Name: ..... **Date:** .....

RATIOS

A ratio is a relationship between two quantities.

Example:

Here we have **3** apples and **2** bananas.
A ratio between these two numbers can be written as:

3:2 **There are 3 apples for every 2 bananas.** $\frac{3}{2}$

NOW LET'S TRY IT!

1.

Martin has a big bag of colored jelly beans. He has 7 red, 3 blue, 10 green, and 2 yellow jelly beans.

A. What is the ratio between Red and Yellow?

- **a.** 10:2
- **b.** 7:7
- **c.** 2:3
- **d.** 7:2

B. What is the ratio between Green and Blue?

- **a.** 3:2
- **b.** 10:3
- **c.** 2:7
- **d.** 7:10

2.

There are tons of flowers growing outside Amy's house. There are 8 daisies, 4 tulips, 9 lilies, 2 sunflowers, 5 orchids, and 1 rose.

A. What is the ratio between Tulips and Orchids?

- **a.** 1:4
- **b.** 4:8
- **c.** 4:5
- **d.** 2:5

A. What is the ratio between Roses and Daisies?

- **a.** 5:5
- **b.** 1:9
- **c.** 4:2
- **d.** 1:8

C. Write the ratio between Lilies and Tulips: _____

RATIO PRACTICE

Use you're knowledge of Ratios and Equivalent Ratios to answer the following questions:

1. **The ratio of dogs to cats in a pet store is 4:2. If there are 28 cats, how many dogs are there?**

a. 95
b. 41
c. 56
d. 20

2. **If there are 24 students in a class and 15 of them are girls, what is the ratio of girls to boys?**_____

3. **Which ratios are equivalent?**

a. 3:1 and 15:42
b. 6:2 and 11:31
c. 4:9 and 12:27
d. 5:7 and 18:34

4. **A car travels 300 miles in 5 hours. What is the ratio of miles traveled to hours spent driving?**

a. 60:1
b. 2:3
c. 15:1
d. 20:10

5. **Sarah spends 3 hours studying math for every 4 hours studying English. If she studies for a total of 21 hours, how many hours does she spend studying math?**

a. 2 Hours
b. 6 Hours
c. 3.3 Hours
d. 9 Hours

6. **A map scale is given as 1 inch represents 5 miles. If the distance between two cities on the map is 20 inches, what is the actual distance between the cities?**

_____

RATIO PRACTICE

Use you're knowledge of Ratios and Equivalent Ratios to answer the following questions:

1. **If the ratio of the ages of Sarah to John is 4:7 and John is 35 years old, how old is Sarah? _____**

2. **If the ratio of the ages of Peter to Jane is 2:3 and Jane is 15 years old, how old is Peter?**

a. 2 years
b. 10 years
c. 15 years
d. 6 years

3. **The ratio of the number of boys to the number of girls in a class is 4:5. If there are 36 students in total, how many girls are there?**

a. 20
b. 30
c. 12
d. 24

4. **In a fruit basket, the ratio of apples to oranges is 6:4. If there are 42 oranges, how many apples are there? _____**

5. **The ratio of the number of boys to the number of girls in a class is 2:5. If there are 28 students in total, which of the following ratios is equivalent to this ratio?**

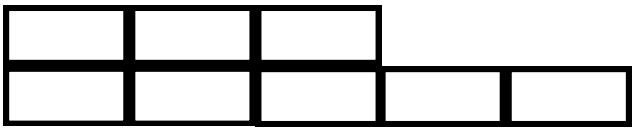
a. 6:14
b. 16:30
c. 10:25
d. 21:34

6. **Alex is mixing paint to create a custom shade of purple. If 4 cups of blue paint are mixed with 7 cups of red paint to make a certain shade of purple, what is the ratio of blue paint to red paint?_____**

Tape Diagrams

Answer the following questions, illustrate you're work with a tape diagram.

