ASCENT ADVANTAGE ACADEMY
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Mathematics 5

Algebra 1 – Unit 1 – Lessons 1- 6

Sets of Numbers, Symbols, Properties, Distributive Property, Powers and Exponents, Squares and Cubes, Square Roots and Cube Roots, Approximating Square Roots, Simplifying Square Roots, Grouping Symbols, Order of Operations, Divisibility Rules

Course Compiled by Mary C. Kessler

MATHEMATICS 0-A

Brain Gym® Exercises Helpful with Math

Brain Gym Exercises are found in the OPENING EXERCISES portion of the Home School Curriculum. They are also found on the Ascent Advantage Academy channel on youtube.

Using these exercises, and the others in the Brain Gym line-up, overtime, will help create and strengthen learning pathways in the brain.

Case in point: A fifth grade girl who could not talk in sentences, was awkward and walked with a limp, and was at first grade math level, by the end of the school year could speak fluently, do most of fifth grade math, and run, skip, and jump. Yea, Brain Gym!

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(**Keep this list**):

Reading Comprehension – For Story Problems
Calf Pump; Foot-flex; Grounder

Thinking Skills – Organization (How to Solve a Problems – The Steps)
Earth Buttons, Space Buttons, Balance Buttons

Math Proper
The Owl; The Elephant; Calf Pump; Neck Rolls, Gravity Glider

Memory and Abstract Thinking
Cross Crawl; Balance Buttons; Positive Points; Neck Rolls

Creative Thinking – Problem Solving
Cross Crawl; Gravity Glider; Energizer; The Rocker

Test Taking
Space Buttons; Cross Crawl; Water; Lazy 8's Earth Buttons; Hook-ups

If Nervous: Positive Points or Calf Pump

Lesson One – Sets, Symbols and Properties

Watch the video and take notes. Practice or learn what YOU need to.

https://youtu.be/BsUpA3Upn_E

Insert numbers into the properties; additive and multiplicative inverses to make sure you understand the concepts.

Lesson Two – Multiplying and Dividing Using Zero; Powers and Exponents

Watch the video and take notes.

https://youtu.be/1tZy28b6mO8

Then work the following problems. Answers in the next video.

1. x^0 =
2. 23^2 =
3. 540^1 -
4. 343 is _____ cubed
5. 3^{-3} =
6. 18^0 =
7. 15^3 =
8. 5^{-4} =
9. 170^1 =
10. 2^6 = (No Calculators)

Lesson 3 – Operations with Powers and Exponents.

Watch the video and note the concepts.

https://youtu.be/bSsENh247zk

Do the following problems.

Problems for Lesson 3

1. $2^2 \times 2^3 =$

2. $5^1 \times 4^0 =$

3. $3^{15} \div 3^9 =$

4. $3^4 \times 5^3 =$

5. $14^2 \div 14^1 =$

6. $7^2 \div 2^4 =$

7. $3^2 - 2^3 =$

8. $2^4 + 3^3 + 4^2 =$

9. $12^2 + 12^4 =$

10. $10^3 - 10^1 =$

Lesson 4 – Square Root and Cube Roots

Watch the video, take notes and learn the concepts.

https://youtu.be/DsPris_UXME

Then, do the problems.

Problem Set for Algebra 1 – Lesson 4

1. 24^1 =

2. 8^0 =

3. 4^{-6} =

4. 3^3 =

5. $4^3 \times 4^2$ =

6. $4^6 \div 4^2$ =

7. $5^2 + 6^2$ =

8. $3^4 - 4^3$ =

9. Give the square roots of the following: 100 25

36 49 64 4 16 9 81

10. Approximate the square root of 54.

11. $\sqrt[3]{27}$ =

12. $-\sqrt{121}$ =

13. $-\sqrt[3]{27}$

14. $\sqrt{49}$

Lesson 5 – Grouping Symbols and Order of Operations

Watch the video, take notes, and learn the material.

https://youtu.be/L4_UBqw6NnQ

Do the problems.

Algebra Problem Set 5

1. $9(6 + 11) =$

2. $6 \times 8 + 5 \times 2 =$

3. $2(5 + 6) + 7 \times 3 =$

4. $9 - 2^3 + 5 =$

5. $72 \div 2 \times 3 + 4 \times 2^4 - 3^2 =$

6. $6[2 + 8(3^3)] =$

7. $9(1 + 7) + 2 \times 5 =$

8. $5[3 + 4(2^2)] =$

9. $3^2[(11 + 3) - 4] =$

10. $5\{4^2[(13 + 4) - 8]\} =$

Lesson 6 - Divisibility Rules

Watch the Video. Take Notes. Learn the Rules.
Then Do the Problems.

