

# Expeditionary Learning Middle School Summer Math Packet for Incoming 8<sup>th</sup> Graders

*“Mathematics is not about numbers, equations, computations, or algorithms: it is about understanding.” —William Paul Thurston*

Dear Incoming 8<sup>th</sup> Graders and Parents/Guardians,

The Expeditionary Learning Middle School 8<sup>th</sup> grade teachers wish you all a wonderful summer break. The mathematics teachers want all students to be as successful as possible in their middle school math program.

Here at ELMS, we push our students to strive for high achievement and to set new goals for themselves often. One goal is to be college and career ready; therefore, this math packet has been designed so that students will maintain and review their math skills during the summer.

The packet is divided into eight weekly sections. Students are to complete one section a week. Answers are provided on our school website, <http://www.syracusecityschools.com/elms>, so that you can check your child's work. Please monitor the progress of your son or daughter so that the work is completed on a weekly basis, not the day before school begins in September. All students are required to complete this packet.

In September, your new Math teacher will be collecting these outlines for extra credit and prizes. To receive credit for this packet, all of the problems must be completed and **ALL SUPPORTING WORK MUST BE SHOWN!** Have a great summer! Thank you for your cooperation and support.

Sincerely,

8<sup>th</sup> Grade Teachers

Student's Name: \_\_\_\_\_

\*Please sign below to verify that your child has completed the packet and all supporting work is shown.

Parent/Guardian's signature: \_\_\_\_\_

# Week 1

Complete the statement using  $<$ ,  $>$ , or  $=$ .

1.  $|-6|$    ?  $6$

2.  $0$    ?  $|3|$

3.  $|-5|$    ?  $|-9|$

4. One fish is 4 feet below sea level. Another fish is 3 feet below sea level. Write each position as an integer. Which integer is greater?

**Add.**

5.  $6 + (-3)$

6.  $8 + (-1) + (-3)$

7. You start hiking at an elevation that is 80 meters below base camp. You increase your elevation by 42 meters. What is the new elevation with respect to base camp?

**Subtract.**

8.  $10 - (-3)$

9.  $-9 - (-9)$

10. The temperature falls from  $3^{\circ}\text{C}$  to  $-4^{\circ}\text{C}$ . What is the difference in these temperatures?

**Multiply.**

11.  $7 \cdot (-4)$

12.  $-2(-5)(-3)$

Divide, if possible.

13.  $-12 \div (-4)$

14.  $-18 \div 6$

15.  $\frac{-16}{8}$

16.  $0 \div (-10)$

Evaluate the expression when  $r = -7$ ,  $s = 2$ , and  $t = -5$ .

17.  $s + t$

18.  $t + s - r$

19.  $s^2 - rt$

20.  $\left| \frac{r+1}{s} \right|$

Use mental math to solve the equation.

21.  $n + (-8) = 5$

22.  $8 - d = 14$

Find the next two numbers in the pattern.

23. 6, -12, 24, -48, ...

24. -2, 20, -200, 2000, ...

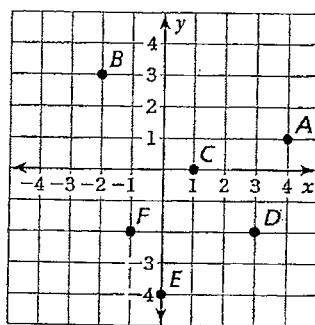
25. The table shows the temperature in Des Moines, Iowa, for certain times during a particular day.

Time	3 A.M.	8 A.M.	1 P.M.	5 P.M.	10 P.M.
Temperature	$-15^{\circ}\text{F}$	$-6^{\circ}\text{F}$	$22^{\circ}\text{F}$	$10^{\circ}\text{F}$	$-11^{\circ}\text{F}$

- What are the high and low temperatures for the day?
- Find the range of temperatures for the day.
- Find the change in temperature from 5 P.M. to 10 P.M.
- Based on the given five temperatures, what is the average temperature for the day?
- Explain why your answer to part (d) is not an accurate average temperature for the day.

