

## ***Welcome to the March 2023 Clyde Hill Math Challenge! (Submit by March 31, 2023!)***

Welcome back to the Clyde Hill Math Challenge! We are so excited to start our second round!

Remember from last time: We believe ***math is for everyone!*** No one is born "bad" at math - we all have different learning styles and obstacles to overcome - but with motivation and practice we can all build a good math foundation that will help us with many life skills. Cooking, art, music, gaming, budgeting, construction, boating, and sports all benefit from mathematical foundations. Just like you do drills in soccer to build your foundational soccer muscles, we encourage math practice to build your math muscles!

Also just like with your favorite sport or music or art - practice and drills can be fun! These Math Challenges are designed to show the many ways puzzles and games use and reinforce math concepts. We love math and want to share our excitement with you! If there are other challenges you want to see in the future - please let us know!

### ***How does the Math Challenge work?***

Every month we will post 6 math challenges that focus on different skills. You can do as many or as few as you like. Even if you don't find the solution - that's ok! Our growth mindset lets us try our best and improve in steps. Trying is our first step! Our goal is to encourage participation, learn and have fun! At the end of each month, during the monthly assembly we will announce the class that has the most participants that month. At the end of the year, the grade that participated the most during the school year will have a special prize!

### ***How do I participate?***

You have two ways of submitting your first entry ***by March 31, 2023:***

1. You may scan/take a photo of your entry and email it to [math-challenge@clydehillpta.org](mailto:math-challenge@clydehillpta.org)
2. You may drop your entry off at a mailbox in the front office

Your entry must contain:

- Your name, grade and teacher (We need to know who you are!)
- Your work on at least one of the challenges. (To participate, you only have to try!)

We will post the solutions after the announcement at the monthly assembly!



Thank you! Gracias! 谢谢! どうもありがとう! 감사합니다! धन्यवाद! спасибо!

Before going to this month's questions, I wish to extend many thank yous to everyone who helped me get the Math Challenge off the ground and into as many languages as possible!

Thank you! Gracias! 谢谢! どうもありがとう! 감사합니다! धन्यवाद! спасибо!

AJ Decostanza

Kathy Bessler

Shera Myers

Bo Su

Principal García de León

Kayo Takashima

Vice Principal Hook

Yuji Ono

Lizie Piazza

Junho Yamamoto

Charu Jeevanandam

Joy Maeng

Rajesh Sugumaran

Jaehong Min

Shoba Girish

Karam Nam

Debyani Ghosh

Hyejin Cho

Anu Bandi

Suh Hyun Choi

Pavel Bronnikov

Thank you again everyone!

Jennie Cochran-Chinn and Clyde Hill PTA

Thank you! Gracias! 谢谢! どうもありがとう! 감사합니다! धन्यवाद! спасибо!

Name: \_\_\_\_\_

Grade: \_\_\_\_\_ Teacher: \_\_\_\_\_

Ten, diez, десять, 十, じゅう, 십, दस, عَشْرَةٌ

We are a multi language family at Clyde Hill. One way to share our languages with each other is to learn our numbers. Our first challenge is to finish the following math equations in various languages. There is a page in the back to help you! Then play the game! Cut out the flashcards on <https://www.clydehillpta.org/mathchallenge#march-2023-math-challenge> and quiz your friends. After every 5 rounds of flashcards, everyone does a round of compliments in any language!

one plus one equals two

five plus five equals ten

uno más cinco son \_\_\_\_\_

tres más dos es igual a \_\_\_\_\_

три плюс пять равно \_\_\_\_\_

девять плюс ноль равно \_\_\_\_\_

五加四等于 \_\_\_\_\_

六加一等于 \_\_\_\_\_

ご足すには \_\_\_\_\_

さん足すろくは \_\_\_\_\_

칠 더하기 삼은 \_\_\_\_\_

오 더하기 사는 \_\_\_\_\_

8 + 6 = \_\_\_\_\_

2 + 3 = \_\_\_\_\_

\_\_\_\_\_ = 7 + 6

\_\_\_\_\_ = 1 + 2

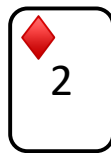
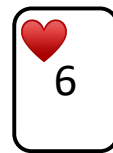
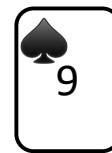
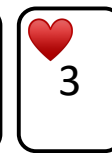
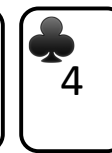
Name: \_\_\_\_\_

