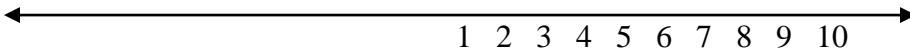


Chapter 1

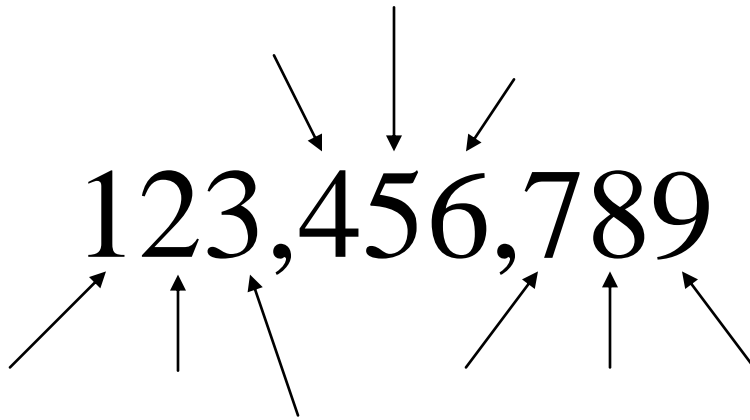
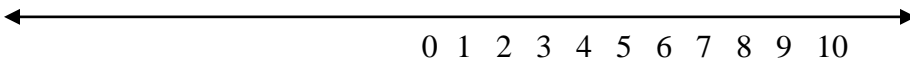
NATURAL NUMBERS (counting numbers)

1, 2, 3, 4, 5, ...



WHOLE NUMBERS

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, ...



Give the place value of the 3.

a) 12,351

b) 143

c) 300,000,000,000

d) 123,456

e) 56,730,987

Expanded form

5,607,521

123

200

587

597,506

In Words

52,543,201

48,512

589,123,546

209

2,009

101,002,003

Three hundred two

Four thousand, three

One hundred million, thirty-three thousand, five hundred eleven

Thirty-two million, twenty thousand, five

Two hundred thousand, four

Count to 10 using ones:

0

Count to 100 using tens:

0

Count to 1000 using hundreds:

0

What are the possible values for the tens place?

What are the possible values for the hundreds place?

What number is in the middle of 10 and 20?

What number is in the middle of 400 and 500?

What number is in the middle of 7000 and 8000?

What number is in the middle of 0 and 10?

What number is in the middle of 0 and 1000?

Is 555 closer to 500 or 600?

Is 1335 closer to 1300 or 1400?

Is 9,999 closer to 0 or 10,000?

Would you say 9,999 is approximately 9,000 or 10,000?

Would you say 5,900 is approximately 5,000 or 6,000?

Would you say 990 is approximately 1,000 or 900?

Would you say 943 is approximately 940 or 950?

