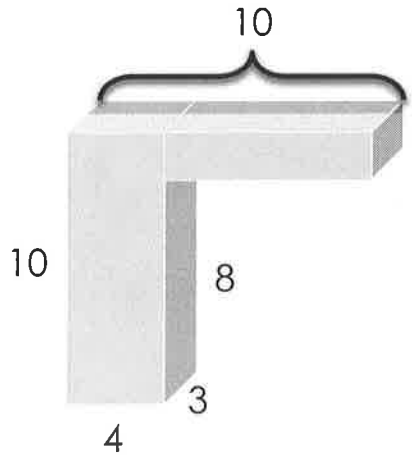

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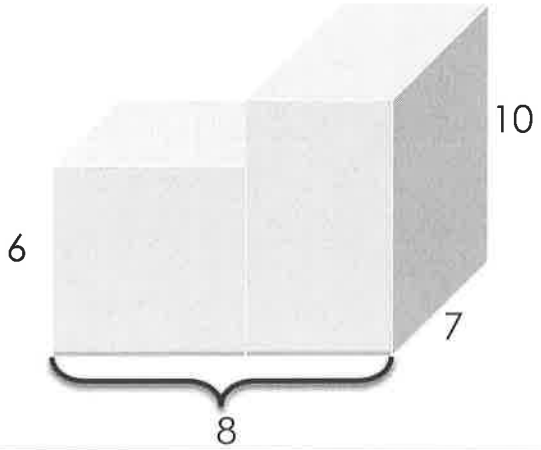
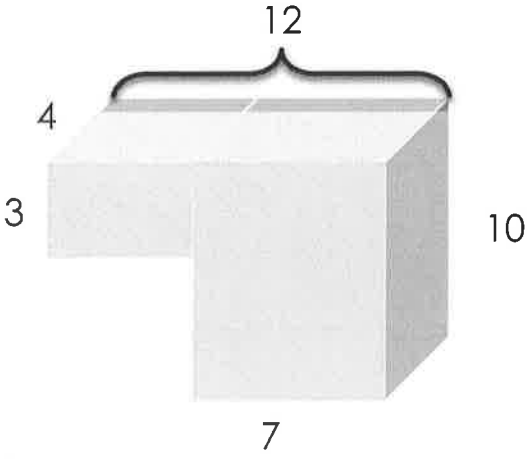


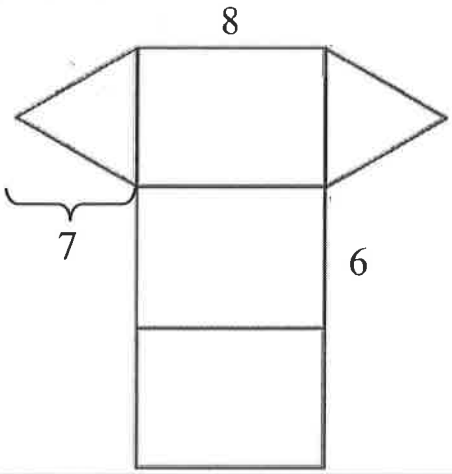
Feet



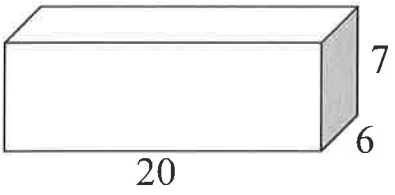
3d figures & nets

Read each problem carefully.

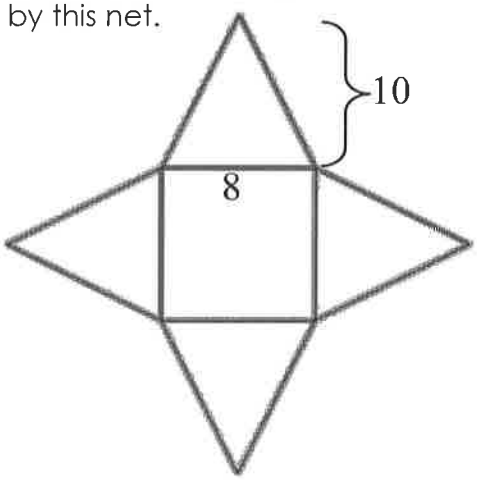
Find the surface area of the shape represented by this net.