Grade: \_\_\_\_\_ Teacher: \_\_\_\_\_

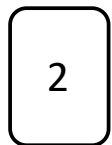
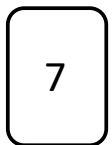
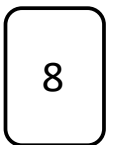
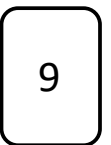
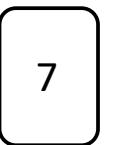
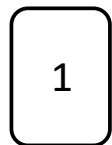
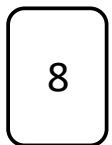
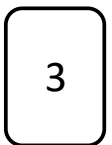
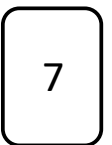
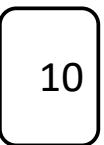
### Find 15

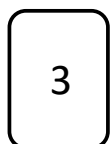
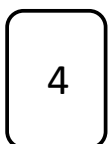
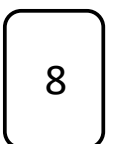
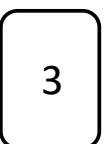
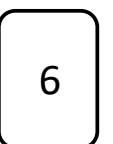
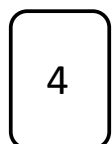
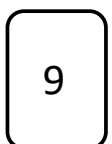
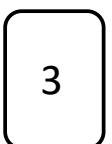
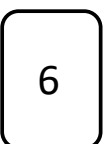
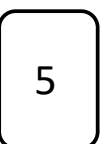
This game is about the various ways to make 15 with addition and subtraction. You can play this with a deck of cards. Use the Aces as 1s and remove the face cards so you are left with 1 through 10 in the 4 suits. To play, take turns between dealing 5 cards onto a surface and finding a way to add or subtract using **exactly 3 cards from the 5** dealt to make 15. The dealer double checks the finder's answer. Every 5 rounds players talk about how their day is going.

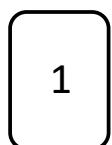
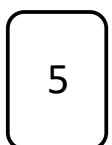
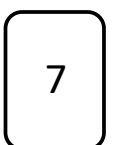
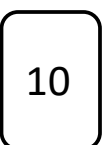
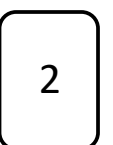
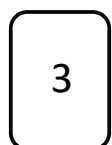
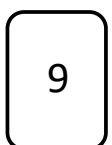
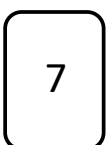
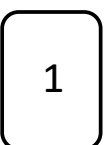

For example, if the 5 cards that are dealt are 2 diamonds, 6 hearts, 9 spades, 3 hearts, 4 clubs, then you can make 15 by adding the 2 diamonds, 4 clubs and 9 spades.

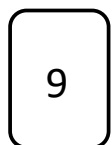
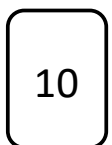
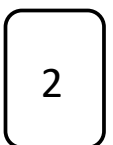
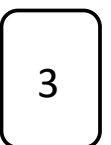
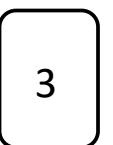
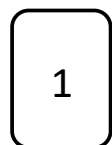
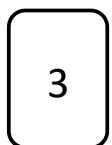
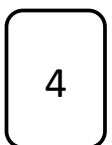
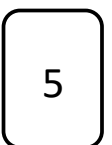

					$2+4+9=15$
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What are the ways can you make 15 using addition and subtraction with **exactly 3** cards in the hands dealt below?

