Math 7   NO CALCULATORS   Name_____

Add, Subtract, Multiply, Divide Rational Numbers   Date_____ Period____

Evaluate each expression.

1) $(-7) + (-4) + 7$

2) $(-4) + 8 - (-2)$

3) $(-1) - (-4) - (-3)$

4) $(-1) - 4 + 6$

Find each product.

5) $7 \cdot -6 \cdot 6$

6) $-10 \cdot -9 \cdot -1$

7) $-7 \cdot 6 \cdot -8$

8) $-3 \cdot 2 \cdot -6$

9) $-\dfrac{5}{3} \cdot -\dfrac{3}{4}$

10) $-\dfrac{7}{4} \cdot \dfrac{1}{2}$

Find each quotient.

11) $7 \div -1$

12) $6 \div 3$

13) $-6 \div 6$

14) $-45 \div 9$

15) $\dfrac{-3}{4} \div \dfrac{5}{8}$

16) $-2\dfrac{1}{5} \div \dfrac{-6}{5}$

Evaluate each expression.

17) $(-6.3) - (-7.46)$

18) $(-3.4) - 1.5$

19) $\dfrac{8}{5} - \left(-\dfrac{4}{5}\right)$

20) $\left(-1\dfrac{1}{2}\right) + \dfrac{3}{4}$

21) $(-30 - 10) \div -4 + -5 - 2$

22) $5 \cdot 8 + 2 - (-6 - -5)$

Evaluate each using the values given.

23) $n - (m + n)$; use $m = 2$, and $n = -3$

24) ab^2; use $a = -3$, and $b = 4$

25) $\dfrac{ab}{6}$; use $a = 3$, and $b = -4$

26) $(c)(a - b)$; use $a = 4$, $b = 2$, and $c = -2$

27) $(m)(p - 2)$; use $m = 5$, and $p = -5$

28) $\dfrac{j}{4} - h$; use $h = -6$, and $j = -4$

29) $(-6)(m - n)$; use $m = -\dfrac{5}{4}$, and $n = -\dfrac{4}{3}$

30) $x + x + y$; use $x = -\dfrac{3}{4}$, and $y = \dfrac{11}{6}$

Answers to Add, Subtract, Multiply, Divide Rational Numbers (ID: 1)

1) -4

2) 6

3) 6

4) 1

5) -252

6) -90

7) 336

8) 36

9) $\dfrac{5}{4}$

10) $-\dfrac{7}{8}$

11) -7

12) 2

13) -1

14) -5

15) $-1\dfrac{1}{5}$

16) $1\dfrac{5}{6}$

17) 1.16

18) -4.9

19) $2\dfrac{2}{5}$

20) $-\dfrac{3}{4}$

21) 3

22) 43

23) -2

24) -48

25) -2

26) -4

27) -35

28) 5

29) $-\dfrac{1}{2}$

30) $\dfrac{1}{3}$

Name : _____   Score : _____

Teacher : _____   Date : _____

Converting Between Percents, Decimals, and Fractions

Convert Decimal to Percent

0.841 =   0.54 =   1.95 =

1.87 =   0.768 =   0.615 =

Convert Percent to Decimal

25.1 % =   113 % =   29.8 % =

74 % =   19 % =   177 % =

Convert Decimal to Fraction

0.881 =   1.46 =   1.49 =

0.283 =   1.79 =   0.22 =

Convert Fraction to Decimal

$\frac{3}{8}$ = $\frac{1}{50}$ = $\frac{27}{40}$ =

$\frac{9}{20}$ = $\frac{5}{16}$ = $\frac{9}{10}$ =

Convert Fraction to Percent

$\frac{17}{25}$ = $\frac{93}{50}$ = $\frac{12}{50}$ =

$\frac{7}{20}$ = $\frac{17}{10}$ = $\frac{28}{25}$ =

Convert Percent to Fraction

143 % =   68 % =   22.9 % =

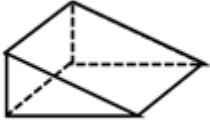150 % =   169 % =   79 % =

Name: _____ Date: _____

7th Grade Summer Practice

1. How many edges are in a Rectangular Prism? (draw one or look at a box if necessary)
a. 6
b. 15
c. 12
d. 10

2. Name the figure:

a. Rectangular Pyramid
b. Triangular Prism
c. Rectangular Prism
d. Triangular Pyramid