26. Write an ordered pair corresponding to the point.

- Point *A*
- Point *B*
- Point *C*
- Point *D*
- Point *E*
- Point *F*



27. Which point in Exercise 26 is located in Quadrant III?

28. The pool is located at  $(0, 0)$ .

a. To get to your house from the pool, you walk 3 blocks west and 1 block north. What ordered pair corresponds to the location of your house?

b. What quadrant is your house located in?

# Week 2

Write the rational number as a decimal.

1.  $-\frac{3}{11}$

2.  $-3\frac{13}{20}$

Write the decimal as a fraction or mixed number in simplest form.

3. 3.42

4. -0.35

5. Your skateboard ramp is  $2\frac{3}{8}$  feet high. Your friend's skateboard ramp is  $2\frac{2}{5}$  feet high. Which skateboard ramp is higher?

Add or subtract. Write fractions in simplest form.

6.  $5.73 - (-3.56)$

7.  $-\frac{5}{3} + 2\frac{1}{3}$

8. A gallon jug of milk is  $\frac{3}{4}$  full. After breakfast the jug is  $\frac{1}{12}$  full. Find the difference of the amounts before breakfast and after breakfast.
9. You buy a bag of dog food for \$12.59 and a bottle of dog shampoo for \$4.75. How much more did the dog food cost than the shampoo?

Multiply. Write fractions in simplest form.

10.  $\left(-\frac{2}{5}\right)\left(-1\frac{1}{4}\right)$

11.  $0.15 \times (-0.6)$

Divide. Write fractions in simplest form.

12.  $-4.2 \div 12$

13.  $-\frac{2}{7} \div \left(-\frac{8}{21}\right)$

14. How many  $\frac{2}{3}$ -ounce packages of peanuts can be made with 8 ounces of peanuts? Explain how you found your answer.

Solve the equation. Check your solution.

15.  $n - 6 = 21$

16.  $-8.3 = d + 4.7$

17.  $p + 1\frac{3}{4} = 4\frac{5}{8}$

18.  $-2 = \frac{w}{-5}$

19.  $5h = 40$

20.  $-0.5x = -4.3$

Write the verbal sentence as an equation. Then solve.

21. 6 more than a number  $w$  is 2.

22. The product of  $\frac{3}{4}$  and a number  $s$  is  $\frac{3}{5}$ .

Write an equation for the situation. Then solve.

23. The temperature is  $-4^{\circ}\text{F}$ . A high pressure front increases the temperature to  $8^{\circ}\text{F}$ . By how many degrees did the temperature increase?

24. One eighth of the students in the seventh grade are in the school band. There are 44 students in the school band. Find the number of students in the seventh grade.

Solve the equation. Check your solution.

25.  $3d - 8 = 13$

26.  $-7 = \frac{z}{2} + 1$

27.  $2y - 3y = 5$

28.  $-2.9 = 3f + 4.3$

29. A rectangular garden has a length of 12 feet. You need 36 feet of fencing to enclose the garden. What is the width of the garden? Explain how you found your answer.



# Week 3

Write the ratio as a fraction in simplest form.

1. 15 girls to 6 boys

2. 24 players : 3 teams

Find the unit rate.

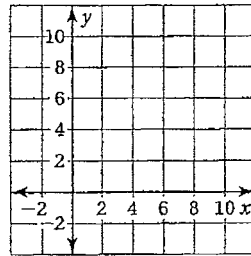
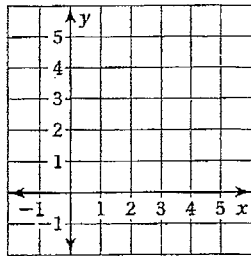
3. 405 rotations in 5 minutes

4. 72 ounces for 12 servings

Graph the line that passes through the two points. Then find the slope of the line.

5.  $(0, 0)$ ,  $(3, 2)$

6.  $(4, 4)$ ,  $(8, 8)$



Tell whether the ratios form a proportion.

7.  $\frac{8}{24}$ ,  $\frac{5}{15}$

8.  $\frac{3}{7}$ ,  $\frac{12}{21}$

9. You can buy 5 stickers for \$3. Write a proportion that gives the cost  $c$  if you buy 12 stickers.

Solve the proportion.