									
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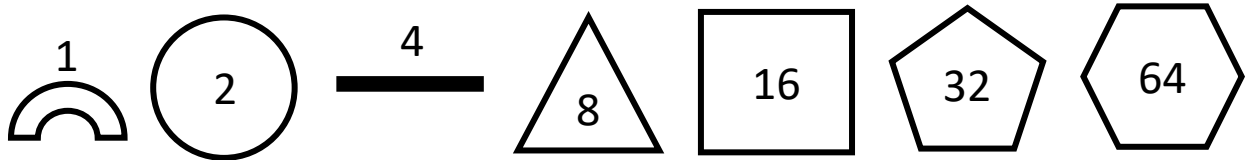
									
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Name: \_\_\_\_\_

Grade: \_\_\_\_\_ Teacher: \_\_\_\_\_

### Binary exchange

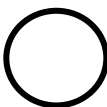
In this game you have various tokens with different values. Your goal is to find ways to sum to a specific number with the tokens. **You may only use a single one of each type of token to make the target number.** Our token values start at 1 and double in value as the tokens get more sides. Each person has a set of tokens. Players take turns between announcing target numbers and finding the tokens that sum to the target. Every 5 rounds, players share something about themselves.



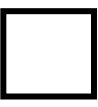
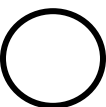
Which tokens do you use to make the following targets? Some have already been done for you. Remember to only **use one or zero of each token.**

1  = 1

13

2  = 2

18

  = 16 + 2

3   = 2 + 1

23

4

26

5

37

7

45

9

50

Name: \_\_\_\_\_

Grade: \_\_\_\_\_ Teacher: \_\_\_\_\_

### Make 24

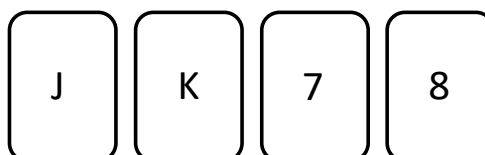
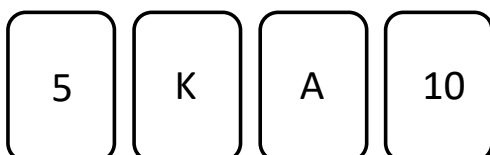
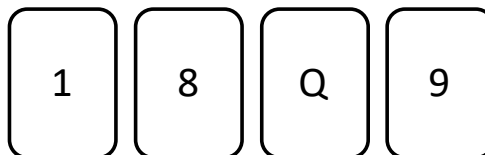
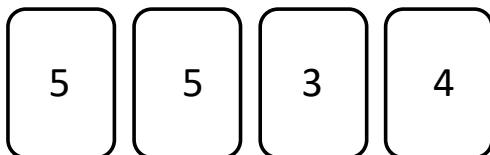
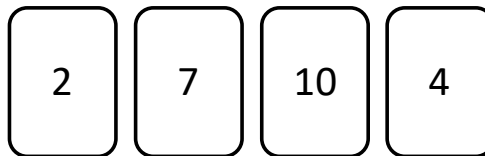
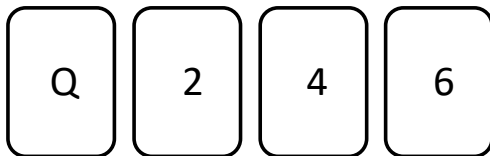
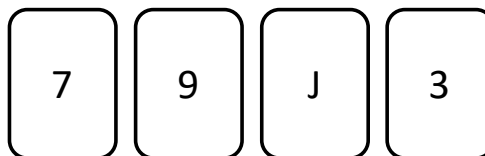
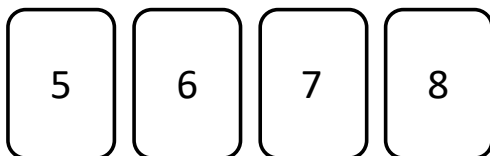
This game is about the various ways to make 24 with parenthesis, addition, subtraction, multiplication and division. You can play this with a deck of cards. Aces are 1, Jacks are 11, Queens are 12 and Kings are 13. To play, take turns between dealing 4 cards onto a surface and finding a way to add, subtract, multiply and divide using **all 4 cards** dealt to make 24. The dealer double checks the finder's answer. Every 5 rounds players talk about a favorite food.

For example, if the 4 cards that are dealt are 2 diamonds, 6 hearts, 9 spades, 3 hearts then we can make 24 by subtracting the 2 diamonds and 3 hearts from the 9 spades to get 4 and then multiple by the 6 hearts to get 24.



$$(9-3-2)*6 = 24$$
$$4*6 = 24$$

What are the ways can you make 24 **with all 4 cards** by using parenthesis, addition, subtraction, multiplication and division in the hands dealt below?