3. What is volume of a cylinder with a base of diameter 4m and a height of 6 m? (Use 3.14)
a. 75.36 m^3
b. 301.44 m^3
c. 908.32 m^3
d. 1205.76 m^3

4. A triangular pyramid has a base with area 12 ft^2 and a height of 5 ft, what is the volume of the pyramid?
a. 24 ft^3
b. 30 ft^3
c. 60 ft^3
d. Cannot be determined

5. A square pyramid has base edges of 0.3 mm and a height of 10 cm, what is its volume?
a. 3.0 cm^3
b. 9.0 mm^3
c. 30 mm^3
d. 900 mm^3

6. A cube with edges 5 ft is compared to a cube with edges 10 ft. How many times bigger is the volume of the larger cube?
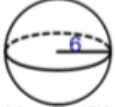a. 4
b. 6
c. 8
d. 875
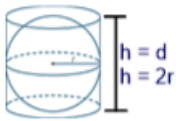
Name: _____   Date: _____

7th Grade Summer Practice

Volume of a Sphere

A sphere is 2/3 the volume of a cylinder
with the same base area
($B = \pi r^2$) and height ($h = d = 2r$).

$h = d$ $h = 2r$	$V = 2/3\ (\pi r^2 h)$ $V = 2/3\ \pi r^2(2r)$ $V = 4/3\pi r^3$	$V = \frac{4}{3}\pi(6)^3$ $V = 288\pi\ u^3$ $V = 904.32\ u^3$

Volume of a Pyramid

A pyramid is 1/3 the volume of a prism with
the same base area (B) and height (h).

$$V = (Bh) \div 3 \quad \text{or} \quad V = \frac{1}{3}(Bh)$$

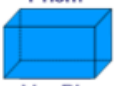| The shape of your base matches the name of the pyramid	Rectangular Pyramid	Triangular Pyramid
The shape of your base matches the name of the pyramid	$V = \frac{1}{3}Bh$ $V = \frac{1}{3}(lw)h$	$V = \frac{1}{3}Bh$ $V = (\frac{1}{2}b_\Delta h_\Delta)h_{pyramid}$ $h_{pyramid}$ h_Δ b_Δ

7th Grade Summer Practice
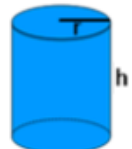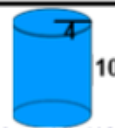
Volume of a Prism

Found by multiplying the Area of the base (B) and the height (h).

$$V = Bh$$

The shape of your base matches the name of the prism	Rectangular Prism $V = Bh$ $V = (lw)h$	Triangular Prism $V = Bh$ $V = (\frac{1}{2}b_1h_1)h_{prism}$

Volume of a Cylinder

Found by multiplying the Area of the base (B) and the height (h).

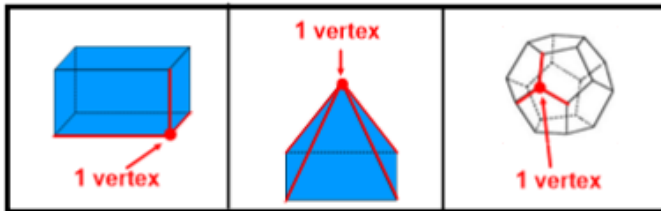| Since your base is always a circle, your volume formula for a cylinder is $V = Bh$ $\boxed{V = \pi r^2 h}$	$V = \pi r^2 h$	$V = \pi(4)^2(10)$ $V = 160\pi$ units³ $V = 502.4$ u³

7th Grade Summer Practice
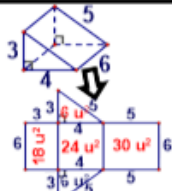
Vertex

Point where 3 or more faces/edges meet
Plural: Vertices

	1 vertex	
1 vertex		1 vertex

Surface Area

The sum of the areas of *all* outside
surfaces of a 3-D figure.