ROUNDING WHOLE NUMBERS

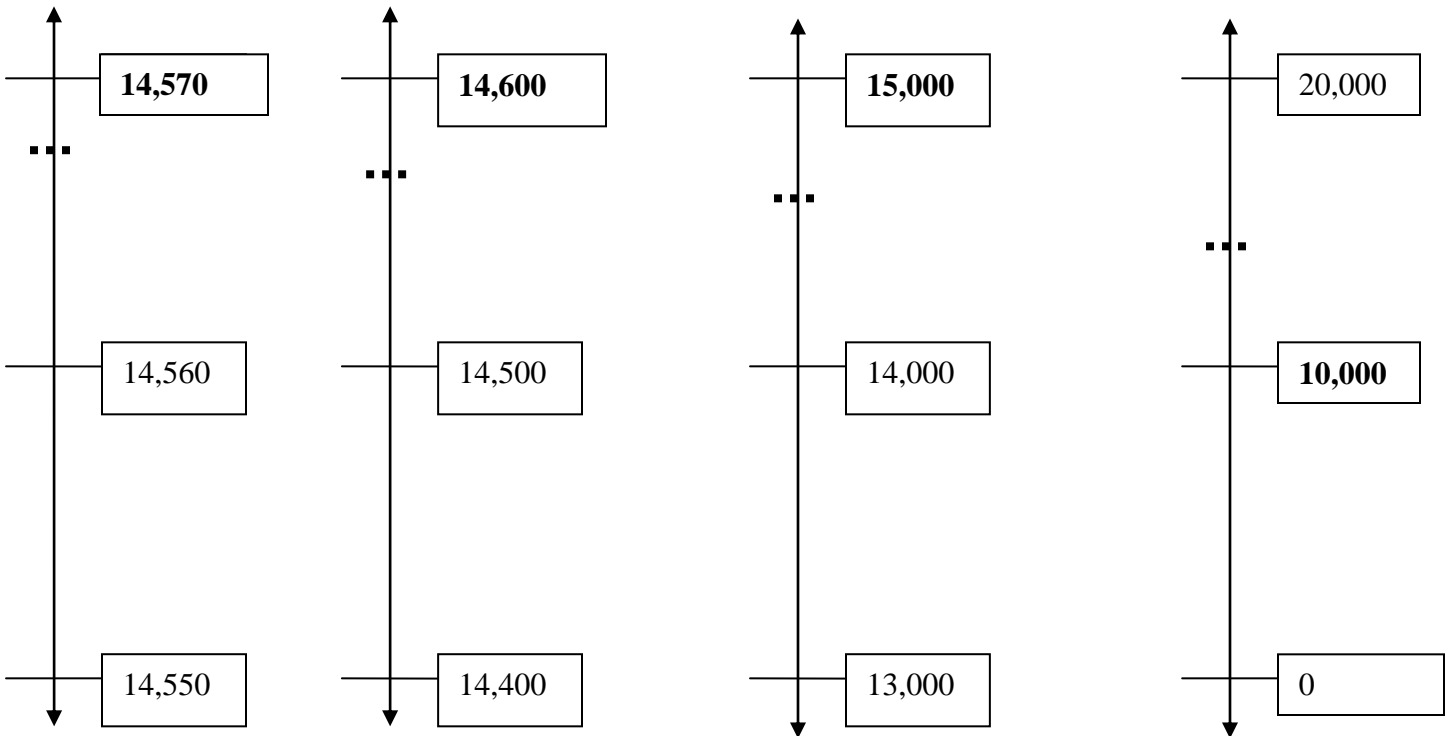
14,567

TENS
14,567

HUNDREDS
14,567

THOUSANDS
14,567

TEN THOUSANDS
14,567



STEPS FOR ROUNDING

Round 726,025 to the nearest ten thousand. 726,025

1. Find the ten thousands place $7\underline{2}6,025$
2. Look at the digit to the right $72\underline{6},025$ This is the test digit.
3. a. If the test digit is **5 or more** the 2 increases by one to 3.
b. If the test digit is **4 or less** the 2 stays the same.
4. Every digit to the right of 2 becomes 0.

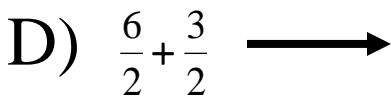
730,000 is 726,025 rounded to the nearest ten thousand.

Adding Whole Numbers



The number in front tells you how many you have.
So, one apple plus three apples is four apples.

