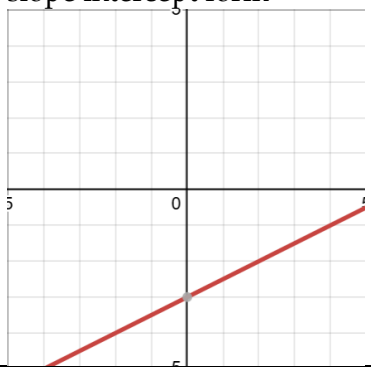
Answer Sheet

Question ID	Question	Answer
N1	2/3*4/5	2*4 = 8 =3*5 = 15 =8/15
N2	1/2+1/3	1*1 = 1 =2*3 = 6 =1/6
N3	(1/5)/(6/19)	1*19 = 19 =5*6 = 30 =19/30
N4	2+9/12	2/1 + 9/12 =24/12 + 9/12 =33/12 = 11/4 = 2 ¾
N5	2/39-8/5	2/39-8/5 =10/195-312/195 =-302/195 = -1 107/195
N6	30 - 6/8	30/1-6/8 =240/8-6/8 =234/8 = 117/4 = 29 ¼
I1	2 1/2 * 5 5/7	2 ½*5 5/7 =5/2*40/7 =200/14 = 100/7 = 14 2/7
I2	(9 1/8)/(7 1/2)	(73/8)/(15/2) =73/8*2/15 =146/120 = 73/60
I3	5 8/40 * 9 1/8	5 8/40 * 9 1/8 208/40*73/8 =15184/320 = 949/20
I4	6 12/2 + 10/98	6 12/2 + 10/98 =24/2+10/98 =1176/98+10/98 =1186/98 = 593/49
I5	-8/13*10/18	-8/13*10/18 =-80/234
I6	-9^2	-9^2 =-(9*9) =-81
I7	(-2)^3	(-2)^3 =-2*-2*-2 =-8
B1	1.4/12*3/12	1.4/12*3/12 =4.2/144 = 21/720 = 7/240

B2	32/0.8*6.4/256	32/0.8*6.4/256 =204.8/204.8 = 1
B3	On a right triangle, a = 3 and b = 4, what would the hypotenuse be? a and b are not the hypotenuse.	3^2+4^2 = 25 =sqrt(25) = 5
B4	0.6(2 1/4 - 4/(3^4))	0.6(2 1/4 – 4/(3^4)) =6/10(9/4 – 4/81) =27/20-4/135 = 713/540
B5	If the hypotenuse of a right triangle is 17 units in length and one of the other sides is 8 units in length how long is the third side?	17^2 = 8^2 + x^2 289 = 64 + x^2 225 = x^2 x = 15
B6	1/3(6/12 + 2)	1/3(6/12 + 2) =6/36 + 2/3 =6/36 + 24/36 =30/36 = 15/18 = 5/6
B7	7/8(9+10)+5(8/9-¾)	63/8+70/8+40/9-15/4 =133/8+25/36 =1247/72
S1	On a right triangle, a = b-10, and c = 50, what is b? a and b are the side lengths.	50^2 = a^2 + b^2 2500 = (b-10)^2 + b^2 Deduce the numbers. Or you could go down the quadratic formula rabbit hole, but using logic is faster. a = 30 b = 40
S2	2^x = 2,147,483,648 What is x	X = 31
S3	A right triangle has a hypotenuse of 13, a side of 5, and a side of length x. If this triangle is mirrored on the side length 5 and merged with the other triangle into an isosceles triangle, what is the perimeter of this triangle?	x ^2 + 25 = 169 x ^2 = 144 X = 12 13+13+12+12 = 50
S4	If a triangle has angles 30, 60, and 90 and one of the sides is 4 units long, what are the lengths of the other sides of the triangle?	3 and 5
S5	(3+18)/x = 7	(3+18) = 7x 21 = 7x X=3
S6	¾(4x - 8 - - 2x) = 1	¾(4x-8+2x) = 1 3x-6+3/2x = 1 4 1/2x = 7

