

FROST MIDDLE SCHOOL

Mathematics Department

Summer Packet for Rising Seventh or Eighth Graders Recommended for **Algebra Honors or Algebra**



The attached problems are intended to provide students with an opportunity to reinforce Math Skills and problem solving strategies over the summer months.

During the second week of school next September, students will be asked to turn in the completed problems and the steps used to solve the problems. **Students should attach their work to the packet.**

Teachers will give a quiz based on these problems. Part of the quiz grade may include students' effort in completing the original problems over vacation.

Although it is expected that most students will be successful on most of the problems, the primary purpose of the assignment is to encourage students to return to school with a good recollection of fundamental topics studied during the previous school year. If a problems cannot be completed in ten minutes of sustained effort, however, the student should return to the problem the next day.

Name: _____

7th grade teacher: _____

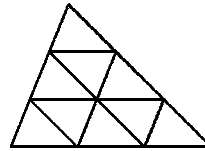
SUMMER Packet

For rising Algebra students

Show steps for each problem on your own paper. Attach your work papers to this packet.

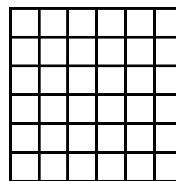
- What is 50% of the sum of the first 10 odd numbers?
- Evaluate for $x = 3, y = 1, z = 2$: $x^y + y^z + z^x$
- What is the greatest common factor of 24, 54, and 72?
- Find the average of the elements of the set:
 $\{0, 7x, 5x + 2, 7 - 2x, 6\}$
- What is the percent of increase if the cost of an article increases from \$8 to \$10?
- Insert the fewest number of grouping symbols to make the following equation true:
 $24 \div 3 + 9 \times 5 - 2 = 6$

- Evaluate $\frac{1}{a} + 3a$ if $a = \frac{1}{2}$. Express your answer as a mixed number.
- A student who is 5' 6" casts a 4' shadow. How many feet tall is a nearby tree which casts a 24' shadow?
- At 60 miles per hour, how far would a car travel in $2\frac{2}{3}$ hours?
- How many triangles are in the figure?

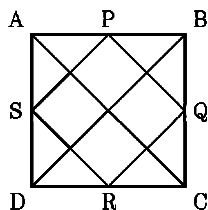


- What is the 4th number in this geometric progression?
108, -36, 12, _____
- In a group of 72 students if the ratio of boys to girls is 5 : 3, how many boys are in the group?

- What is the least common multiple of 24, 36, and 18?
- How many squares of all sizes are in the figure?



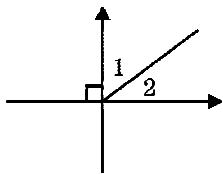
- $ABCD$ is a square and P, Q, R and S are midpoints of its sides. What is the number of right triangles in the diagram?
- A rubber ball bounces exactly half as high as it did on the previous bounce. It bounces 128 feet high on the first bounce. How high does it bounce on the 12th bounce? Express your answer as a common fraction.



17. If eight students scored 100 on a test, twelve scored 90, and eight scored 80, what was the mean of the students' scores?
19. A secretary types 54 words per minute. How many words can she type in 90 seconds?
21. To keep her hair shiny, Rapunzel brushed her hair at the rate of 3 strokes every 2 seconds. How many times did she stroke her hair in an hour?
23. If the price of a shirt is reduced by 20% to \$14.40, find the original price.
25. If the arithmetic mean is 90, what is the value of the missing score?