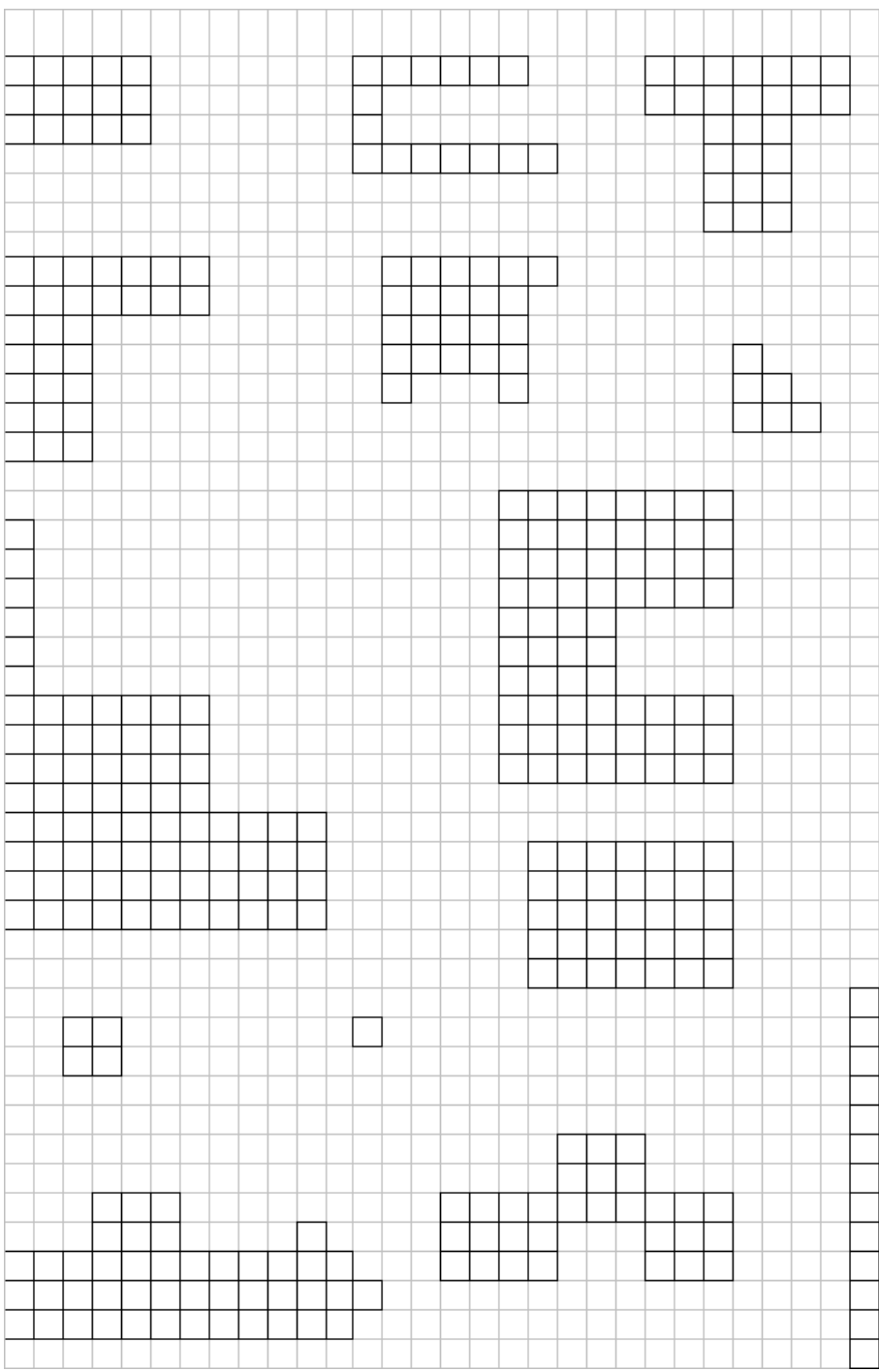
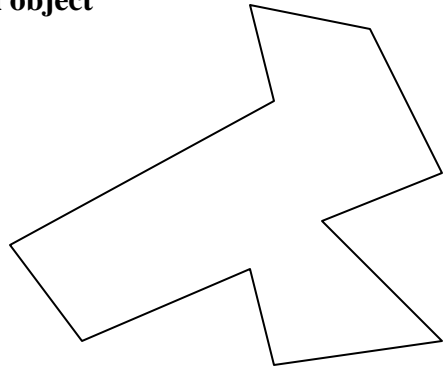
Remember this---the + means you can only count or remove your like terms, that is all.



432+5,812+52 → Four different place values. What are they?

	Associative	Commutative	identity
Addition			

Perimeter-- The distance around the outside of an object



Estimate the sum by rounding to the indicated value:

a) $234 + 576 + 789 + 100$ to the nearest 100.

b) $456 + 789 + 123 + 1,203 + 10$ to the nearest 100.

c) $25,399 + 7,601 + 18,744 + 6,298$ to the nearest thousand.

Subtracting

$5,812 - 152$ **—————>** Four different place values. What are they?