10.  $\frac{2}{3} = \frac{n}{12}$

11.  $\frac{33}{p} = \frac{3}{28}$

12.  $\frac{k}{6} = \frac{15}{18}$

13.  $\frac{2}{3} = \frac{3}{q}$

Copy and complete the statement. Round to the nearest hundredth, if necessary.

14. 3 in.  $\approx$     ? cm

15. 4 L  $\approx$     ? qt

16. 30 mi/h  $\approx$     ? km/h

17. 40 oz  $\approx$     ? kg

18. Use the table to find the rate.

Quarters	2	3	4	6
Minutes	30	45	60	90

19. Your baseball team has won 6 games and lost 4 games. If the team does not lose any more games, how many games must the team win to have a win : loss ratio of 2 : 1? Explain your answer.

20. It costs \$145 for 10 people to attend a concert. How much does it cost a group of 8 people?

21. The weekly cost per person to rent a cottage on a lake varies inversely with the number of people who share the cost. When four people share the cost, each one pays \$312.

a. Write an equation relating the cost per person  $c$  and the number  $n$  of people who share the cost.

b. If six people share the cost instead of four, how much does the cost per person decrease?

# Week 4

Write and solve an equation to answer the question.

1. 17 is what percent of 68?
2. What number is 16% of 80?
3. 35% of what number is 21?
4. 70 is what percent of 56?

Identify the percent of change as an *increase* or *decrease*. Then find the percent of change. Round to the nearest tenth of a percent, if necessary.

5. 15 books to 21 books
6. 60 cars to 24 cars
7. 12 calculators to 3 calculators
8. 100 pennies to 101 pennies

Use the percent of change to find the new amount.

9. 40 employees increased by 15%
10. 120 pounds decreased by 30%
11. \$84 increased by 12%
12. 820 brushes decreased by 25%

Find the price, discount, or markup.

13. Original price: \$82

Discount: 10%

Sale price:   ?

14. Cost to store: \$32

Markup: 16%

Selling price:   ?

An account earns annual simple interest. Find the interest earned, principal, interest rate, or time.

15. Interest earned: \$84

Principal: \$600

Interest rate: 7%

Time:   ?

16. Interest earned:   ?

Principal: \$1250

Interest rate: 3%

Time: 4 years

17. Interest earned: \$39.60

Principal:   ?

Interest rate: 11%

Time: 6 months

18. Interest earned: \$3250

Principal: \$5000

Interest rate:   ?

Time: 10 years

An account earns annual simple interest. Find the balance of the account.

19. \$250 at 4% for 1 year

20. \$2000 at 9% for 6 months

21. The percent of sales tax is 6%. What is the sales tax on a skateboard that costs \$98?

22. The price of your favorite brand of jeans was \$35 last month. This month the price is \$42. What is the percent of change from last month to this month?

23. You are shopping for a cell phone. At which store should you buy the cell phone? Explain your answer.

Store	Original Price	Discount
A	\$129	30%
B	\$135	35%
C	\$150	40%

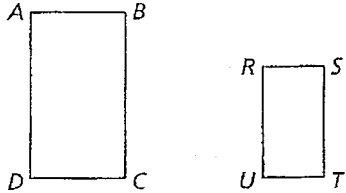
24. You deposit \$200 in an account earning 3.5% simple interest. How long will it take for the balance of the account to be \$221?

# Week 5

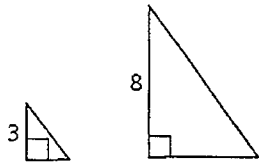
Name the corresponding angle or the corresponding side of the similar figures.

1.  $\angle B$

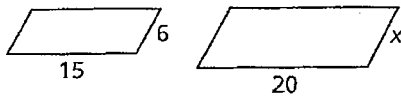
2. Side  $CD$



3. The two figures are similar. Find the ratio (small to large) of the perimeters and of the areas.



4. The polygons are similar. Find the value of  $x$ .



Find the missing dimension. Use the scale factor 1 : 8.

