Monroe Township Middle School
Monroe Township, New Jersey

2025 Middle School 8ᵗʰ **Grade** *PREPARATION PACKET*

Welcome to 8th Grade Mathematics! Our 8th Grade Mathematics Course is a comprehensive survey course that will provide you with the fundamental tools of mathematical understanding that will support you in all your high school courses. Since you will be taking *8th Grade Mathematics* after successful completion of 7th Grade Mathematics, the **Monroe Township Middle School 8th GRADE PREPARATION PACKET** contains review material of the 7th grade concepts, skills, and procedures that should be mastered <u>BEFORE</u> entering 8th grade in the fall. Essentially, this packet provides a review of the major 7th grade topics as well as a preview of 8th grade topics. The sections are based on the NJ 2016 Student Learning Standards.

Here are some websites you might find particularly useful:
- http://www.khanacademy.org/
- http://www.ixl.com/math/ (free version)
- Study Island (use Clever)
- enVisions (use Clever)

This collection of problems will identify those concepts that you have mastered as well as those you will need to practice and review. **You are expected to seek extra help immediately on those concepts with which you have not demonstrated proficiency.** Be resourceful – use the online resources!

SOLVE THESE PROBLEMS WITHOUT THE USE OF A CALCULATOR AND SHOW ALL WORK

You will be responsible for handing in the completed packet with all work shown <u>ON THE FIRST DAY OF SCHOOL</u>. The problems here are very representative of the types of items you will need to have mastered <u>**BEFORE**</u> 8th Grade Math… so we strongly encourage that you include this packet in your summer festivities! Good luck and enjoy! ☺

MATH 8 PREPARATION PACKET SCORE: _____ of 41 points

REVIEW: NJ 2016 Student Learning Standards: Grade 7

- **Ratios and Proportional Relationships**
  - o Analyze proportional relationships and use them to solve real-world & math problems
- **The Number System**
  - o Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers
- **Expressions & Equations**
  - o Use properties of operations to generate equivalent expressions
  - o Solve real-life and mathematical problems using numerical and algebraic expressions and equations
- **Geometry**
  - o Draw, construct, and describe geometrical figures and describe the relationships between them
  - o Solve real-life and mathematical problems involving angle measure, area, surface area, and volume
- **Statistics and Probability**
  - o Use random sampling to draw inferences about a population
  - o Draw informal comparative inferences about two populations
  - o Investigate chance processes and develop, use , and evaluate probability models

PREVIEW: NJ 2016 Student Learning Standards: Grade 8

- **The Number System**
  - o Know that there are numbers that are not rational & approximate them
- **Expressions & Equations**
  - o Work with radicals and integer exponents
  - o Understand the connections between proportional relationships, lines, and linear equations
  - o Analyze and solve linear equations and pairs of simultaneous linear equations
- **Functions**
  - o Define, evaluate, and compare functions
  - o Use functions to model relationships between quantities
- **Geometry**
  - o Understand congruence & similarity using physical models, transparencies, or geometry software
  - o Understand and apply the Pythagorean Theorem
  - o Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres
- **Statistics and Probability**
  - o Investigate patterns of association in bivariate data

Ratios and Proportional Relationships

Use the table below for #1.

The table shows the numbers of hours Melissa works and the amounts that she earns.

Melissa's Earnings					
Hours Worked	2	4	7	8	10
Earnings (in $)	44	88	154	176	220

1. Is the relationship between time and earnings proportional? Explain why or why not using a proportion to support your reasoning.

(For #2) Use the map below.

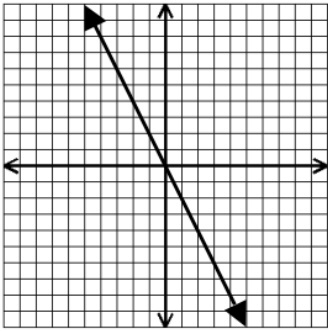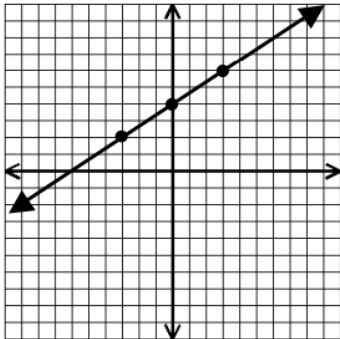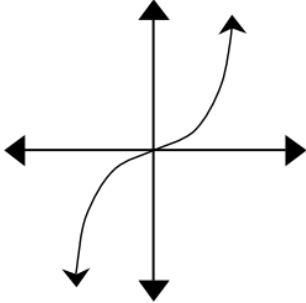

Scale
1 centimeter = 195 miles

2. What would be the approximate driving time to travel from Seattle to New York at an average speed of 55 miles per hour? Use a proportion to calculate your answer.

3. If David walks ½ mile in ¼ hour, then how fast does David walk in one hour? (In other words, what is David's "**unit rate**"?) Create a rate table to show distance walked per ¼ hour.