$497 - 29$

$1000 - 899$

$1000 - 999$

Multiplying

3×6 **—————>** **Three 6's** **—————>** **$6 + 6 + 6$**

6×3 **—————>**

3×2 **—————>**

$2 \times$  **—————>**

4×25 **—————>**

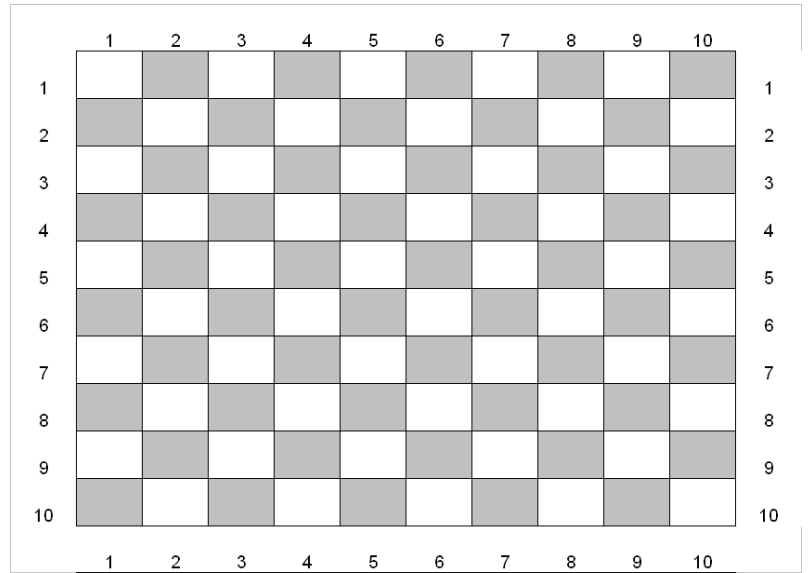
1.
$$\begin{array}{r} 84 \\ \times 99 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 7 \\ \times 44 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 87 \\ \times 12 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 62 \\ \times 90 \\ \hline \end{array}$$

5.
$$\begin{array}{r} 72 \\ \times 5 \\ \hline \end{array}$$



6.
$$\begin{array}{r} 21 \\ \times 41 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 35 \\ \times 72 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 70 \\ \times 73 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 18 \\ \times 70 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 63 \\ \times 46 \\ \hline \end{array}$$

1.	$84 \times 99 = 8,316$
2.	$7 \times 44 = 308$
3.	$87 \times 12 = 1,044$
4.	$62 \times 90 = 5,580$
5.	$72 \times 5 = 360$
6.	$21 \times 41 = 861$
7.	$35 \times 72 = 2,520$
8.	$70 \times 73 = 5,110$
9.	$18 \times 70 = 1,260$
10.	$63 \times 46 = 2,898$

1.
$$\begin{array}{r} 707 \\ \times 4 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 515 \\ \times 58 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 474 \\ \times 34 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 629 \\ \times 50 \\ \hline \end{array}$$

5.
$$\begin{array}{r} 344 \\ \times 95 \\ \hline \end{array}$$

1.	$707 \times 4 = 2,828$
2.	$515 \times 58 = 29,870$
3.	$474 \times 34 = 16,116$
4.	$629 \times 50 = 31,450$
5.	$344 \times 95 = 32,680$
6.	$496 \times 93 = 46,128$
7.	$569 \times 69 = 39,261$
8.	$684 \times 0 = 0$
9.	$951 \times 39 = 37,089$
10.	$209 \times 47 = 9,823$

6.
$$\begin{array}{r} 496 \\ \times 93 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 569 \\ \times 69 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 684 \\ \times 0 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 951 \\ \times 39 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 209 \\ \times 47 \\ \hline \end{array}$$

$(4 \cdot 3)$

$5 \cdot 7$

$15 \cdot 30$

The product of 4 and 3

2×3
$2(3)$
$2 \cdot 3$

$$2 \times 3 \times 5 = 30$$

Properties

	Associative	Commutative	identity	Zero Factor	Distributive
Multiplication					

Name the property:

a) $3+5=5+3$

b) $4(3+2) = 12+ 8$

c) $3+0=3$

d) $3 \times 0=0$

Dividing

$$6 \overline{) 251}$$

$$12 \overline{) 253,021}$$

1. $7 \overline{)21}$ 2. $7 \overline{)28}$ 3. $1 \overline{)12}$ 4. $10 \overline{)50}$ 5. $12 \overline{)84}$

6. $12 \overline{)48}$ 7. $9 \overline{)27}$ 8. $7 \overline{)7}$ 9. $2 \overline{)14}$ 10. $5 \overline{)40}$

1.	$21 \div 7 = 3$
2.	$28 \div 7 = 4$
3.	$12 \div 1 = 12$
4.	$50 \div 10 = 5$
5.	$84 \div 12 = 7$
6.	$48 \div 12 = 4$
7.	$27 \div 9 = 3$
8.	$7 \div 7 = 1$
9.	$14 \div 2 = 7$
10.	$40 \div 5 = 8$

