IMPACT ACADEMY

MATH NEST: SUMMER EDITION

Join our wise owls on a summer journey through numbers and logic!

Your Algebra teacher is very excited to meet you and work with you in the upcoming year!

Please use the following problems to practice the prerequisite skills needed to be most prepared for Algebra. Your student should work through the following pages and **SHOW ALL WORK.** There are some helpful math tips included as you work through the pages to provide reminders on different topics.

When you have completed the summer packet, you may use your IXL login to practice some additional math skills (number sense and numeracy).

Please see the list below of possible incentives completing the packet. You will turn the packet into your teacher during the first week of school. You may choose two incentives with the submission of a completed packet.

INCENTIVES:

- Free admittance to a back-to-school event
- Lunch with the principal
- Chick-Fil-A Complimentary Meal Card
- Free HW or CW assignment pass (*See your teacher for when this can be used*)
- Impact Owl Badge & Certificate of Achievement
- Entry into a raffle - For an Impact Academy Shirt

I. Integers

Remember

* Integers are all whole numbers (not fractions) that can be positive, negative, or zero. That is, all the numbers {...-4, -3, -2, -1, 0, 1, 2, 3, 4,...}.

Problem Set 1

For each of the following, please give the prime factorization. (Use a factor tree to help).

1. 24 2. 42 3. 48

Problem Set 2

For each of the following, perform the indicated operation.

1. $-6 + (-13)$ 2. $19(0)$ 3. $6 + (-9) + 1$ 4. $5 - 7$

5. $-7 - (-3)$ 6. $6(-4)$ 7. $2(-3) + 0(5)$ 8. $21 \div -7$

9. $3(-7)(-2)$ 10. $-4 - (-6)$ 11. $-28 + 16 + 34$ 12. $-8 - 15$

Problem Set 3

Read and perform the indicated operations.

1. What is the sum of 8 and 17?
2. What is the difference between 3 and 12?
3. What is the product of -3 and 14?
4. What is the quotient of 15 and -5?
5. If the sum is 4 and one of the integers is 1, what must the other integer be?

Problem Set 4

Evaluate the expression when $x = -7$ and $y = 5$.

1. $8xy$ 2. $27 + 3y^2 + x$

Problem Set 5

Simplify the expression.

1. $-4(11m)$ 2. $(3a)(17)$ 3. $b + (-14) + 35$ 4. $8 + c + (-5)$

5. $d + 7d$ 6. $4m - 6m - 7m$ 7. $6x - (x - 1)$ 8. $-3(r + 2) - 3r$

II. Fractions

Problem Set 6

Identify the two integers that each of the following fractions is between.

1. $\frac{-21}{4}$ 2. $\frac{9}{21}$

Problem Set 7

Perform the indicated operation.

1. $1\frac{2}{7} + \left(-3\frac{4}{7}\right)$ 2. $\left(-3\frac{3}{5}\right) - 4\frac{2}{5}$ 3. $3\frac{6}{7} + \left(-1\frac{1}{7}\right)$ 4. $\left(-1\frac{3}{4}\right) + \left(-3\frac{3}{4}\right)$

Problem Set 8

Perform the indicated operation.

1. $\frac{8}{10} \div \frac{2}{3}$ 2. $\frac{2}{3} \bullet \frac{2}{4}$ 3. $\frac{7}{8} + \left(-\frac{3}{16}\right)$ 4. $\frac{3}{7} \times \frac{5}{18}$

5. $\frac{1}{2} \div \frac{1}{4}$ 6. $\frac{1}{2} + \frac{2}{4}$ 7. $\frac{2}{4} + \frac{6}{10}$ 8. $\frac{3}{10} + \frac{1}{2}$

9. $\frac{9}{10}\left(-\frac{5}{21}\right)$ 10. $-\frac{3}{4} - \frac{2}{7}$ 11. $-\frac{4}{11} + \frac{9}{11}$ 12. $\frac{7}{18} - \frac{17}{18}$

Problem Set 9

Read and solve each question using proportions.

1. A car travels 150 km on 12L of gasoline. How many liters of gasoline are needed to travel 500 km?

2. A baseball pitcher strikes out an average of 3.6 batters per 9 innings. At this rate, how many batters will the pitcher strike out in 315 innings?