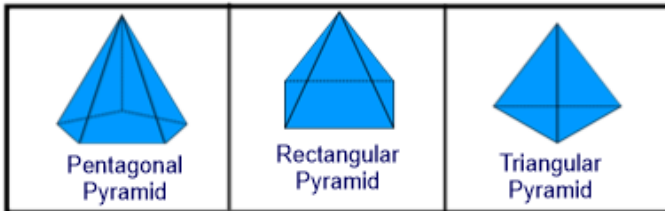| 1. Find the area of each surface of the figure
2. Add all of the areas together | 5
3 _ 6
4
3 3 6 u² 5
6 18 u² 24 u² 30 u² 6
4
3 6 u² 5 | 18
24
30
6
+ 6
SA = 84 units² |

7th Grade Summer Practice

Pyramid

A polyhedron that has 1 polygon base with a vertex opposite it. Remaining sides are triangular. Named by the shape of their base

Pentagonal Pyramid	Rectangular Pyramid	Triangular Pyramid

Prism

A polyhedron that has 2 congruent, polygon bases which are parallel to one another. Remaining sides are rectangular (parallelograms). Named by the shape of the base.

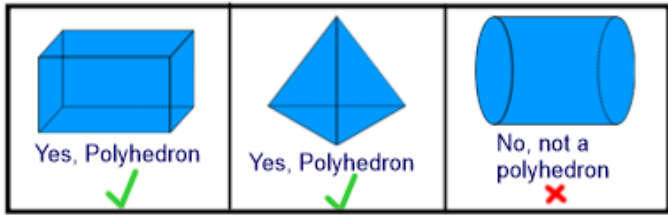|		
Triangular Prism	Hexagonal Prism	Octagonal Prism
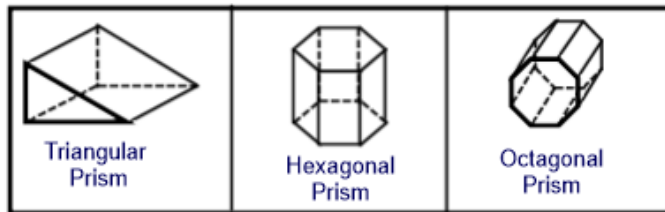
7th Grade Summer Practice

Polyhedron

A 3-D figure whose faces are *all* polygons.
A Polyhedron has NO curved surfaces.
Plural: Polyhedra

Yes, Polyhedron ✓	Yes, Polyhedron ✓	No, not a polyhedron ✗

Net

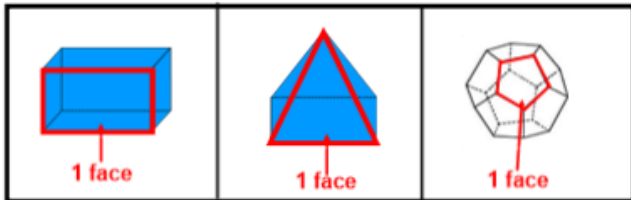A 2-D pattern of a 3-D solid that can be folded to form the figure. An unfolded geometric solid.

Solid → Net	Solid → Net	Solid → Net
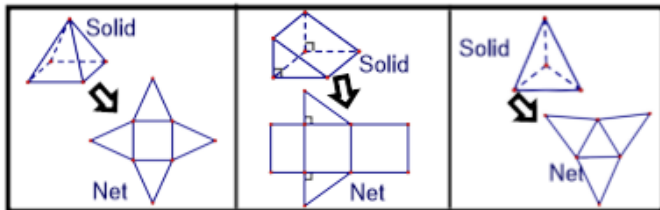
7th Grade Summer Practice

Face

Flat surface of a Polyhedron.

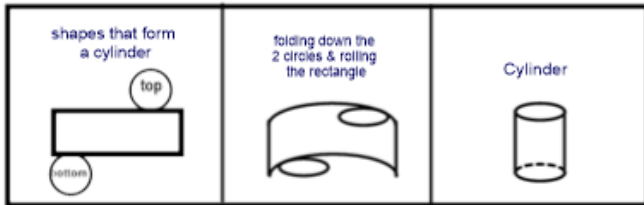|		
1 face	1 face	1 face

Cylinder

A solid that has 2 congruent, circular bases
which are parallel to one another.
The side joining the 2 circular bases is a
curved rectangle.

shapes that form a cylinder	folding down the 2 circles & rolling the rectangle	Cylinder
top bottom		

Solve the Two-Step Equations

$2m + 3 = m - 3$	$\dfrac{a}{7} + \dfrac{1}{4} = \dfrac{5}{6}$
$\dfrac{18.62 + z}{2.01} = -1.2$	$\dfrac{v}{-8} = v + 4$
$-\dfrac{2}{3}\left(k + \dfrac{2}{5}\right) = \dfrac{5}{6}$	$b + 2.35 = 9.78 + 2b + 7.22$