1. $22 \overline{)286}$ 2. $5 \overline{)175}$ 3. $49 \overline{)2,940}$ 4. $17 \overline{)323}$ 5. $95 \overline{)9,310}$

1.	$286 \div 22 = 13$
2.	$175 \div 5 = 35$
3.	$2,940 \div 49 = 60$
4.	$323 \div 17 = 19$
5.	$9,310 \div 95 = 98$
6.	$1,365 \div 91 = 15$
7.	$584 \div 8 = 73$
8.	$1,400 \div 35 = 40$
9.	$6,160 \div 70 = 88$
10.	$644 \div 92 = 7$

6. $91 \overline{)1,365}$ 7. $8 \overline{)584}$ 8. $35 \overline{)1,400}$ 9. $70 \overline{)6,160}$ 10. $92 \overline{)644}$

$(4 \div 3)$

The quotient of 4 and 3

$(7 \div 13)$

$(14 \div 21)$

$$\begin{array}{r} 7 \div 3 \\ 7 \\ \underline{3} \\ 3 \end{array} \quad 3 \overline{)7}$$

$$6 \div 3 = 2$$

$$\frac{6}{0} \quad 6 \div 0$$

Undefined

$$\frac{0}{0} \quad 0 \div 0$$

Undetermined

$$6 \div 2 = 3$$

Divided into groups of 2
Divided among 2 people

3 groups of 2

$$6 \div 3 = 2$$

Divided into groups of 3

2 groups of 3

$$4 \div 1 = 4$$

Divided into groups of 1

4 groups of 1

Try $10 \div 5$ without performing the operation.

Try $12 \div 5$ without performing the operation

Now do the math... **no pictures:**

You have 12 pizza slices to divide among 3 people. How many slices does each person get?

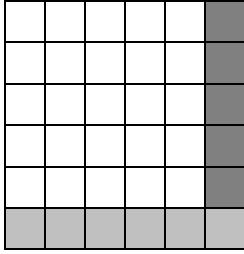
You have 11 pizza slices to divide among 3 people. How many slices does each person get and how many are left over?

It takes 2 oz of mud to fill the belly of a 4 year old. How many 4 year old bellies can 12 oz of mud fill?

If there are 5 equal weight people in an elevator with a combined weight of 700 lbs, what is the weight of each person?

Area= the number of unit squares in an object. (laying tile)