5. Model length: 6 cm

Actual length:   ?

6. Model height:   ?

Actual height: 28 in.

7. Your rectangular vegetable garden is 12 feet long and 8 feet wide.  
Your friend's rectangular vegetable garden is 15 feet long and 10 feet wide. Are the gardens similar?

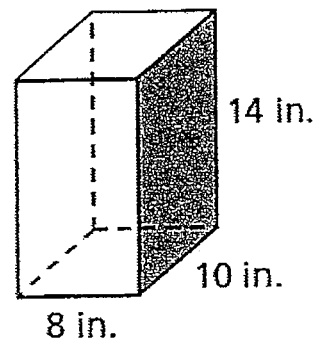
8. The ratio of the corresponding side lengths of two similar MP3 players is 4 : 3. The area of the larger MP3 player is 8 square inches. What is the area of the smaller MP3 player?

9. The ratio of the side length of square A to the side length of square B is 3 : 5. The perimeter of square B is 60 feet. What is the area of square A?

10. The scale on a map is 1 in. : 50 mi. The actual distance between two cities is 350 miles. What is the distance between the cities on the map?

11. Find the surface area of the rectangular prism.

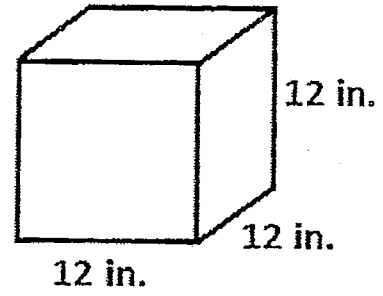
12. Find the volume of the rectangular prism.





13. Find the surface area of the cube.

14. Find the volume of the cube.



# Week 6

## Real World Word Problems

1. Joey is putting all of his trophies onto 7 shelves. If he places 6 trophies on each shelf but still has 2 trophies left over, how many trophies does he have?
2. Angie read 3 books in 4 days, and each book contained 280 pages. If Angie read the same number of pages each day, how many pages did she read per day?
3. Mike put 304 baseballs into 8 trash bins. He put the same number of baseballs in each bin. He took 5 trash bins of baseballs to the baseball field. How many baseballs did Mike take?
4. Workers Inc. just bought 14 boxes of pens to put in their storage room for employees to use as needed. Each box contains 50 pens. If each of the 33 employees working for Workers Inc. takes 4 pens when they are first brought into the office, how many pens will be left in the storage room?

5. John has 9 boxes of apples. Each box holds 16 apples. If 7 of the boxes are full, and 2 of the boxes are half full, how many apples does John have?
6. The temperature outside is  $-5^{\circ}\text{F}$ , and the wind chill is  $-12^{\circ}\text{F}$ . What is the difference between the temperature and the windchill?
7. Jena has a rope that is  $4\frac{1}{4}$  inches long. If she divides the rope into sections that are exactly  $\frac{1}{4}$  inch in length, how many  $\frac{1}{4}$ -inch sections will she have?
8. Mrs. Jones decided to buy some pencils for her class. She bought 3 packages of pencils, and each package contained 72 pencils. There are 24 students in her class and she divided up the pencils so that each student had the same amount of pencils. If there were no pencils left over, how many pencils did each student get?

9. Griffin ordered a pair of sneakers online. He had a \$16 credit that he applied toward the purchase, and then he used a credit card to pay for the rest of the cost. If the shoes cost \$80, how much did Griffin charge to his credit card when he bought the sneakers?

10. Caleb had 27 video games. He bought 8 more from a garage sale. He then sold  $\frac{1}{35}$  of his games to a used video game store. How many video games did he sell?

11. For a scavenger hunt, Jim's mom distributed a bag of 725 jelly beans evenly into 29 plastic containers and hid them around the yard. If, after the hunt, Jim has a total of 275 jelly beans, then how many of the plastic containers did he find?

12. Sandra, Robert, and some other friends had a total of \$73. Sandra spent \$28 on videos and Robert spent \$14 on videos.

How much money did the group have after Sandra and Robert bought the videos?