Student Name: _____   Score:

Answers

<table>
<tr>
<td>

$2m + 3 = m - 3$

$m = -6$

</td>
<td>

$\dfrac{a}{7} + \dfrac{1}{4} = \dfrac{5}{6}$

$a = \dfrac{49}{12} \ or \ 4\dfrac{1}{12}$

</td>
</tr>
<tr>
<td>

$\dfrac{18.62 + z}{2.01} = -1.2$

$z = -21.032$

</td>
<td>

$\dfrac{v}{-8} = v + 4$

$v = -\dfrac{32}{9} \ or -3\dfrac{5}{9}$

</td>
</tr>
<tr>
<td>

$-\dfrac{2}{3}\left(k + \dfrac{2}{5}\right) = \dfrac{5}{6}$

$k = \dfrac{33}{20} \ or \ 1\dfrac{13}{20}$

</td>
<td>

$b + 2.35 = 9.78 + 2b + 7.22$

$b = -14.65$

</td>
</tr>
</table>

One-Step Equations – Integers, Fractions and Decimals

Solve the one-step equations:

$9.4 + p = 4.8$	$\dfrac{y}{5} = \dfrac{2}{5}$
$8s = \dfrac{1}{2}$	$v - 21 = 19$
$\dfrac{q}{2.78} = 9$	$k + 21 = 35$
$a - \dfrac{3}{7} = \dfrac{2}{7}$	$\dfrac{4}{5}m = \dfrac{2}{9}$

Answers

$9.4 + p = 4.8$ $p = -4.6$	$\dfrac{y}{5} = \dfrac{2}{5}$ $y = 2$
$8s = \dfrac{1}{2}$ $s = \dfrac{1}{16}$	$v - 21 = 19$ $v = 40$
$\dfrac{q}{2.78} = 9$ $q = 25.02$	$k + 21 = 35$ $k = 14$
$a - \dfrac{3}{7} = \dfrac{2}{7}$ $a = \dfrac{5}{7}$	$\dfrac{4}{5}m = \dfrac{2}{9}$ $m = \dfrac{5}{18}$

Student Name: _____   **Score:**

Name_____

Multi-Step Equations

Date_____ Period_____

Solve each equation.

1) $6a + 5a = -11$

2) $-6n - 2n = 16$

3) $4x + 6 + 3 = 17$

4) $0 = -5n - 2n$

5) $6r - 1 + 6r = 11$

6) $r + 11 + 8r = 29$

7) $-10 = -14v + 14v$

8) $-10p + 9p = 12$

9) $42 = 8m + 13m$

10) $a - 2 + 3 = -2$

11) $18 = 3(3x - 6)$

12) $30 = -5(6n + 6)$

13) $37 = -3 + 5(x + 6)$

14) $-13 = 5(1 + 4m) - 2m$

15) $4(-x + 4) = 12$

16) $-2 = -(n - 8)$

17) $-6(1 - 5v) = 54$

18) $8 = 8v - 4(v + 8)$

19) $10(1 + 3b) = -20$

20) $-5n - 8(1 + 7n) = -8$

21) $8(4k - 4) = -5k - 32$

22) $-8(-8x - 6) = -6x - 22$

23) $8(1 + 5x) + 5 = 13 + 5x$

24) $-11 - 5a = 6(5a + 4)$

25) $-5(4x - 2) = -2(3 + 6x)$

26) $5(2x + 6) = -4(-5 - 2x) + 3x$

Name_____

Multi-Step Equations

Date_____ Period____

Solve each equation.

1) $6a + 5a = -11$

$\{-1\}$

2) $-6n - 2n = 16$

$\{-2\}$

3) $4x + 6 + 3 = 17$

$\{2\}$

4) $0 = -5n - 2n$

$\{0\}$

5) $6r - 1 + 6r = 11$

$\{1\}$

6) $r + 11 + 8r = 29$

$\{2\}$

7) $-10 = -14v + 14v$

No solution.