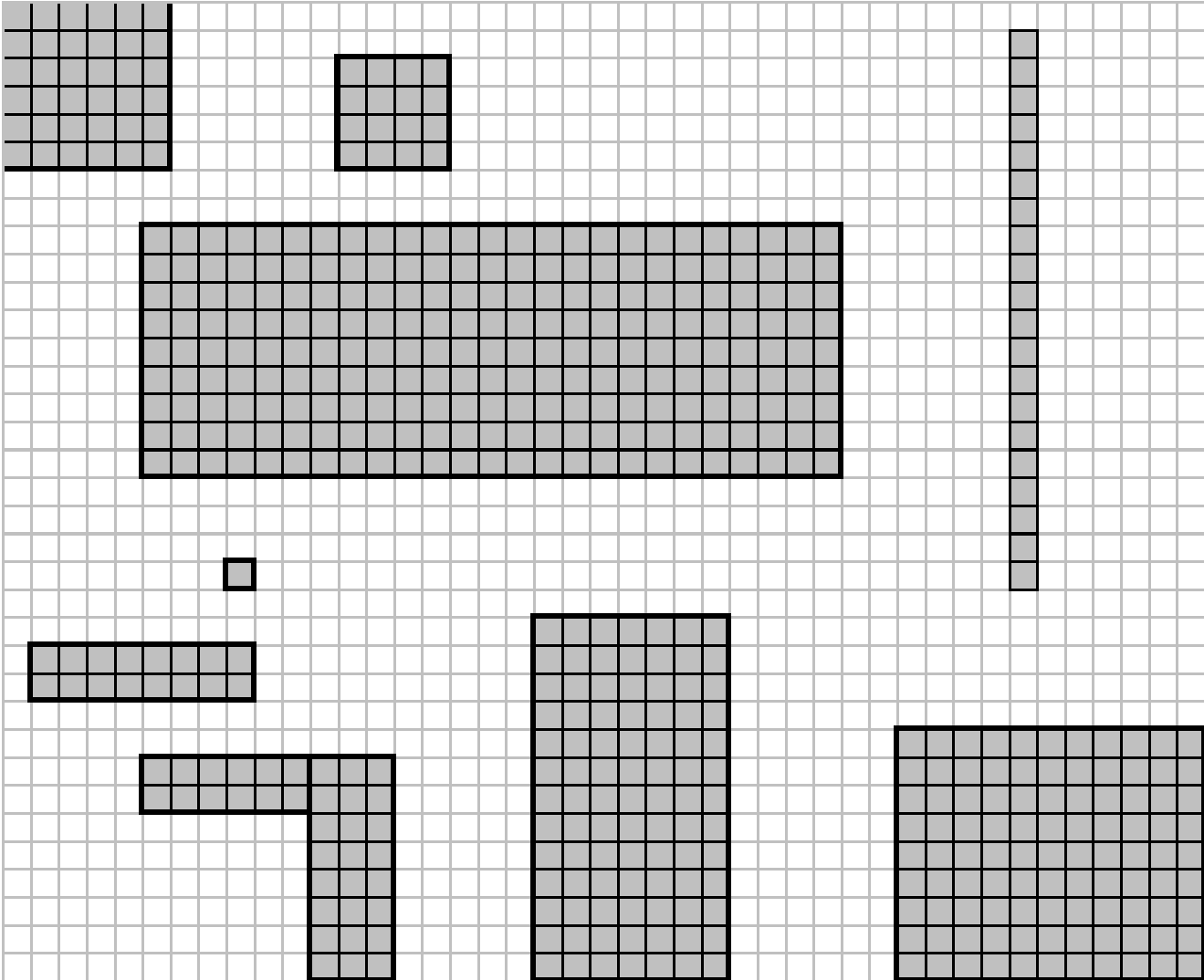
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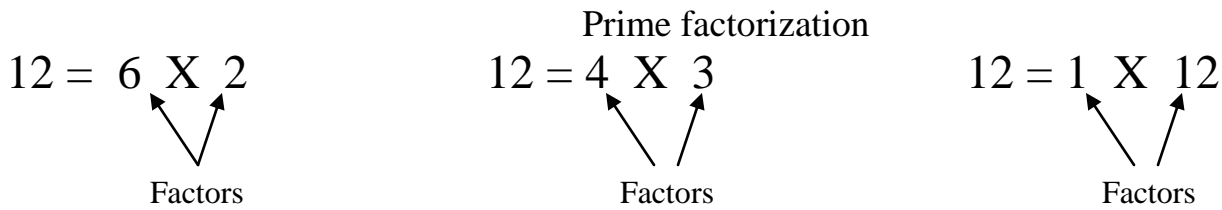
Base

$$\text{Area} = \text{ ______ } \text{ Columns} \cdot \text{ ______ } \text{ Rows} = \text{ ______ }$$

$$\text{Area} = \text{Base} \cdot \text{Height}$$



Find the area of a room that is 12 feet by 10 feet.



Prime- A counting number other than 1 with only one and itself as factors.

Ex. $3 = 1 \times 3$

$7 = 1 \times 7$

$5 = 1 \times 5$

$3 =$ no other factors

$7 =$ no other factors

$5 =$ no other factors

Composite- A counting number other than 1 that is **not** prime. Has a factor other than one and itself.

Ex. $4 = 1 \times 4$

$9 = 1 \times 9$

$24 = 1 \times 24$

$4 = 2 \times 2$

$9 = 3 \times 3$

$24 = 2 \times 12$

$24 = 4 \times 6$

SIEVE OF ERATOSTHENES

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

TESTS FOR DIVISIBILITY

Multiples of 2

2 4 6 8 10 12 14 16 18 20 22

Multiples of 3

3 6 9 12 15 18 21 24 27 30 33

Multiples of 4

4 8 12 16 20 24 28 32 36 40 44

Multiples of 5

5 10 15 20 25 30 35 40 45 50 55

Multiples of 9

9 18 27 36 45 54 63 72 81 90 99

Multiples of 10

10 20 30 40 50 60 70 80 90 100 110 120

If a number can be divided by another number so that the remainder is 0, then we say:

1. The first number is **DIVISIBLE** by the second number. Ex. 6 is **DIVISIBLE** by 2
2. The second number **DIVIDES** the first. Ex. 2 **DIVIDES** 6

Tests for divisibility.