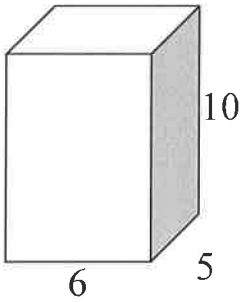
Find the surface are of the figure below.



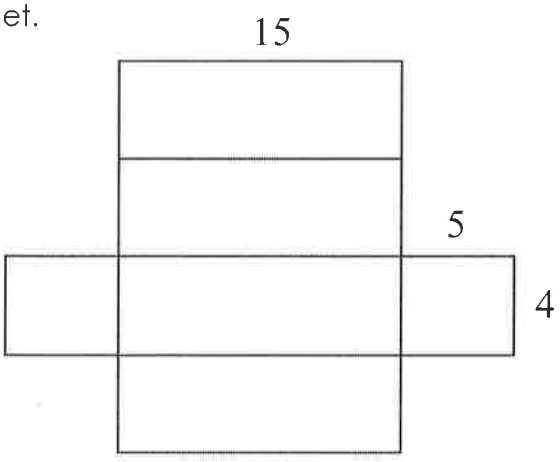
Find the surface area of the shape represented by this net.



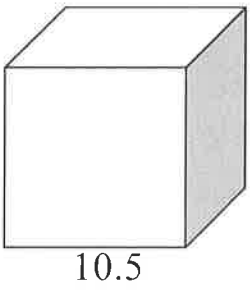
Find the volume of the figure below.



Find the volume of the shape represented by this net.



Find the surface are of the figure below.



Unit Rate

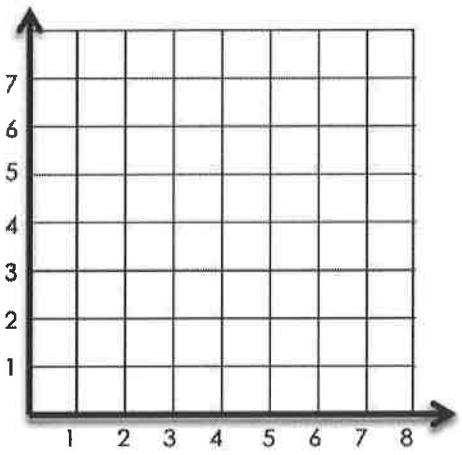
Determine each unit rate.

$4.50 for 2 gallons of gas.	$14.80 for 4 pounds of fruit.	145 miles on 9 gallons of gas.	$25 for seven tickets.
$14 for 6 drinks.	11 miles in 45 minutes.	918 miles in 18 hours.	240 t-shirts made in 9 hours.
210 donuts can be made in 10 hours. How many can be made in 3 hours?		An airplane travels 475 miles in 5 hours. How far will the airplane travel in 9 hours?	
You bought 11 books for $42.35. How much would 15 books cost?		In 9 hours, 2 inches of rain fell. At this rate, how many inches would fall in 12 hours?	

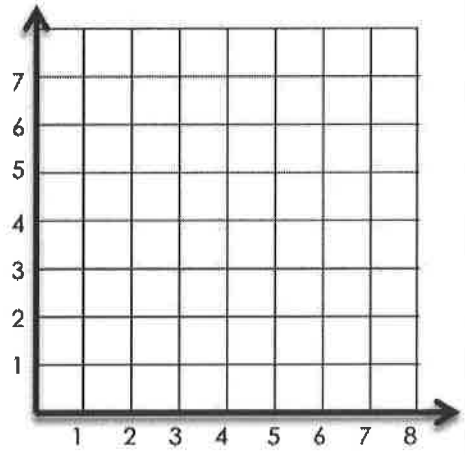
COORDINATE PLANES

Plot the following points.