90, 85, _____, 95, 90, 100, 90, 100

27. In the figure, $m\angle 1 = 30^\circ$. Find $m\angle 2$.



29. In a house plan the actual height of 6 feet is represented by 2 inches. If the actual length of the house is 120 feet, what is the length the house in the drawing?
31. Which is the prime factorization of 150?
- a) $2 \times 3^2 \times 5$ b) $2 \times 3 \times 5^2$
 c) $2^2 \times 3 \times 5$ d) $2 \times 3 \times 25$
33. Last week Robin did 30 sit-ups in one minute. Today, she did 45 in one minute. Her coach told her she had improved 150%. Is this correct? Explain.
35. A group of friends rode to a concert together. Each ticket cost \$10. They had to pay \$5 for parking. The total cost was \$65. How many people went to the concert? Which equation could be used to solve this?
- a) $10n + 5n = 65$ b) $10n + 5 = 65$
 c) $5n + 10 = 65$ d) not enough information
18. The price of a \$300 television set is raised 20% in January and reduced 20% in February. What is the price, in dollars, after the reduction?
20. If 24 students in a class of 30 students were present, what percent of the students were absent?
22. Write 87 as the sum of three consecutive integers.
24. If refreshments cost \$45 for 18 people, at the same rate how much would refreshments cost for 26 people?
26. Simplify: $5 \cdot 11^2 - 3(2^4 - 4 \div 2 \cdot 3)$
28. Find the value of the following expression:
 $20 - 3.2 \cdot 3\frac{1}{2} + (-18)$
- a) 9.2 b) -9.2 c) 40.8 d) -40.8
30. John has a board measuring 12 inches by 18 inches. If he saws 3 inches off one side, which of the following could not be the area of the remaining board?
- a) 162 in^2 b) 180 in^2 c) 135 in^2
32. Simplify: $2^3 + (7 - 3) \div 2 + (7 - 2)^2$
34. Karen opened a checking account by depositing \$500. She wrote checks for \$13.85, \$28.14, and \$230.18. She made a deposit which was a tenth of the opening balance. What is the balance in her account?
36. The area formula for a trapezoid is:
 $A = \frac{1}{2}h(b_1 + b_2)$
 If the height of a trapezoid is 5 cm and the bases measure 4 cm and 3 cm, find the area.
- a) 35 cm^2 b) 17.5 cm^2
 c) 30 cm^2 d) 25 cm^2

37. A senior guard on Hillside’s basketball team has scored the following points over the past nine games: 38, 18, 1, 11, 7, 7, 14, 14, and 7. Find the mean, mode, and median of his scores. Which measure best describes his “average”? Should we consider the range values? Why?

39. The tax on a car costing \$9,200 is \$368. At the same tax rate, what will the tax be on a car costing \$12,500?

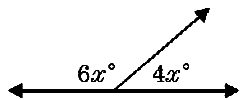
- a) \$437.50
- b) \$562.50
- c) \$250
- d) \$500

41. A sign on a building is 12 feet above the ground. You have a 13-foot ladder. Use the Pythagorean Theorem to explain why the base of the ladder must be five feet or closer to the wall.

43. It took 2.5 tons of fertilizer to fertilize 75 acres. How many tons of fertilizer would it take to fertilize 450 acres?

- a) 6 tons
- b) 15 tons
- c) 187.5 tons
- d) 8100 tons

45. Solve for x .



47. Bob lives eight blocks due east of Helen. Helen lives three blocks due west of Ilene. Where does Ilene live in relation to Bob?

49. Solve: $-7 - \frac{x}{5} = -10$

51. Bob saves \$ x per month for three months. His father gives him \$40 and he has enough money to buy the \$115 tennis shoes he wants. Which equation shows this information?

- a) $3x + 25 = 115$
- b) $115 - 40 = 3x$
- c) $3x + 40 = 115$
- d) $40 - 3x = 115$

38. Last year, Central High School had 800 students. This year’s enrollment dropped to 600. What was the percent of decrease?