8) $-10p + 9p = 12$

$\{-12\}$

9) $42 = 8m + 13m$

$\{2\}$

10) $a - 2 + 3 = -2$

$\{-3\}$

11) $18 = 3(3x - 6)$

$\{4\}$

12) $30 = -5(6n + 6)$

$\{-2\}$

13) $37 = -3 + 5(x + 6)$

{2}

14) $-13 = 5(1 + 4m) - 2m$

{−1}

15) $4(-x + 4) = 12$

{1}

16) $-2 = -(n - 8)$

{10}

17) $-6(1 - 5v) = 54$

{2}

18) $8 = 8v - 4(v + 8)$

{10}

19) $10(1 + 3b) = -20$

{−1}

20) $-5n - 8(1 + 7n) = -8$

{0}

21) $8(4k - 4) = -5k - 32$

{0}

22) $-8(-8x - 6) = -6x - 22$

{−1}

23) $8(1 + 5x) + 5 = 13 + 5x$

{0}

24) $-11 - 5a = 6(5a + 4)$

{−1}

25) $-5(4x - 2) = -2(3 + 6x)$

$\{2\}$

26) $5(2x + 6) = -4(-5 - 2x) + 3x$

$\{10\}$

Name: _____   Date: _____

7th Grade Summer Practice

1) Write an equation then solve.
   a. Find the width of a rectangle if its length is 5 more than the width and its perimeter is 90 cm.
   b. Find the length of a rectangle if its width is 13 less than the length and its perimeter is 90 cm.
   c. Four times the sum of a number and -3 is 27 less than the number.
   d. Six times the difference of a number and 9 is 19 less than the number.

2) Rafael has 3 times as many blue marbles as he does red marbles. He has a total of 124 marbles. How many red marbles does he have? How many blue marbles does he have?

3) Luna is going bowling. Shoe rental cost $3 and the lane cost $2 per game. If Luna paid a total of $17, how many games did she bowl?

4) Jose went to an all-you-can-eat buffet. He paid $15 for his meal and $2 for each soda. If Jose spent $21, how many sodas did he buy?

5) Audra and Tina are shopping at the Tanger Outlets in Rehoboth Beach, DE. There is no additional sales tax in the state of Delaware.
Part A
At the GUESS Factory Store, Audra purchased 2 pairs of jeans that cost $42 each and 4 shirts. The cost of Audra's total purchase was $132. Write an equation that can be used to find n, the number of shirts that Audra purchased. Drag and drop the appropriate variable or number into each box.

Part B
At the Banana Republic Store, Tina buys 3 T-shirts and 2 skirts. Each T-shirt costs $22.50. Tina pays the clerk $200 and gets $24.50 in change. What is the cost, in dollars, of one skirt?

7th Grade Summer Practice

Write an equation in words.

Then translate that into a mathematical equation.

Tim is eight years older than Kathy. Write an equation for Kathy's age.

Tim's age is equal to Kathy's plus 8

$T = K + 8$

Write an equation in words.

Then translate that into a mathematical equation.

Bob is 6 inches less than twice the height of Fred. Write an equation for Bob's height.

Bob's height equals double Fred's height less 6

$B = 2F - 6$

We can use our algebraic translating skills to solve other problems.

We can use a variable to show an unknown.
A constant will be any fixed amount.
If there are two separate unknowns, relate one to the other.

_____ x _____ + _____ = _____
 Rate   Variable   Constant   Total

Do not always have rate and constant. Could have one or both.

Name: _____   Date: _____

7th Grade Summer Practice

The school cafeteria sold 225 chicken meals today. They sold twice the number of grilled chicken sandwiches than chicken tenders. How many of each were sold?

2c + c = 225

chicken sandwiches	chicken tenders	total meals
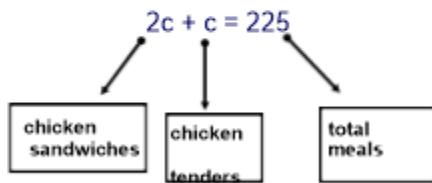
$c + 2c = 225$
$\dfrac{3c}{3} = \dfrac{225}{3}$
$c = 75$

The cafeteria sold 150 grilled chicken sandwiches and 75 tenders.

Julie is matting a picture in a frame. Her frame is $9\frac{1}{2}$ inches wide and her picture is 7 inches wide. How much matting should she put on either side?

2m + 7 = 9.5

both sides of the mat	size of pictur e	size of frame as a decimal
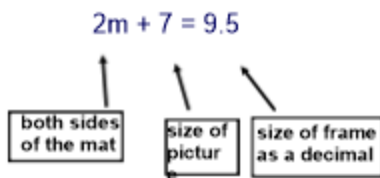
$2m + 7 = 9.5$
$\underline{\quad -7 \quad -7}$
$\dfrac{2m}{2} = \dfrac{2.5}{2}$
$m = 1.25 = 1\frac{1}{4}$

Julie needs $1\frac{1}{4}$ inches on each side.