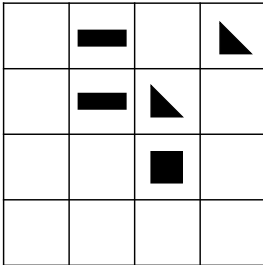


Name: \_\_\_\_\_

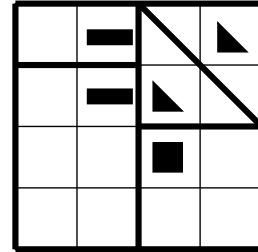
Grade: \_\_\_\_\_ Teacher: \_\_\_\_\_

### Shapes in a Square

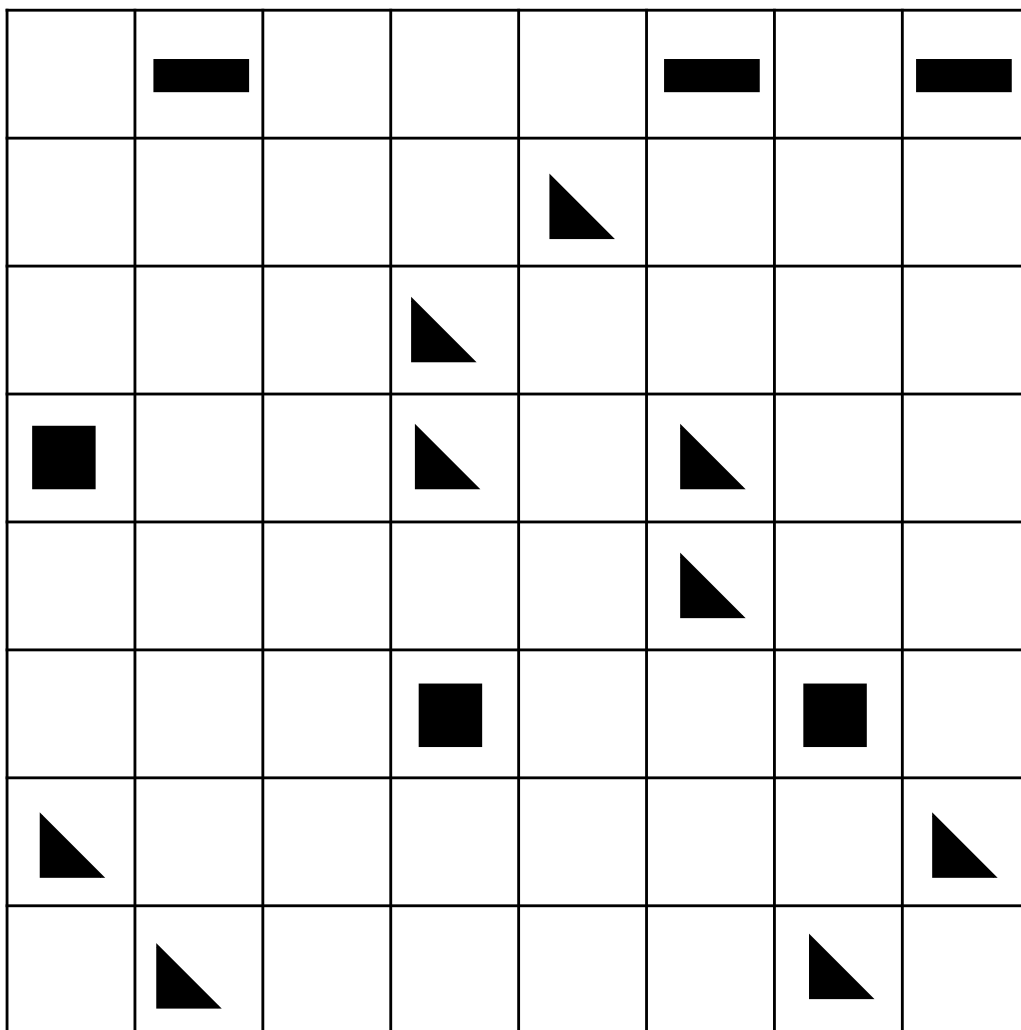
In this puzzle, we divide up the square below into smaller shapes by drawing lines to create triangles, squares or rectangles. We may only draw lines on the horizontal and vertical grid lines or across a diagonal grid square. Each shape we draw must have exactly one shape icon in it. Also, each shape we draw must match the shape icon inside of it. Last rule – when you get frustrated stand up and do a dance to celebrate how hard you are working!