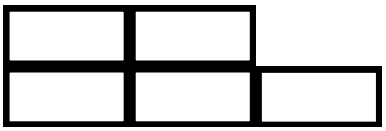
1. **Melvin went out to buy party supplies, he needed balloons and birthday candles. The ratio between balloons and candles is 3:5. If he bought 32 items total, how many balloons and candles did he buy?**



Balloons: _____

Candles: _____

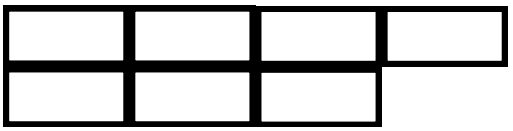
2. **A farmer mixes feed for her animals. The ratio of oats to corn in the feed mix is 2:3. If she has 90 pounds of feed mix in total, how much oats and corn does she use?**



Oats: _____

Corn: _____

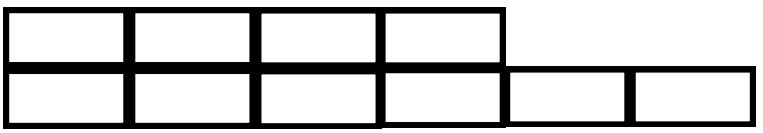
3. **Sarah is packing her suitcase for a trip. She needs to bring along socks and hair ties. The ratio of socks to hair ties she's packing is 4:3. If she has a total of 49 items in her suitcase, how many socks and hair ties does she have?**



Socks: _____

Hair Ties: _____

4. **At a pet adoption event, the ratio of adopted dogs to adopted cats is 4:6. If there were 64 adopted animals in total, how many dogs and cats were adopted?**



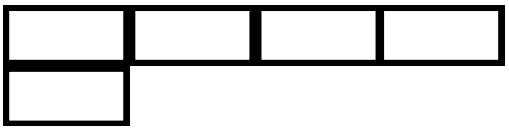
Dogs: _____

Cats: _____

Tape Diagrams

Answer the following questions, illustrate you're work with a tape diagram.

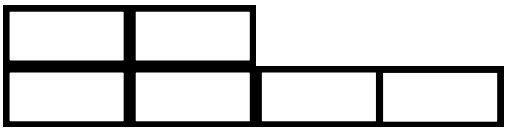
1. **Alex is organizing a movie night and needs to prepare popcorn and drinks. The ratio of popcorn bags to drink cans is 4:1. If he has a total of 15 items to prepare, how many popcorn bags and drink cans does he need?**



Popcorn: _____

Cans: _____

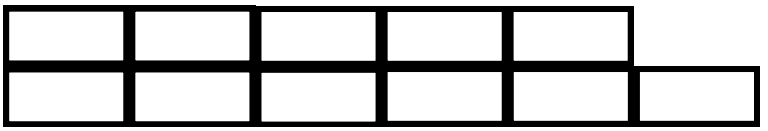
2. **At a school fundraiser, the ratio of chocolate bars to lollipops sold is 2:4. If they sold a total of 100 candies, how many chocolate bars and lollipops were sold?**



Chocolate: _____

Lollipops: _____

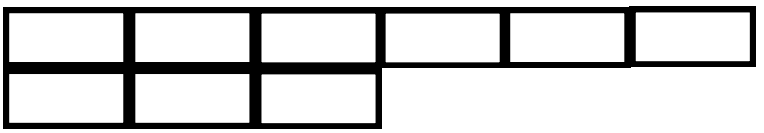
3. **In a fruit salad, the ratio of strawberries to blueberries is 5:6. If there are a total of 40 pieces of fruit in the salad, how many strawberries and blueberries are there?**



Strawberries: _____

Blueberries: _____

4. **A recipe for a smoothie calls for bananas and berries in a ratio of 6:3. If the total weight of bananas and berries is 100 grams, how much of each ingredient is needed?**



Bananas: _____

Berries: _____

Double Number-Lines

Answer the following questions using a Double Number-Line.

1. **Jared just ordered some frozen treats for his food truck. For every 6 ice cream bars, theirs 8 popsicles in the shipment. If he bought 32 popsicles, how many ice cream bars did he get? _____**

Ice Cream: ⟷

Popsicles: ⟷

2. **Maria collects baseball cards. For every 9 catcher cards she has, she also has 2 pitcher cards. If she has 27 catchers, how many pitchers does she have? _____**

Catchers: ⟷

Pitchers: ⟷

3. **Tommy likes to work-out. For every 7 push-ups he does, he also does 15 sit-ups. If he does 45 sit-ups, how many push-ups does he do?_____**

Push-ups: ⟷

Sit-ups: ⟷

4. **Sarah is training for a triathlon. For every 4 miles she swims, she runs 9 miles. If she runs 36 miles, how many miles did she swim?_____**

Swam (mi): ⟷

Ran (mi): ⟷

Double Number-Lines

Answer the following questions using a Double Under-Line.