- a) 75%
- b) $33\frac{1}{3}\%$
- c) 25%
- d) $133\frac{1}{3}\%$

40. Write $(3 \times 10^4) + (2 \times 10^3) + (5 \times 10^0) + (6 \times 10^{-1})$ in standard notation.

42. Simplify: $(2x^2)(3x^4)$

- a) $6x^6$
- b) $6x^8$
- c) $5x^6$
- d) $5x^8$

44. Simplify: $23 - 3(5 + 2^2)$

- a) 180
- b) -4
- c) 4
- d) -124

46. On last week’s English final, Sarah scored a 95 and was told she had the highest grade in the class. The class “average” was 80. Sarah claimed she scored the highest by a large margin. Comment on her statement.

48. Find the value of the following expression:

$$30 \cdot (-2) + 12 \div 2 - 5$$

50. Solve: $\frac{12x}{25} = \frac{36}{15}$

- a) 3
- b) 5
- c) 2
- d) $\frac{1}{5}$

52. In the pattern, the volume of one small cube is one cubic unit. What would be the volume of the ninth figure?



Answer List

- | | | |
|--|-------------------------|---|
| 1. 50 | 2. 12 | 3. 6 |
| 4. $2x + 3$ | 5. 25% | 6. $24 \div (3 + 9) \times (5 - 2) = 6$ |
| 7. $3\frac{1}{2}$ | 8. 33 | 9. 160 miles |
| 10. 13 | 11. -4 | 12. 45 |
| 13. 72 | 14. 91 | 15. 20 |
| 16. $\frac{1}{16}$ foot | 17. 90 | 18. \$288 |
| 19. 81 | 20. 20% | 21. 5400 |
| 22. $28 + 29 + 30$ | 23. \$18 | 24. \$65 |
| 25. 70 | 26. 575 | 27. 60° |
| 28. b | 29. $40''$ | 30. c |
| 31. b | 32. 35 | 33. No, she <i>improved</i> by 50%. |
| 34. \$277.83 | 35. b | 36. b |
| 37. mean is 13, mode is 7,
median is 11; [answers will
vary] | 38. c | 39. d |
| 40. 32005.6 | 41. [answers will vary] | 42. a |
| 43. b | 44. b | 45. 18 |
| 46. [answers will vary] | 47. 5 blocks due west | 48. -59 |
| 49. 15 | 50. b | 51. c |
| 52. 45 | | |

Catalog List

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|---------------|---------------|---------------|
| 1. MCH FB 79 | 2. MCH BB 50 | 3. MCH DF 9 |
| 4. MCH EA 52 | 5. MCH FE 4 | 6. MCH AG 75 |
| 7. MCH BB 5 | 8. MCH FA 150 | 9. MCH FA 64 |
| 10. MCH DA 38 | 11. MCH FB 20 | 12. MCH FA 8 |
| 13. MCH DF 3 | 14. MCH DA 4 | 15. MCH DA 35 |
| 16. MCH FB 47 | 17. MCH EA 13 | 18. MCH FE 47 |
| 19. MCH FA 65 | 20. MCH FA 4 | 21. MCH FA 15 |
| 22. MCH FB 8 | 23. MCH FE 35 | 24. MCH FA 2 |
| 25. MCH EA 12 | 26. MCH AG 58 | 27. NC1 DB 2 |
| 28. NC1 DG 1 | 29. NC1 DB 23 | 30. NC1 DD 4 |
| 31. NC1 DA 8 | 32. NC1 DC 2 | 33. NC1 DF 10 |
| 34. NC1 DG 3 | 35. NC1 DC 33 | 36. NC1 DC 41 |
| 37. NC1 DF 3 | 38. NC1 DG 16 | 39. NC1 DG 13 |
| 40. NC1 DA 2 | 41. NC1 DB 14 | 42. NC1 DA 43 |
| 43. NC1 DG 7 | 44. NC1 DC 1 | 45. NC1 DB 3 |
| 46. NC1 DF 11 | 47. NC1 DE 7 | 48. NC1 DG 2 |
| 49. NC1 DC 14 | 50. NC1 DA 28 | 51. NC1 DC 34 |
| 52. NC1 DC 28 | | |