Many times with equations there will be one number that will be the same no matter what (constant) and one that can be changed based on the problem (variable and coefficient).

Example: George is buying video games online. The cost of the video is $30.00 per game and shipping is a flat fee of $7.00. He spent a total of $127.00. How many games did he buy in all?

Notice that the video games are "per game" so that means there could be many different amounts of games and therefore many different prices. This is shown by writing the amount for one game next to a variable to indicate any number of games.
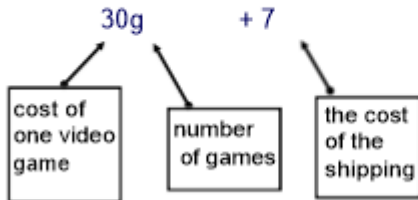
30g

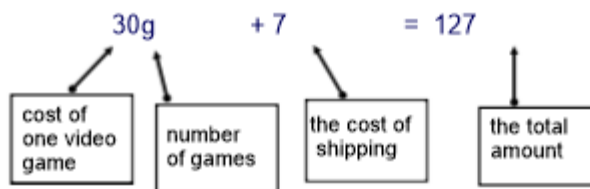| cost of one video game	number of games
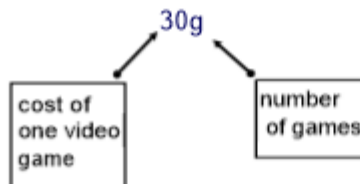
7th Grade Summer Practice

Notice also that there is a specific amount that is charged no matter what, the flat fee. This will not change so it is the constant and it will be added (or subtracted) from the other part of the problem.

$$30g \qquad + 7$$

cost of one video game	number of games	the cost of the shipping

"Total" means equal so here is how to write the rest of the equation.

$$30g \qquad + 7 \qquad = 127$$

cost of one video game	number of games	the cost of shipping	the total amount

$30g + 7 = 127$
  $-7 \quad -7$
$\dfrac{30g}{30} = \dfrac{120}{30}$
  $g = 4$
George bought 4 video games.

7th Grade Summer Practice

Equation

A mathematical statement, in symbols, that two things are exactly the same (or equivalent).

[balance scale] $4x+2 = 14$	$7x = 21$ (where x = 3) $3y + 2 = 11$ (where y = 3) $11 - 1 = 3z + 1$ (where z = 3)	a.k.a. function $d = rt$

Inverse Operation

The operation that reverses the effect of another operation.

Addition + ↓↑ Subtraction Multiplication × ↓↑ ÷ Division	$-5 + x = 5$ $+5 \qquad +5$ ———————— $x = 10$	$11 = 3y + 2$ $-2 \qquad -2$ ———————— $9 = 3y$ $\div 3 \quad \div 3$ ———————— $3 = y$

Name: _____   Date: _____

7th Grade Summer Practice

Directions: Choose the correct answer(s) for the following multiple choice question.

1. What is the perimeter of an equilateral triangle with 6-inch sides?
a. 18 inches
b. 24 inches
c. 27 inches
d. 36 inches

2. A soccer field has a length of 100 yards and a width of 60 yards. What is the perimeter of the field?
a. 160 yards
b. 220 yards
c. 320 yards
d. 6000 square yards

3. What is the area of a rectangle with length 36 cm and width 4 cm?
a. 72 cm
b. 144 cm
c. 144 cm²
d. 72 cm²

4. What is the area of the figure pictured to the right?
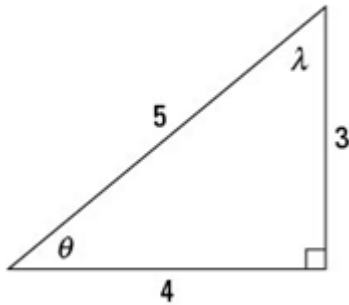
5. A triangle has an area of 36 yd² and a base of 3 yd, what is the height of the triangle?

6. Find the area of the figure to the right.

7th Grade Summer Practice

3 in.

3 in.

2 in.