4. An important category of percentage problems is markup & markdown problems. Solve the following:

   a. A sporting goods store pays its wholesaler $50 for a certain baseball glove and then sells the glove to customers at a retail value of $90. What is the **markup rate**?

   b. A sweater originally priced at $44 is marked down 25%. What is the **sale price**?

5. The table shows the rate at which water is being pumped into a swimming pool. Does the table represent a proportional relationship? If so, what is the equation?

Time (min)	2	5	7	12
Amount (gal)	36	90	126	216

6. Determine which of the following graphs represent proportional relationships. Circle the appropriate response.

Proportional   non-proportional

Proportional   non-proportional

Proportional   non-proportional

The Number System

7. Fill in the missing fraction/decimal/percent conversions below.

FRACTION	DECIMAL	PERCENT
	0.12	
$\dfrac{7}{8}$		
		125%

8. Use the **distributive property** to write an equivalent variable expression.

$$-7(2x-5)$$

9. Find the sum or difference.

    a. $\dfrac{5}{16}+\dfrac{3}{4}$ b. $5\dfrac{3}{32}-1\dfrac{5}{8}$

10. Find the quotient or product.

    a. $1\dfrac{4}{5}\bullet 20$ b. $\dfrac{1}{2}\div\dfrac{3}{4}$

11. Simplify and show all steps of work: $10-(50\div(-2\bullet 25)+7)\bullet 2^{2}$

Expressions & Equations

12. Simplify the following expressions:

     a. $m + 0.5m$ b. $(6p + 4) + (-5p + 8)$ c. $6(x - 3) - 2(x - 5)$

13. The perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

14. Felicia is planning a white water rafting trip. She compares two companies to find the better buy.

     a. Sinking Rivers charges two hundred dollars for insurance and fifteen dollars an hour to rent the raft. Write an equation to represent Sinking Rivers' total cost (c) for any number of hours (h).

     b. Floating Down the Stream charges thirty dollars an hour and one hundred and ten dollars for insurance. Write an equation to represent Floating Down the Stream's total cost (c) for any number of hours (h).

15. Solve: $2x + 17 = 81$

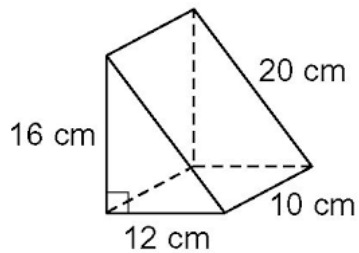16. Solve and graph the inequality below:
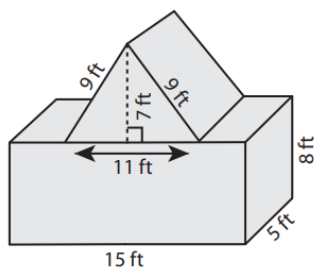
     $5x + 460 \geq 1,000$
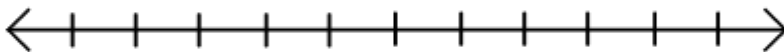
Geometry

17. **<u>Illustrate</u>** each of the following terms by providing clear examples including angle measures.

    a. Supplementary angles

    b. Complementary angles

    c. Vertical angles

    d. Adjacent angles

18. What is the **VOLUME** of the triangular prism?

20 cm
16 cm
10 cm
12 cm

19. What is the total **SURFACE AREA** of the figure below?

9 ft
7 ft
9 ft
11 ft
8 ft
5 ft
15 ft

Statistics and Probability

Match the following terms to their corresponding definition:

20. _____Probability

      A. The middle number of an ordered set of numbers. If there is an even number in the set, then it is the average of the two middle values.

21. _____Law of Large Numbers

      B. The "average" of a set of numbers – the sum of the set divided by the number in the set.

22. _____Random sample

      C. A number between 0 and 1 that describes the likelihood that an outcome will occur. It can be theoretical where it's the ratio of the number of favorable outcomes (assuming they are equally likely) to the total number of outcomes or experimental where it's the ratio of the number of favorable outcomes of a trial to the total number of trials in an experiment.

23. _____Mean

      D. The most frequently occurring value in a numerical set.

24. _____Median

      E. As more trials of an experiment are conducted, the experimental probability more closely approximates the theoretical probability. If is not at all unusual to have 100% heads after three tosses of a fair coin, but it would be extremely unusual to have 100% heads after 1,000 tosses.

25. _____Mode

      F. When you choose in such a way that gives every sample from a population an equally likely chance of being selected.

26. Each letter of the word "MATHEMATICS" is written on a separate slip of paper and placed in a hat. A letter is chosen at random from the hat.

    a.   What is the probability of choosing "M" on your first try?

    b.   Suppose you choose an "M" on your first try. You keep the slip of paper (do not replace it in the hat) and go for another letter. What is the probability of getting another "M"?