2 If a numbers last digit is a 0,2,4,6, or 8 then 2 divides that number.

Ex. 2 will divide 330 332 334 336 338 etc

3 If 3 divides the sum of a numbers digits then 3 divides that number.

Ex. The sum of 327's digits is $3 + 2 + 7 = 12$
 3 will divide 12 , therefore 3 will divide 327.

5 If the number's last digit is a 0 or 5 then 5 divides that number

Ex. 325 325's last digit is a 5,
 Therefore 5 will divide 325

	2	Sum	3	5	7
234					
721					
100002					
5210					
125					

Find the prime factorization of the following: (use factor trees if needed)

1. 16

4. 125

7. 256

10. 40

2. 100

5. 12

8. 512

11. 250

3. 8

6. 200

9. 18

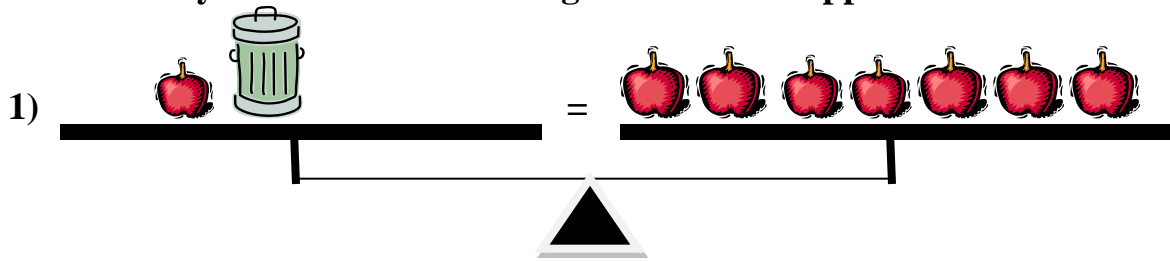
12. 32

Find the factors of 12

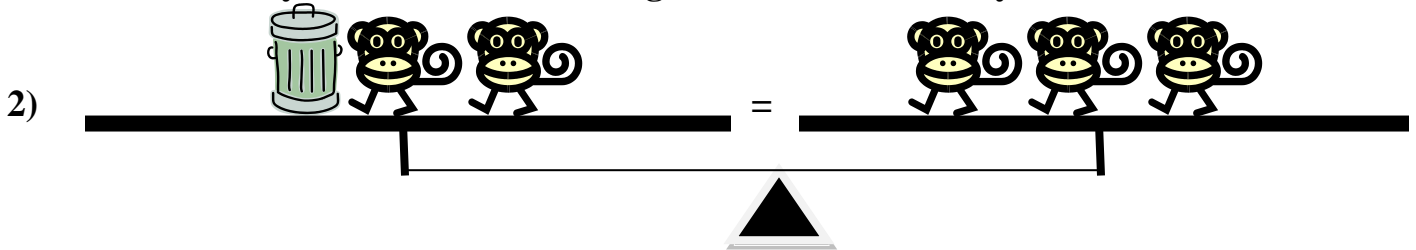
Find the factors of 18

Find the factors of 54

What does 1 mysterious trash can weight in terms of apples?



What does one mysterious trash can weight in terms of monkeys?



What does one X weight in terms of apples?