Example



Hint: How do you include the corners?



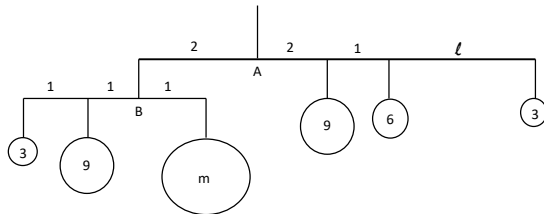
Name: \_\_\_\_\_

Grade: \_\_\_\_\_ Teacher: \_\_\_\_\_

### Disco Ball Balance

We want to build a hanging disco ball decoration for our room. The decoration is made of disco balls, string and bars. In order for our artwork to balance, we have to follow two principles.

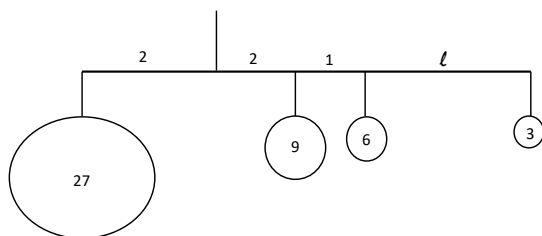
1) The sum of the products of the mass of the bodies times the distance from the suspension point on each side of the suspension point must equal.



Below at suspension point B,  
 $m \cdot 1 = 9 \cdot 1 + 3 \cdot (1+1)$   
 $m = 9 + 6$   
 thus  $m = 15$

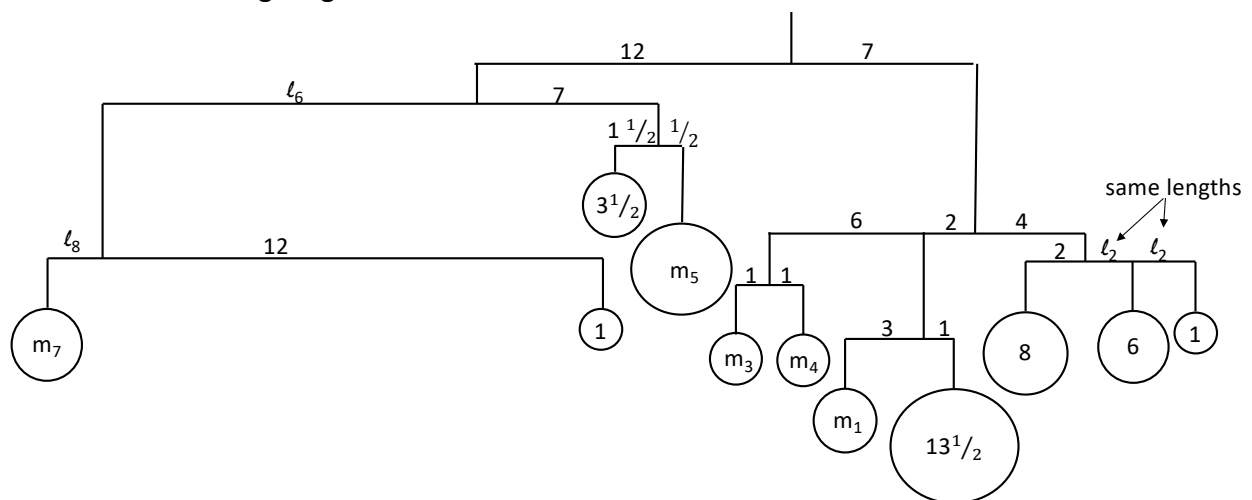
To find the length  $l$ , we can simplify the diagram using the second principle.