1. **Emma runs a local bookstore with her family. For every 5 mystery novels she sells, Emma sells 7 romance novels. If she sold 28 romance novels, how many mystery novels did she sell? _____**

Mystery: ⟷

Romance: ⟷

2. **Alex recently started his own bakery. For every 3 chocolate cakes Alex bakes, he also bakes 5 cheesecakes. If he bakes 40 cheesecakes, how many chocolate cakes did he bake? _____**

Chocolate Cakes: ⟷

Cheesecakes: ⟷

3. **Liam likes gardening in his spare time. For every 2 rose bushes Liam plants, he plants 9 tulip bulbs. If he planted 54 tulip bulbs, how many rose bushes did he plant? _____**

Rose Bushes: ⟷

Tulip Bulbs: ⟷

4. **Sophia teaches a general music-study class at Wichita State University. For every 8 piano lessons Sophia teaches, she teaches 15 guitar lessons. If she teaches 45 guitar lessons, how many piano lessons did she teach? _____**

Piano Lessons: ⟷

Guitar Lessons: ⟷

Exponents

Simplify the following exponents to their simplest form:

1. 3^2

2. 5^0

3. 2^3

4. $4^2 + 6^2$

5. 10^1

6. 3^3

7. $2^3 - 7^2$

8. 9^2

9. $99^1 - 12^2$

10. $4^3 + 2^3$

11. $11^2 - 8^2$

12. $5^3 + 15^2$

ORDER OF OPERATIONS

Solve the following equations in the corect Order of Operations. Show you're work:

1. $5+3(4)$
2. $(12-5)\div 3+2$
3. $2(4+3)-5$
4. $18\div(4-1)+2$
5. $3(7-4)+5-2$
6. $4(6-2)+8\div 2$
7. $2+3(4-1)2+3(4-1)$
8. $(15-3)\div 6+2(4)$
9. $5(8-2)\div 2$
10. $3(10-2)+4\div 2$
11. $24\div(6-2)+5$
12. $2(9-4)+8\div 2$

ORDER OF OPERATIONS

Solve the following equations in the corect Order of Operations. Show you're work:

1. $3(4+2)-5$
2. $10-2(3+1)$
3. $(7+3)\div 2+5$
4. $6(8-4)\div 2$
5. $9-2(5-2)$
6. $4(9-3)+6\div 2$
7. $(16-4)\div(2+1)$
8. $5+2(8-3)$
9. $(20-4)\div 4+3$
10. $12-(7-2)$
11. $2(6-2)+8\div 2$
12. $18\div(6-3)+4$

Absolute Value

Find the Absolute Value of the following problems, and simplfy:

1. $|6|$

2. $|-12|$

3. $|-43| + |6|$

4. $3|2-16|$

5. $\dfrac{|9-24|+6}{|3+3|}$

6. $(|-22+11|)(|2-3|)$

7. $|-9| + |-17| - |-4|$

8. $|45| - |-15| - |-24|$

9. $(|7-16|)(|3-6|)$

10. $6|5-13|$

11. $|-12| - |-23|$

12. $\dfrac{2|4-16|-12}{5|3+3|-|-6|}$

Linear Equations

Solve the following equations for the missing variable:

1. $3x+5=17$
2. $2y-8=10$
3. $4a+7=23$
4. $6b-9=15$
5. $2(c+4)=18$
6. $5(d-3)=25$
7. $\frac{x}{2}+3=9$
8. $\frac{y}{3}-4=7$
9. $9-2r=5$
10. $2q-4=24$
11. $2m+7=15$
12. $3(p+2)=21$

The Distributive Property

Simplify the expressions with the distributive property, and solve for x. Show you're work:

1. $3(x+2)$

2. $2(3x-4)$

3. $4(x+5)$

4. $5(3x-2)$

5. $2(2x+3)+3(x-1)$

6. $3(x-4)-2(2x+1)$

7. $2(4x-3)+x(2)$

8. $3(x+2)-2(3-x)$

9. $4(x-3)-3(2x+1)$

10. $2(3x+2)$

The Distributive Property

Simplify the expressions with the distributive property, and solve for x. Show you're work:

1. $3(4x+7)$

2. $2(5x-3)$

3. $4(2x+9)$

4. $2(3x+5)+4(x-2)$

5. $5(3x-4)$

6. $3(x+4)-2(2x-3)$

7. $4(x-3)-3(3x+2)$

8. $3(x-2)-2(4-x)$

9. $2(3x-5)+x(9)$

10. $4(2x+3)-2(3x-1)$

Answer Key

Ratios

Now Let's Try It:

1.
- A.) **d**
- B.) **b**

2.
- A.) **c**
- B.) **d**
- C.) **9:4**

Part 1:

1.) **c**
2.) **a**
3.) **c**
4.) **a**
5.) **d**
6.) **100 mi**

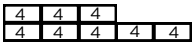
Part 2:

1.) **20**
2.) **b**
3.) **a**
4.) **63 Apples**
5.) **b**
6.) **4:7**

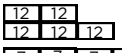
Tape Diagrams

Part 1:

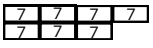
1.) **Balloons: 12, Candles: 20**



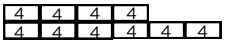
2.) **Oats: 24 lbs, Corn: 36 lbs**



3.) **Socks: 28, Hair ties: 21**

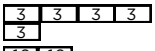


4.) **Dogs: 16, Cats: 24**

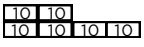


Part 2:

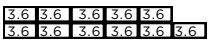
1.) **Popcorn: 12, Cans: 3**



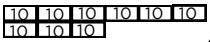
2.) **Chocolate: 20, Lollipops: 40**



3.) **Strawberries: 21, Blueberries: 28**



4.) **Bananas: 60 gm, Berries: 30 gm**

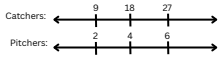


Double Number-Lines

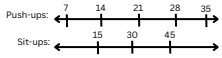
Part 1:

1.) 24 Ice Cream Bars

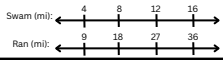
2.) 6 Pitchers



3.) 21 Push-ups

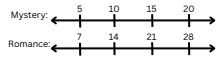


4.) 16 mi

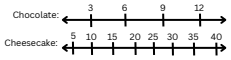


Part 2:

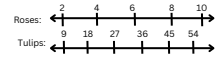
1.) 20 Mystery novels



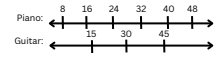
2.) 24 Cheesecakes



3.) 12 Rose Bushes



4.) 24 Piano Lessons



Exponents

1.) **9**
2.) **1**
3.) **8**
4.) **52**
5.) **10**
6.) **27**
7.) **-41**
8.) **81**
9.) **-45**
10.) **72**
11.) **57**
12.) **350**

Order of Operations

Part 1:

1.) **17**
2.) **4**
3.) **9**
4.) **8**
5.) **12**
6.) **20**
7.) **22**
8.) **10**
9.) **15**
10.) **26**
11.) **11**
12.) **14**

Part 2:

1.) **13**
2.) **2**
3.) **10**
4.) **12**
5.) **3**
6.) **27**
7.) **4**
8.) **15**
9.) **7**
10.) **7**
11.) **12**
12.) **10**

Absolute Value

1.) **6**
2.) **12**
3.) **49**
4.) **42**
5.) **7/2**
6.) **11**
7.) **22**
8.) **6**
9.) **27**
10.) **48**
11.) **-11**
12.) **1/2**

Linear Equations

1.) **x=4**
2.) **y=9**
3.) **a=4**
4.) **b=4**
5.) **c=5**
6.) **d=8**
7.) **x=14**
8.) **y=33**
9.) **r=2**
10.) **q=14**
11.) **m=4**
12.) **p=5**

The Distributive Property

Part 1:

1.) x=-2
2.) x=3/5
3.) x=-9/2
4.) x=2/3
5.) x=-3/7
6.) x=-14
7.) x=3/5
8.) x=0
9.) x=-15/2
10.) x=-2/3

Part 2:

1.) x=-7/4
2.) x=3/5
3.) x=-9/2
4.) x=-1/5
5.) x=4/3
6.) x=18
7.) x=-18/5
8.) x=14/5
9.) x=2/3
10.) x=-7