3. A watch loses 2 minutes every 15 hours. How much time will it lose in 2 hours?

4. A school has a policy that 2 adults must accompany every group of 15 students on school trips. How many adults are needed to take 180 students on a trip?

III. Linear Equations and Inequalities

Remember:

*To solve equations, you must first get your like terms together, then isolate the variable.

*To solve inequalities, the sign changes direction when multiplying or dividing by a negative integer.

Problem Set 10

Solve each equation.

1. $4x = 2x + 6$

2. $3x = x + 20$

3. $6x + 7 = 5x + 13$

4. $10x - 6 = 7x + 9$

5. $5x - 1 = 2x + 11$

6. $6x - 1 = x + 19$

7. $-3(2x + 5) = 15$

8. $7x - 4(x - 3) = 33$

9. $6(x + 8) = 5x + 4$

Problem Set 11

Solve each inequality. Graph your solution on a number line.

1. $a + 3 < 10$ 2. $19 \geq b - 29$ 3. $-5d > 40$

IV. Monomials/Exponents/Square Roots

Problem Set 12

Find the greatest common factor of the following.

1. 51, 63 2. 56, 136

3. $48y^2$, $52y$ 4. $16p$, $68p$

Problem Set 13

Find the least common multiple of the following.

1. 10, 15 2. 18, 45

3. $10n^2$, $16np$ 4. $4s^3$, $36s^2$

Problem Set 14

Find the product or quotient. Write your answer using exponents.

1. $6^5 \cdot 6^9$ 2. $4c^3 \cdot 5c^2$ 3. $\frac{6a^6}{a^3}$ 4. $\frac{4^{11}}{4^5}$

5. $12^3 \cdot 12^4 \cdot 12^2$ 6. $\frac{3^8}{3}$ 7. $7d^5 \cdot d^2$ 8. $\frac{15r^7}{12r^4}$

Write the expression using only positive exponents.

9. 18^{-4} 10. 7^{-8} 11. s^3t^0 12. $5w^{-2}$

Problem Set 15

Find the square roots of the number.

1. 49 2. 2500 3. 144 4. 100

Simplify the expression.

5. $\sqrt{54x}$ 6. $\sqrt{30}$ 7. $\frac{\sqrt{32\,a^2}}{\sqrt{81}}$ 8. $\sqrt{75a^2}$

Estimate the square root to the nearest whole integer.

9. $-\sqrt{10}$ 10. $\sqrt{95}$ 11. $\sqrt{65}$ 12. $-\sqrt{50}$

V. Decimals

Problem Set 16

Write the fraction or mixed number as a decimal.

1. $\frac{3}{5}$ 2. $-\frac{14}{9}$ 3. $-6\frac{13}{25}$

Write the decimal or fraction as a mixed number.

4. 0.34 5. -3.78 6. $0.\overline{5}$

Problem Set 17

Add or subtract.

1. $3.7 + 8.9$ 2. $75.006 + 2.3 + 15.863 + 246.9$ 3. $8.1 + 268 + 49.64$

4. $3.16 - 1.87$ 5. $162.8 - 46.96$ 6. Subtract 1.97 from 15.1

Problem Set 18

Multiply or divide.

1. 5.82×0.78 2. $0.01 \times 0.167 \times 0.9$

3. $0.17 \div 8.5$ 4. $\$13.92 \div 8$

Arrange from smallest to largest.

5. 1.62, 1.6, 1.06, 1.16, 1.66

6. 0.808, 0.81, 0.8019, 0.807, 0.8

VI. Percents

Remember:

*To find the percent of a number, change the percent to a decimal and multiply.

*The percent proportion is $\frac{is}{of} = \frac{\%}{100}$.

*The percent of change can be found using the proportion $\frac{difference}{original} = \frac{\%}{100}$.

Problem Set 19

Write the decimal as a percent or the percent as a decimal.

1. 0.045

2. 1.34

3. 7%

4. 0.25%

Problem Set 20

Find the percent of the number.

1. 40% *of* 300

2. 25% *of* 28

3. 75% *of* 76

Problem Set 21

Use the percent proportion to answer the question.

1. What number is 52% of 625?

2. What percent of 72 is 252?

3. 117 is 45% of what number?

4. What number is 0.5% of 3400?

Problem Set 22

Identify the percent of change as an increase or decrease. Then find the percent of change.

1. Original: 40
   New: 62

2. Original: 92
   New: 23