https://youtu.be/PcPGyQynZuw

Problems for Algebra Lesson 6

1. List **ALL** numbers by which the following numbers are divisible.

a. 126

b. 1648

c. 186

d. 2488

e. 2853

f. 1800

g. 23751

Begin Unit Review

2. List the 13 sets of numbers.

3. Show all ways that multiplication can be represented.

4. Draw at least 6 common math symbols as presented in this unit.

5. Explain or show algebraically each of the following:

a. Closure Property of Addition

b. Closure Property of Multiplication

c. Commutative Property of Addition

d. Commutative Property of Multiplication

e. Associative Property f Addition

f. Associative Property of Multiplication

g. Identity Property of Addition

h. Identity Property of Multiplication

I. Additive Inverse

J. Multiplicative Inverse

K. Distributive Property

6. Tell what happens when you multiply by 0.

7. What is division by 0 called? WHY?

8. What is a base and what is an exponent?

9. What does an exponent mean?

10. 10^1 =

11. 10^3 =

12. 10^0 =

13. 3^{-4} =

14. $5^5 \div 5^2$ =

15. 3^3 =

16. List the perfect squares 0 – 12

17. List the perfect cubes 0 – 7

18. $4^2 \times 4^3$ =

19. $2^6 - 4^2$ =

20. $3^2 \times 2^4$ =

21. $3^3 + 4^2$ =

22. $5^3 \div 4^3$ =

23. $(2^2)^3$ =

24. $\sqrt{49}$ =

25. $\sqrt[-3]{8}$

26. Approximate $\sqrt{29}$

27. Name and show the 3 grouping symbols.

28. Find the answer using PEMDAS.

$10 - 3 \times 6 + 10^2 + (7) \times 4 =$

29. NOTE: When a minus or negative sign appears before a parenthesis, remove the parentheses and change the sign of each term within the parentheses.

Try the following:

$6 - (- 3 + a - 2b + c) =$

ANSWERS

1. List **ALL** numbers by which the following numbers are divisible.

a. 126 1, 2, 3, 6, 9

b. 1648 1, 2, 4, 8

c. 186 1, 2,

d. 2488 1, 2, 4,

e. 2853 1, 3,

f. 1800 1, 2, 3, 4, 5, 6, 9, 10

g. 23751 1, 3, 7, 9

2. List the 13 sets of numbers.

Natural or counting, whole, Integers, Positive integers, negative integers, evens, odds, rational, irrational, prime, composites, squares, cubes.

3. Show all ways that multiplication can be represented.

X • (2)(3) (4)5 4(5) 3a ab

4. Draw at least 6 common math symbols as presented in this unit.

≥ ≤ = ≰ ≱ ≠ ≈

5. Explain or show algebraically each of the following:

a. Closure Property of Addition

All answers are contained in the original set. Integers; Even numbers

b. Closure Property of Multiplication

All answers are contained in the original set. Integers, Evens and Odds

c. Commutative Property of Addition

a + b = b + a The same numbers in any order equal the same answer.

d. Commutative Property of Multiplication

a x b = b x a The same numbers in any order equal the same answer.

e. Associative Property of Addition

How the same numbers are associated within parentheses, makes no difference in the answer. (2 + 3) + 5 = 2 + (3 + 5)

f. Associative Property of Multiplication

How the same numbers are associated within parentheses, makes no difference in the answer. (2 x 3) x 5 = 2 x (3 x 5)

g. Identity Property of Addition 0

h. Identity Property of Multiplication 1

I. Additive Inverse - The opposite number; added together they = 0 3, -3

J. Multiplicative Inverse Two numbers multiplied together that equal 1. 4, ¼

K. Distributive Property – a(b+c) = ab + ac

6. Tell what happens when you multiply by 0. The answer is always 0.

7. What is division by 0 called? WHY? Undefined, because you can't divide by 0.

8. What is a base and what is an exponent?

The bottom or big number is the base; the small number up to the right is the exponent. 3^9 3 is the base, 9 is the exponent.

9. What does an exponent mean?

The number of times the base will be multiplied by itself.

10. $10^1 = 10$ 11. $10^3 = 10 \times 10 \times 10 = 1000$ 12. $10^0 = 1$

13. $3^{-4} = \frac{1}{3^4}$

14. $5^5 \div 5^2 = 5^3 = 125$

15. $3^3 = 27$

16. List the perfect squares 0 – 12

0, 1,, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144

17. List the perfect cubes 0 – 7

0, 1, 8, 27, 64, 125, 216, 343

18. $4^2 \times 4^3 = 4^5$

1024

19. $2^6 - 4^2 =$

64 – 16 = 48

20. $3^2 \times 2^4 =$

9 x 16 = 144

21. $3^3 + 4^2 =$

27 + 16 = 45

22. $5^3 \div 4^3 =$

125 – 64 = 61

23. $(2^2)^3 =$

$2^6 = 64$

24. $\sqrt{49} = 7$

25. $\sqrt[-3]{8}$ -2

26. Approximate $\sqrt{29}$

4 points 7 points

Between 25 and 36

5.35?² = 28.6225

27. Name and show the 3 grouping symbols.

( ) parentheses [ ] brackets { } brace

28. Find the answer using PEMDAS.

$10 - 3 \times 6 + 10^2 + (7) \times 4 = 10 - 18 + 100 + 28 = 120$

29. NOTE: When a minus or negative sign appears before a parenthesis, remove the parentheses and change the sign of each term within the parentheses.

Try the following:

6 - (- 3 + a – 2b + c) =