9 in.
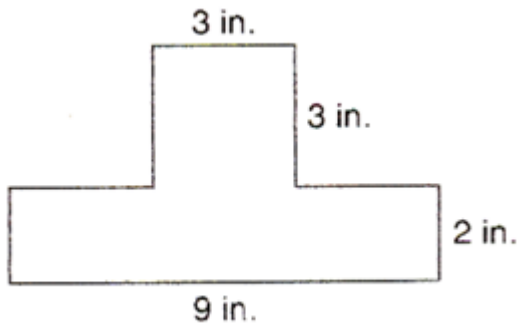
7. Find the height of the parallelogram with a length of 50 in and an area of 275 in².

8. Jewell wants to tile her kitchen floor with tiles that are 1.5 ft². If her kitchen is 18 ft by 12 ft, how many tiles will she need?
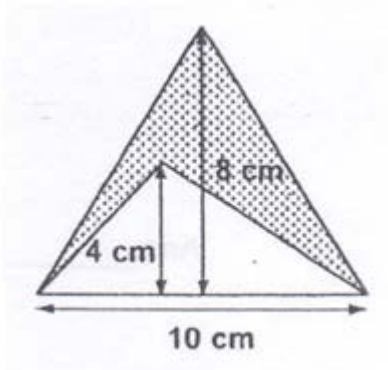
9. Find the area of the figure to the right.

3 cm

4 cm

3 cm

2 cm

5 cm

6 cm

9 cm
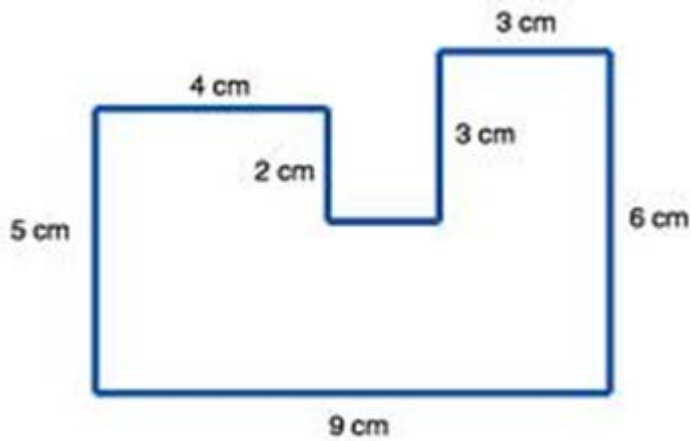
10. Find the area of the shaded region to the right.

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11. A circular carpet covers an area of 201 cm². What is the radius of the carpet?   Use 3.14 as your value of .

12. The doors in your home need to be painted. Each door measures 8 ft x 3 ft. You are amazed that you have 22 doors to paint! A can of paint can cover 400 square feet. How many cans of paint will you need to purchase?
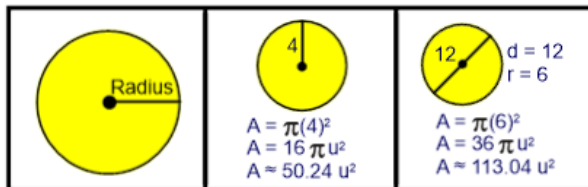
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Area (Space)

The number of square units (units²) it
takes to cover the surface of a figure

Area = 6 units²

Area = 8 units²

Area = 16 units²

Area of a Circle

$$A = \pi r^2$$

Radius

4

$A = \pi(4)^2$
$A = 16\,\pi\,u^2$
$A \approx 50.24\,u^2$

12

d = 12
r = 6

$A = \pi(6)^2$
$A = 36\,\pi\,u^2$
$A \approx 113.04\,u^2$
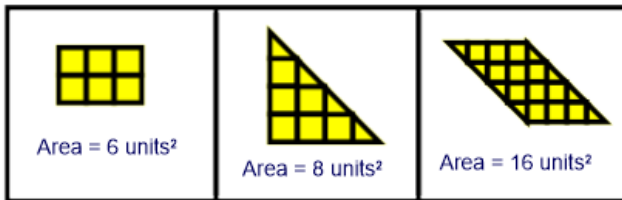
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Area of a Parallelogram

$$A = base(height)$$
$$A = bh$$

h b	8 6 A = 6(8) A = 48 units²	10 8 A = 8(10) A = 80 units²
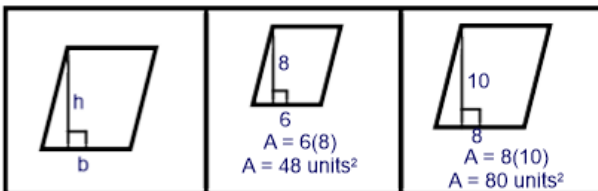
Area of a Rectangle