		X = 1 5/9
G1	Expand the following: (a-b)^2	Use the binomial theorem: a^2 - 2ab + b^2
G2	A right triangle has a hypotenuse of 25, and one side length 7. If this right triangle is the face of a triangular prism with height of 9 ½, what is the volume of the triangular prism?	25^2 = 7^2 + x^2 625 = 49 + x^2 576 = x^2 x = 24 (7*24)/2 = 84 84*9 ½ = 798 unit^3
G3	Look at a graph, and write it in slope intercept form 	Just observe the graph :/ y=½x-3
G4	Expand the following: (a-b)^3	Use the cube formula. We don't know what it's called. But like, if you know it, you know it. Or you can multiply it out manually. a^3 – 3(a^2)b + 3a(b^2) - b^3
G5	2x + 23 - (-5x) = 5*9 - x	2x + 23 - (-5x) = 5*9 – x 2x + 23 + 5x = 45 - x 8x = 22 x = 2.75
G6	y-3 = 3(x-9) Convert to slope-intercept form	y-3 = 3(x-9) y-3 = 3x - 27 y = 3x - 24
D1	4y^2 + 12xy + 9x^2	Use perfect square formula Answer: (3x+2y)^2
D2	Factor: (a-b)6y + (a-b)8y	(a-b)6y + (a-b)8y =(a-b)(6y+8y) =2y(3+4)(a-b) =2y(3a-3b+4a-4b) =2y(7a-7b) =14ay-14by
D3	Factor: 9a^2 - 16	9a^2 – 16 Use difference of squares rule or factor manually. =(3a+4) (3a-4)
D4	Solve for x: x^2-41x+78 = 0	x^2-41x+78 = 0 = -39*-2=78 = -39-2=41

		Answer: x = 39, 2
D5	x^2+6x+8 = 0 Solve for x	x^2+6x+8 = 0 =2*4=8 =2+4=6 Answer: x = -2, -4
D6	x^2-16x+48= 0 Solve for x	-4*-12=48 -4+-12=16 (x - 4)(x - 12) = 0 Answer: x = 4, 12
T1	Mathematically prove who asked	i asked
T2	Calculate how long it will take for your dad to come back with the milk	
T3	Use math to compare and contrast capitalism and communism on a Venn diagram	
T4	0/0 + 0/0	2?
T5	Build an 8-bit calculator from rubber duplos	
T6	0^0	
T7	Solve the Riemann hypothesis	
T8	Time is money. How long will it take for you to get out of student loan debt?	Never

Rules

- Math questions are received based on dice rolls. The higher the number, the more difficult the question. 1 = Normal, 2 = Iron, 3 = Bronze, 4 = Silver, 5 = Gold, 6 = Diamond.
- If you answer a question wrong/decline a question, you move backwards half the number rolled on the die (if it's an odd number, round down the quotient).
- You must answer a math question to place your piece on the board. The difficulty for this initial roll can only go to silver rank (difficulty 4). If you roll a five or higher, you must roll again until you get something lower than five.
- Pieces move like in a game of Ludo. Follow the white tiles clockwise around the board, until you reach the tile beneath the arrow of your colour. Then ascend that arrow to win the game. If this is unclear, we'll be explaining with a diagram in a few slides.
- Players will not take turns. Move at your own pace.
- A piece is captured when another player's piece walks into and stays in the square that your piece is in. Captured pieces go back to the bank.
- Trap squares are scattered throughout the board. Landing on one of these squares will force you into an event. If you land on a trap square, the hosts will spin a wheel to determine your fate.
- Your options are: math duels, splice fissures, and transcendence rank questions.
- Splice fissure! You roll another dice - if the number is even, you get sent forwards the amount you rolled, and vice versa for odd numbers
- Math Battle! You can challenge an opponent to answer a math challenge. A random question is given using the usual dice roll system and then whoever solves it faster moves forward that many spaces while the other person moves back that many
- Trap space! Transcendent rank question - if you decline/fail, go back four spaces (but if you get the question, you win the game :D). Transcendent rank questions are explicitly to sow chaos fun and not genuine math problems, so many different answers can work.

Group Reflection

Did we really learn?

During this assignment, we didn't learn a lot. Without bragging, if we were to put in questions over our level of math, then the game would become unplayable for some of the class.

What part was most challenging?

The 'logistics' aspects. Determining what items we will use to represent characters. We didn't have a lot of materials at our disposal, so it took a bit of a discussion in order to figure out what to use – the pieces had to be visually distinctive per team and small enough to fit on the budget size board we made.

Developing the game mechanics was also challenging. We wanted to make a game that wasn't overly complicated but also not as simple as "space move good." In the end, we made the game with similar rules to Ludo, but with extra parts to it like questions and trap spaces. It was also a little complicated when it came to incorporating the questions, because Ludo itself didn't have a lot of moves besides rolling a dice. So, we made it so that the amount rolled affected the question you got. The higher you roll, the harder the question will be. Trap spaces were added to make the game more interesting and have more things to do while playing. They also encourage people to do more "math" questions than if we didn't include them.

How did we work together?

Everyone contributed to every aspect. We all wrote the rules together and added questions that suited our areas of specialization, etc. We're happy with the end product and we think we made a good team.