3) $X - 3 \text{ (apple)} = 7 \text{ (apple)}$

$$4 + x = 21$$

What does $x =$

$$x + 7 = 21$$

What does $x =$

$$x - 3 = 21$$

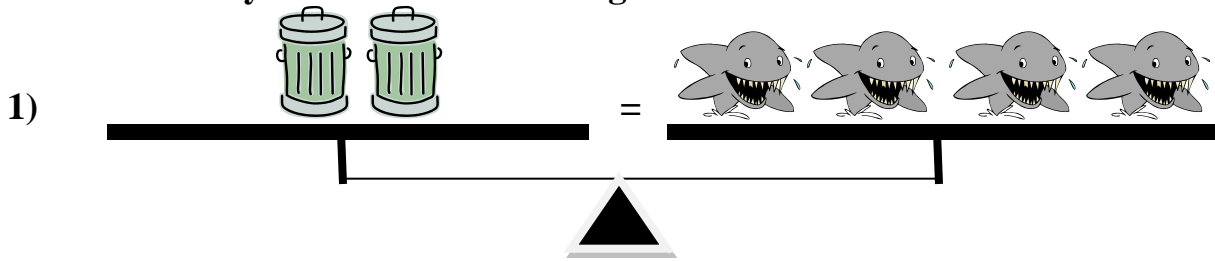
1) $7 + x = 8$

2) $x - 7 = 12$

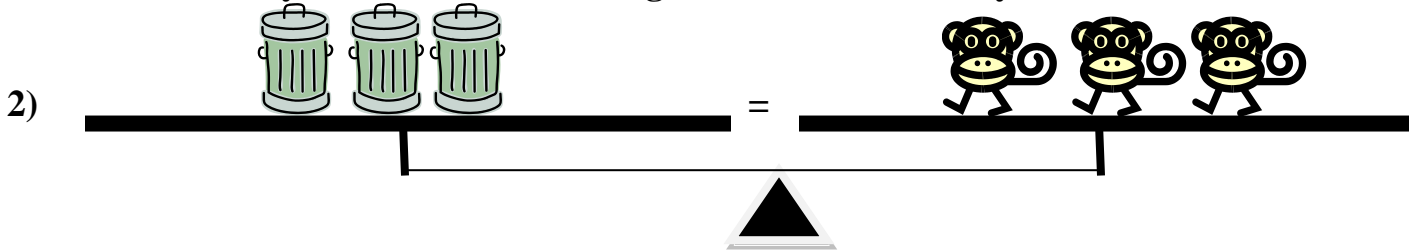
3) $1 = 1 + x$

4) $3 = 2 + x$


What does 1 mysterious trash can weight in terms of sharks?



What does one mysterious trash can weight in terms of monkeys?



What does one X weight in terms of apples?

3) $4X = 12$ 

Translation: Four Xs is the same as twelve apples.

$$4 \cdot x = 24$$

What does $x =$

$$x \cdot 4 = 21$$

What does $x =$

$$17 = 2 \cdot x$$

1) $2 \cdot x = 3$

2) $x \cdot 7 = 14$

3) $17 = 17 \cdot x$

4) $5 \cdot x = 3$

$$\frac{x}{2} = 7$$

$$1) \frac{x}{4} = 8$$

$$2) \frac{x}{3} = 11$$

$$3) \frac{x}{7} = 7$$

$$4) \frac{1}{2}x = 7$$

Now try all of the different types:

$$x + 3 = 81$$

$$5 = x - 2$$

$$3x = 12$$

$$\frac{x}{2} = 7$$

$$17 = 17 \cdot x$$

$$x - 7 = 12$$

$$\frac{1}{2}x = 7$$

$$1 = 1 + x$$

$$\frac{x}{7} = 7$$

$$5 \cdot x = 3$$

Exponents

x^5	<div style="border-left: 1px dashed black; height: 100px; margin: 0 auto;"></div> 2^5	<div style="border-left: 1px dashed black; height: 100px; margin: 0 auto;"></div> 2^4	<div style="border-left: 1px dashed black; height: 100px; margin: 0 auto;"></div> $3(2)^4$
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Order of operations

1. Symbols of Grouping. (), [], { }, $\sqrt{\quad}$, —
2. Exponents
3. Multiplication or Division from LEFT TO RIGHT.
4. Addition or Subtraction from LEFT TO RIGHT.

	1	2	3	4
$(4 + 4 \bullet 6) \div 4 \bullet 3^2 + 5$	_____			
$28 \div 4 \bullet 3^2 + 5$	_____			
$28 \div 4 \bullet 9 + 5$	_____			
$7 \bullet 9 + 5$	_____			
$63 + 5$	_____			

Try:

$4 + 3(2 - 1^2)$	$8 \div 4 \cdot 2$	$3 - 4(2) \div 8$	$\frac{4 + 1(2)}{6 - 3}$
			<div style="display: flex; justify-content: space-around; align-items: center;"> T <div style="border-left: 1px dashed black; height: 100px; width: 20px;"></div> B </div>

Evaluating

- 1) replace every variable with a ()
- 2) Insert the given numbers for the given variables

$$2b + c^2 + a, \quad a=3 \quad b=2 \quad c=5$$

Wrong Way

Right Way

$$b^2 + 3b, \quad \text{for } b=2$$

$$5ab - c + 1 \quad \text{for } a=2, b=1, \text{ and } c=3$$