2) The mass at the balance point equals the sum of the masses on the suspended bar. This means that we can replace the bar and balls at suspension point B with a ball with mass  $3 + 9 + 15 = 27$ . Now we can go back to the first principal to find length  $l$ .



$2 \cdot 27 = 9 \cdot 2 + 6 \cdot (2+1) + 3 \cdot (2+1+l)$   
 $54 = 18 + 18 + 3 \cdot (3+l)$   
 $54 = 36 + 3 \cdot (3+l)$   
 $18 = 3 \cdot (3+l)$   
 $6 = (3+l)$   
 $3 = l$

What are the missing lengths and masses below?





Name: \_\_\_\_\_

Grade: \_\_\_\_\_ Teacher: \_\_\_\_\_

### Number Notes

- Arabic is written and read right to left as opposed to from left to right in English.
- The "equals" words in Korean  $\text{은}$  and  $\text{는}$  depend on the ending of the preceding word.
- In Spanish, "es" vs "son" depend on whether the answer is bigger than one or not.
  
- The numerals we are taught at Clyde Hill and use in the US are called Hindu-Arabic (or Western Arabic) numerals.
- Even though the 0-9 numeral system is called Hindu-Arabic numerals - both Eastern Arabic and Hindi (which uses the Devanagari script) have their own set of numerals. Both sets of numerals are often taught.
  
- Chinese characters are used as numerals in Chinese and Japanese writing, as are Hindu-Arabic numerals. In general Hindu-Arabic numerals are written horizontally and characters/kanji are written vertically.
- Japanese writing is a mixture of 3 systems. Kanji are adopted Chinese characters (like the numerals). Hiragana is shown in the poster and is a syllable based phonetic system. Katakana is also a syllabary.
- There are two numeral systems in both Korean and Japanese used for different purposes.

English	Spanish	Russian	Chinese	Japanese	Korean	Hindi numerals	Hindi numerals	Arabic numerals	Arabic numerals
0 zero	cero	НОЛЬ (noľ')	零 (líng)	れい (rei)	영 (yeong)	०	शून्य (shunya)	٠	صفر (sifr)
1 one	uno	ОДИН (odin)	一 (yī)	いち (ichi)	일 (il)	१	एक (ek)	١	واحد (wāhid)
2 two	dos	ДВА (dva)	二 (èr)	に (ni)	이 (i)	२	दो (do)	٢	إثنان (itnān)
3 three	tres	ТРИ (tri)	三 (sān)	さん (san)	삼 (sam)	३	तीन (teen)	٣	ثلاثة (talāṭah)
4 four	cuatro	ЧЕТЫРЕ (chetire)	四 (sì)	よん (yon)	사 (sa)	४	चार (char)	٤	أربعة (arba'ah)
5 five	cinco	ПЯТЬ (pyat')	五 (wǔ)	ご (go)	오 (o)	५	पांच (panch)	٥	خمسة (ḡamsah)
6 six	seis	ШЕСТЬ (shest')	六 (liù)	ろく (roku)	육 (yuk)	६	छह (chah)	٦	ستة (sittah)
7 seven	siete	СЕМЬ (sem')	七 (qī)	なな (nana)	칠 (chil)	७	सात (saat)	٧	سبعة (sab'ah)
8 eight	ocho	ВОСЕМЬ (vosem')	八 (bā)	はち (hachi)	팔 (pal)	८	आठ (aath)	٨	ثمانية (tamāniyah)
9 nine	nueve	ДЕВЯТЬ (devyat')	九 (jiǔ)	きゅう (kyū)	구 (gu)	९	नौ (nau)	٩	تسعة (tis'ah)
10 ten	diez	ДЕСЯТЬ (decyat')	十 (shí)	じゅう (jū)	십 (sip)	१०	दस (das)	١٠	عشرة ('aşrah)
+ plus	más	ПЛЮС (plyus)	加 (jiā)	ます (tasu)	더하기 (deohagi)		प्लस (plas)		زائد (zayid)
= equals	es igual a	РАВНО (ravno)	等于 (děngyú)	は (wa)	은 / 는 (eun) / (neun)		बराबर (baraabar)		يساوي (yusawy)