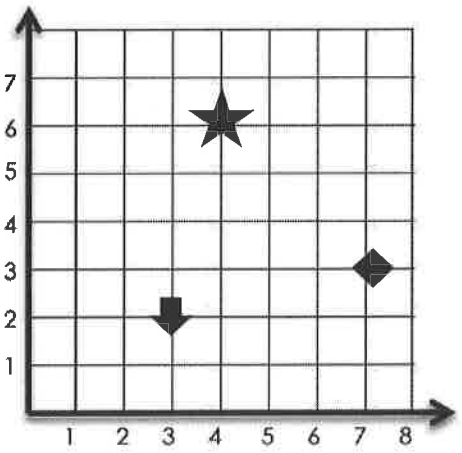
(2, 3)
(4, 1)
(6, 3)
(4, 5)



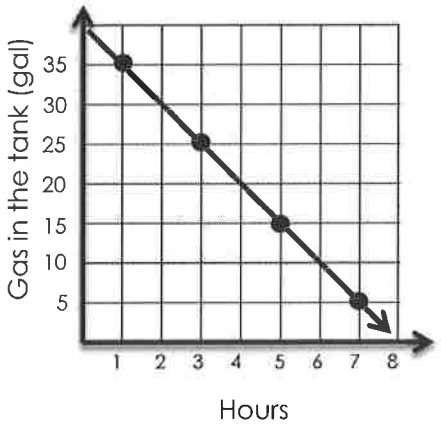
If you start at point (2, 2) and move right 3, then up 5, where do you end up?



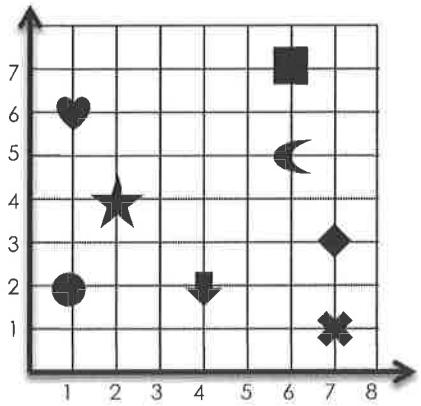
Which shape is closest to the point (2, 5)?



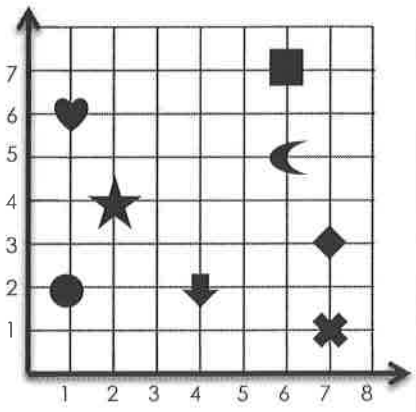
Based on the graph below, how much gas is left in the tank after 4 hours?



What shape is at (6, 7)?

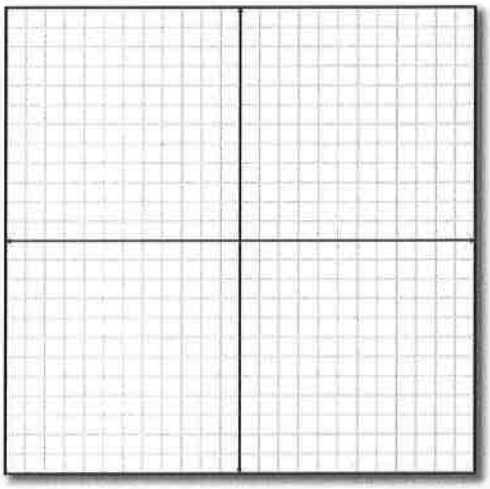


What are the coordinates of the heart?



QUADRANTS

Read each problem carefully.

Label each quadrant. 	In which quadrant would you find the point $(5, -8)$?
In which quadrant would you find the point $(3, 9)$?	In which quadrant would you find the point $(-4, -4)$?
In which quadrant would you find the point $(-1, 6)$?	In which quadrant would you find the point $(1.2, -4.5)$?

Writing Expressions

Write an expression for each situation.

You pay $1.25 per pound for x pounds of apples.	Emma weighs 38 pounds. Gavin weighs x pounds less.	Four friends split an $x dinner bill.
There are 15 kids on a bus. x more get on.	You have $x on a gift card and spend $9.50.	It takes x days to build a house. 3 weeks have passed.
You buy x DVDs for $15 each.	Bill used a $10 bill to pay for a $x cup of coffee.	Nina left an $x tip on a $42.60 lunch bill.
There were 325 students in 6th grade last year. There are x less this year.	A soccer team raised $4,250 for charity last year. This year they raised $x more.	Tim pays a moving company $50 per hour. They help him move for x hours.