**13.** Jimmy is writing a paper for one of his classes. The paper has to be 3,000 words long, and so far he has written 696 words. If he only has 6 more days to write his paper and wants to write the same number of words each day, then how many words must he write per day to finish the paper?

**14.** Lindsey went skydiving. When she jumped out of the plane, its elevation was 13,000 feet. She was in free fall for 10,000 feet, and then she deployed her parachute. At what elevation did Lindsey deploy her parachute?

**15.** On his bookshelf, Adam has the difference between two-thirds of Brett's books and two thirds of Charlie's books. If Brett has 72 books and Charlie has 27 books, how many books does Adam have?

**16.** Fredo has a coupon for \$1.00 off the price of a loaf of bread at the grocery store. After he arrived at the store, he found out the bread had already been marked down \$2.00. What is the total discount on the price of the bread?

- 17.** Carla, Patricia, and Angelina went on a car trip together, and they took turns driving. When they reached their destination, Carla and Patricia had driven a total of 259 miles, and Angelina and Patricia had drive a total of 255 miles.

If Carla drove 101 miles, who drove the most miles?

- 18.** The temperature of a city at sunset was  $-3^{\circ}\text{F}$ . Overnight, the temperature decreased by  $13^{\circ}\text{F}$ . What was the lowest temperature overnight in that city?

- 19.** A pet store sold 245 cans of cat food last weekend for a total of \$90.65. What was the price per can?

- 20.** Sam, James, and Leonard participated in a fundraiser for their school.

Sam sold 23 candles. Together, Sam and James sold 51 candles. Together, James and Leonard sold 54 candles.

How many candles did Leonard sell?

# Week 7

The stem-and-leaf plot at the right shows the lengths (in inches) of some snakes.

1. How many data values are in the set?

Stem	Leaf
0	3
1	1 3 3
2	0 3 7 8
3	3
4	5 6 7 9

2. Find the least value and the greatest value.

Key: 1|5 = 15

3. What is the median?

4. What is the range?

5. Which value occurs the most often?

6. Is the value 31 in the set? Explain.

7. Display the data in a histogram.

Books Read	
Books	Frequency
0-3	6
4-7	7
8-11	6
12-15	5

Find the angle measure that corresponds to the percent of a circle.

8. 25%

9. 40%

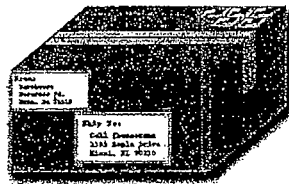
10. Display the data in a circle graph.

Month	Absences
September	1
October	1
November	7
December	3

11. Identify the population and the sample.



2 cell phones



Cell phones in shipment

12. Which sample is better for making a prediction? Explain.

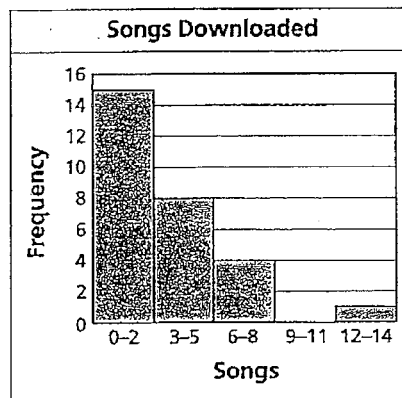
Predict the amount of nitrates in the river.

*Sample A:* A random sample of 5 gallons of water from one location in the river

*Sample B:* A random sample of 5 gallons of water from five different locations in the river

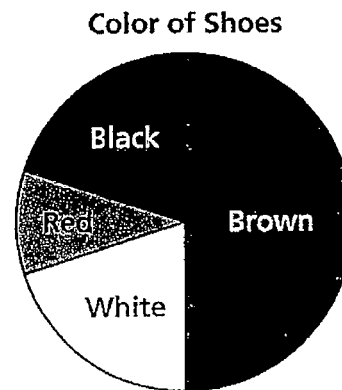


In Exercises 13–15, use the histogram that shows the number of songs downloaded per week by students in a class.