$$A = length(width)$$
$$A = lw$$

w l	8 3 A = 8(3) A = 24 units²	10 4 A = 10(4) A = 40 units²
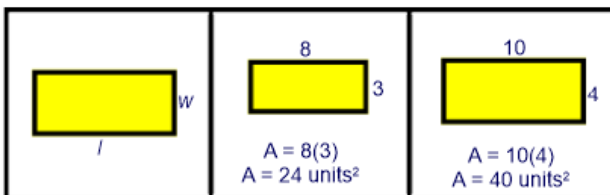
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Area of a Square

$$A = \text{side(side)}$$
$$A = s^2$$

$A = 2^2$
$A = 4 \text{ units}^2$

$A = 5^2$
$A = 25 \text{ units}^2$
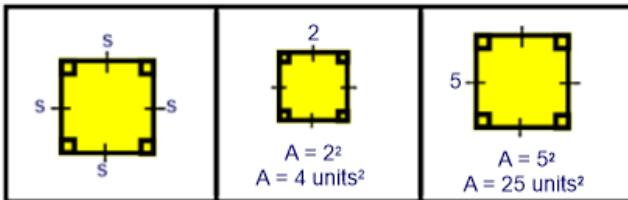
Area of a Trapezoid

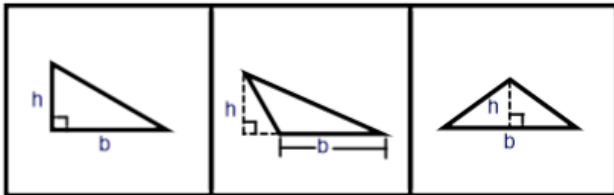$$A = \frac{1}{2}(b_1 + b_2)(h) \quad \text{or} \quad A = \frac{1}{2}h(b_1 + b_2)$$
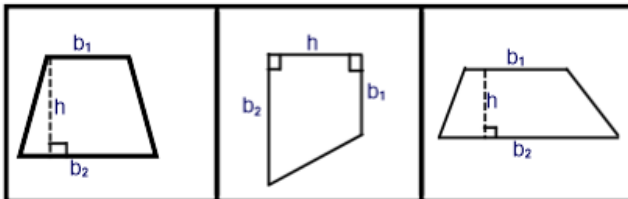
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Area of a Triangle

$$A = \frac{1}{2}bh \quad \text{or} \quad A = \frac{bh}{2}$$

Circumference

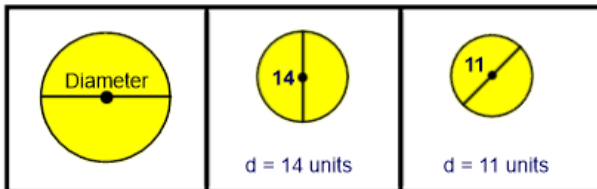The outer boundary of a circle.
The "perimeter" of the circle.
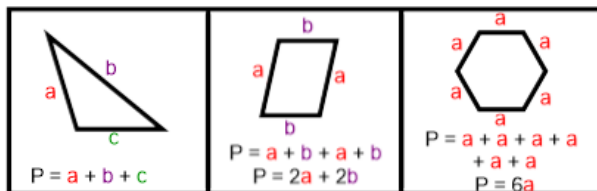

$C = 2\pi r \qquad\qquad C = \pi d$

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Diameter

Any straight line segment that passes through the center of the circle, whose endpoints are on the circle.

Diameter	14	11
	d = 14 units	d = 11 units

Perimeter

The distance around a two-dimensional figure.
Found by adding up all of the sides.

b, a, c	b, a, a, b	a, a, a, a, a, a
P = a + b + c	P = a + b + a + b	P = a + a + a + a
	P = 2a + 2b	+ a + a
		P = 6a

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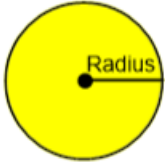
Pi (π)

A mathematical constant; the ratio of a circle's circumference to its diameter.

(pie image with π)	$\pi \approx 3.14$	$\pi \approx \dfrac{22}{7}$

Radius

Any line segment from the center of the circle, to any point on the circle.
The radius is 1/2 of the diameter.

Radius	7 r = 7 units	11 d = 11 r = 1/2(11) r = 5.5 units