SOLVING EQUATIONS

Solve each equation.
Show your work.

$3x = 15$	$\frac{x}{3} = 45$	$x - (^{-}8) = 4$
$9 + x = 2$	$^{-}1 + x = ^{-}3$	$^{-}x = 14$
$^{-}3x = 18$	$\frac{^{-}x}{5} = 20$	$\frac{1}{2}x = ^{-}8$
$4\frac{1}{2} + x = 9$	$x - 14 = ^{-}2$	$x + (^{-}3) = ^{-}12$

Writing Inequalities

Write an inequality to represent each situation.

A number is at least -43.	Twice a number is no more than 14.	Half a number is more than 20.
You can pay no more than $20 for groceries.	Emily has already invited 6 friends to her party. She wants to invite at least 20 people altogether.	The temperature is at most 20° outside.
7 is greater than a number.	A number is less than or equal to -15.	-8 is more than triple a number.
At least 40 students need to return their permission slips in order for the field trip to take place.	A soccer team raised more than $4,250 for charity.	Tim earns at most $9 an hour at his job.

SOLUTIONS TO EQUATIONS AND INEQUALITIES

Identify whether or not the given number is a solution.

$3x+4=12\ ;\ 3$	$^{-}4x+2=^{-}14\ ;\ 4$	$\frac{x}{2}=10\ ;\ 5$
$5+(^{-}2)x=15\ ;\ 5$	$\frac{1}{4}x=20\ ;\ 40$	$5\frac{1}{2}+x=10\frac{1}{4}\ ;\ 5\frac{1}{4}$
$5+x\leq ^{-}10\ ;\ ^{-}5$	$^{-}2x>22\ ;\ 10$	$^{-}x+4<8\ ;\ 10$
$^{-}x-2>^{-}3\ ;\ ^{-}5$	$x-5\leq 8\ ;\ ^{-}13$	$3x-5<4\ ;\ 3$

measures of central tendency

Show all work.

Ages of children in a camp : 5, 6, 8, 4, 6, 7, 8, 9, 12, 8, 10	
Find the mean of the ages.	Find the median age.
Find the range of the ages.	Find the mode of the ages.
Height of seventh graders (inches) : 48, 60, 62, 55, 49, 52, 60, 58	
Find the median height.	Find the range of the heights.
Find the mode of the heights.	Find the mean height.

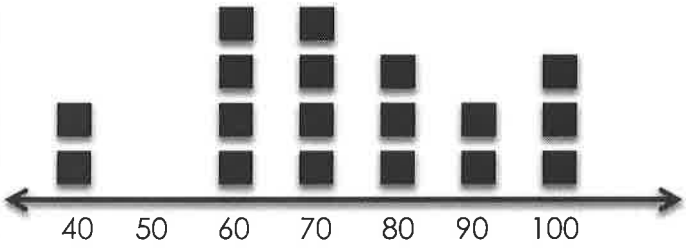
LINE PLOTS

For questions 1 – 2, create a line plot using the given information.

1. The ages of kids in an art club:
6, 8, 9, 8, 7, 10, 8, 9, 7, 7, 6, 9, 10, 10, 8, 8

2. The height of flowers in a garden:
12, 16, 17, 15, 16, 14, 15, 16, 17, 14, 14, 16, 19, 12, 14, 17

Use the line plot below to answer questions 3 – 5.



3. The line plot shows test scores for a 10 question quiz. How many students scored higher than 70%?

4. How many students got a perfect score?

5. How many students scored 60% or lower?

absolute value

Read each problem carefully.

What is the definition of absolute value?		Find the absolute value of -5.
How far is 6 from zero on a number line?	Is the absolute value of a number the same as the opposite? Explain.	
Find the absolute value of -4.3.	Find the absolute value of 0.	How far is -8 from zero on a number line?
Find the absolute value of 1.	Find the absolute value of 8.	Find the absolute value of 140.
Find the absolute value of $-\frac{3}{4}$.	Find the absolute value of 1.4.	Find the absolute value of -12.