13. Which interval contains no data values?
14. How many students are in the class?
15. What percent of the students downloaded fewer than 6 songs? Round to the nearest tenth.

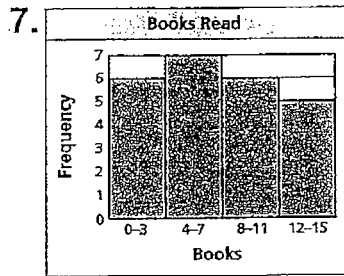
In Exercises 16–20, use the circle graph that shows the results of a shoe store’s survey on favorite color of shoes.



16. Which color is the most popular?
17. Which two colors were chosen the same number of times?
18. Forty adults were surveyed. How many adults chose brown?
19. Find the angle measure that corresponds to the percent of shoes that are *not* brown.
20. Predict the number of customers out of 250 who would choose red as their favorite color.

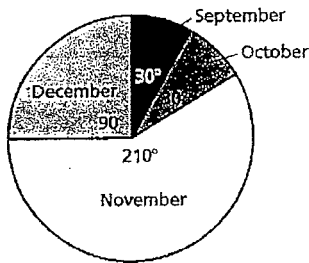
## Week 7

1. 13                      2. least: 3; greatest: 49  
3. 27              4. 46              5. 13  
6. No; *Sample answer*: The only value with the stem 3 is 33.



8.  $90^\circ$                       9.  $144^\circ$

10. Absences per Month



11. population: The cell phones in the shipment; sample: 2 cell phones  
12. Sample B; Taking samples from different locations gives more representative results.  
13. 9-11                      14. 28 students  
15. 82.1%                      16. brown  
17. black and white                      18. 20 adults  
19.  $180^\circ$                       20. 25 customers

# Week 8

You randomly choose one of the tiles shown. Find the favorable outcomes of the event.



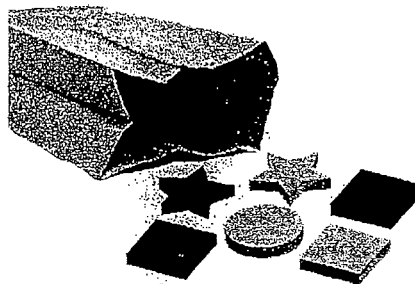
1. Choosing an odd number less than 4
2. Choosing a number less than 1
3. Choosing a number divisible by 4

You randomly choose one of the files shown above. Determine the theoretical probability of the event.

4. Choosing an even number greater than 7
5. Choosing a negative number
6. Choosing a number divisible by 3

You randomly choose one shape from the bag. (a) Find the number of ways the event can occur. (b) Find the favorable outcomes of the event.

7. Choosing a square
8. Choosing a circle
9. *Not* choosing a star



In Exercises 10 and 11, use the following information.

You check 20 batteries. Fourteen of the batteries do not have a charge.

9. What is the experimental probability that the next battery you check does not have a charge?
  
  
  
  
  
  
  
  
  
  
11. Out of the next 70 batteries that you check, how many would you expect to not have a charge?

You throw two sticks 15 times and record the results. Use the table to find the experimental probability of the event.

12. Tossing 2 blue

13. Tossing 1 blue and 1 pink

Outcome	Frequency
2 blue	4
2 pink	3
1 blue, 1 pink	8

14. *Not* tossing all blue

15. You have 160 songs on your MP3 player. The probability of randomly choosing a rock song is 30%. How many of the songs on your MP3 player are *not* rock songs?

Tell whether the events are *independent* or *dependent*. Explain.

16. You flip a coin twice.

First Flip: You flip tails.

Second Flip: You flip tails.

17. Two students are selected to serve on the student council.

First Choice: You are chosen. Second Choice: Your friend is chosen.

A spinner has 4 equal sections numbered 1 to 4. You spin it twice.  
Find the probability of the events.

18. Spinning a 2 and then an even number

19. Spinning an odd number and then another odd number

A game has a deck of cards with 10 red cards, 4 blue cards, and 2 yellow cards. You randomly choose two cards. Find the probability of choosing the given cards.

20. two red cards

21. a blue card and a yellow card