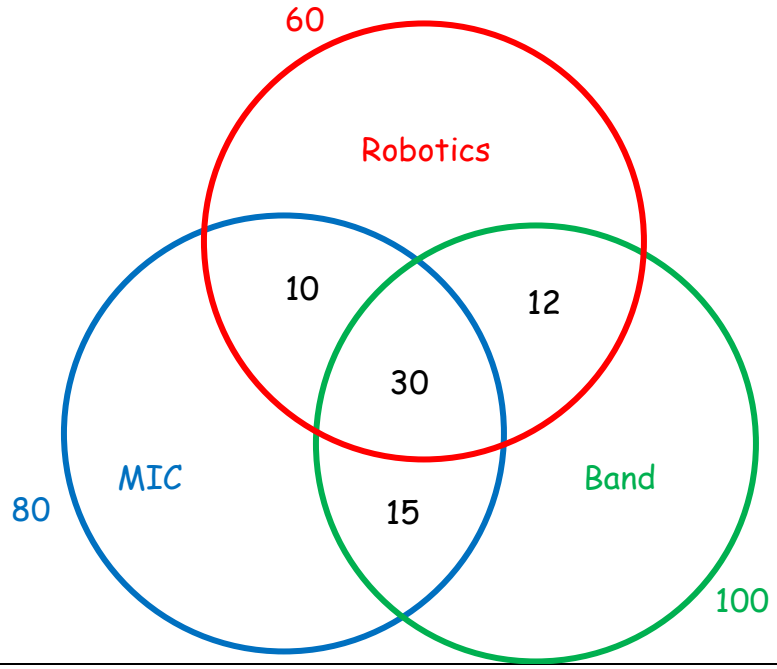
Mental Math

#	Answer	Solution
1	40	22+18=40
2	4 [snickerdoodles]	7-3=4
3	2 [M&Ms]	10/5=2 Ella and 4 friends is 5 people
4	0	8,709 8*7*0*9=0
5	6	(2+5+7+10)/4 = 24/4 = 6
6	5 [missions]	1 mission = 3 days, 15/3 = 5
7	35 [nickels]	5*25+5*10 or (125+50)/5
8	3 [units]	(2b*b)/2=9, b^2=9, b=3

Individual Contest

#	Answer	Solution
1	186	345 – 159
2	7926.18	
3	9 [sides]	
4	11	Add 3 each time, 8 + 3 = 11
5	120	24*5
6	17	(26+8)/2
7	23 [eggs]	5*12 – 37 =60 – 37 = 23
8	104 [degrees]	180 – 76 = 104
9	Sunday	Andrea's birthday was on Wednesday. 25/7 = 4 (mod 7) Count 4 days from Wednesday.
10	99	49+50 = 99
11	16 [mistakes]	4 mistakes in an hour, 4*4 = 16

#	Answer	Solution
12	27 [units]	9*3=27
13	3/8 or equivalent	$\frac{3}{4}*\frac{1}{2}$
14	2/100 or 1/50	100 people are playing including Alan and Manuel, so 2/100 chance
15	130 [sq. feet]	10*13
16	31/6	5*6+1 = 31/6
17	1:38 PM	178 = 120+58 = 2 hours 58 min. Add 3 hours subtract 2 min.
18	10/ 15 or 2/3	Rosaline competed in 15 races. She won 10/15
19	13 [years old]	4 & 12 → diff = 8, 21 – 8 = 13
20	67.5 [units]	$\frac{1}{2}$ *15*9 = 135/2 = 67.5
21	485	(x)(2x)(2x-3) = 485
22	[$]2,300,000	2,300,000,000/10/100
23	4 [cats]	24/2 (all have 2 eyes) = 12, 12/(2+1) = 4
24	600,000 [cm^2]	1 sq m = 10,000 sq cm or 100^2 sq cm, 1200*500 = 600000
25	4 [pieces]	1/3 = 4/12, 1/4 = 3/12, 1/12 + 4/12 + 3/12 = 8/12, → 4 pieces remain
26	75 [%, percent]	6/8 = 3/4 = 0.75 = 75%
27	7/4 [hours] (or 105/60 or equivalent)	3*35 = 105 105/60 = 21/12 = 7/4
28	368 [grams]	8*$\frac{1}{2}$*(30+31+31) = 4*92 =368
29	24 [ways]	4! = 24
30	72 [sq. units]	Large grey square is 12x12. Grey square can be split into quarters to show white/grey portions are each half of a quarter, so white square makes up half the total square. 144/2=72
31	10/24 or 5/12 or equivalent	1/4*2/6*5=10/24=5/12
32	5 [cups]	1:15 = 1/3:5 → 5

#	Answer	Solution
33	5 [weeks]	700/(7*5*4) = 100/20 = 5
34	51 [degrees]	180 – 43*2 = 94 94-43 = 51
35	7	Ones digit repeats 3, 9, 7, 1, [repeat]. 15 divide by 4 and use remainder…R3 means 7
36	22 [ducks]	Two equations, two unknowns or guess and check (40*4 – 116)/2 = 44/2 = 22
37	[$]25	Percent discount with unknown starting price 17.5=.7x , x= 175/7 = 25
38	Saturday	Days of the week, fraction, division 400/25 = 16 → 4 weeks exactly → Saturday
39	286 [students]	Figuring out overlap of groups then doubling to find total. Only in robotics = 60-(10+30+12) = 8 Only in MIC = 80-(10+30+15)=25 Only in Band=100-(30+15+12)=43 Total student body = 2*(8+25+43+15+30+12+10) 
40	2500	Adding series, rainbow addition/mult. 1 + 3 + 5 + … + 97 + 99 = 50^2 = 2500

Multiple Choice Contest

#	Answer	Solution
1	D) $8.75	2.5 + 2.5 + 3.75
2	D) $6.75	4.5+4.5/2 = 4.5+2.25 = 6.75
3	B) $4.20	21 (2.95) – 21 (2.75) = 21(.2) = 4.20
4	C) 20,446	half of 40,892 is 20,446
5	A)Small smoothie	3*4=12 total for the friends. 3+3.75+2.25=9 12-9=$3 for Hannah
6	E) Nov. 4, 2020	
7	A) 269 [pages]	(832+880+817)/3 - (488+592+642)/3 = 843 – 574 = 269
8	E) Answer Not Given (43.05)	(488+592+642)/40 = 1720/40 = 43.05
9	D) 2590	365*7+1 leap day + 31 Oct. days + 3 days = 2590
10	A) 1:00 PM	816/30 = 27.2 hours reading 27.2/6 = 4.5 so she takes 4 breaks. 27.2 +(4*12)/60 = 28 hours. 1 pm is 1 day and 4 hours later.

Team Contest

#	Answer	Solution
1	10 [miles]	2.5*4=10 miles
2	-14	The 'certain number' is 4. (22+6)/7 = 28/7 = 4 (4 – 6)*7 = -2*7 = -14
3	0	Toss out 9, 8+1, 7+2, 6+3, 5+4 to leave 0
4	2.25 [°C]	2.25 = 5*2*.225
5	72 [cm²]	2[(3*6)+(3*2)+(6*2)] 2(18)+2(6)+2(12) = 2*36 = 72
6	30 [percent]	6/10 * 5/10 = 3/10 .6*.5 = 0.30 = 30%
7	5	5/6 * 1/2 * 4/5 * 15
8	10,769	11, 22, 33, 44, 55 999, 989, 979 979*11
9	85 [mL]	Total capacity is 170+260+310 =740 370 liquid/740 capacity = half full. Smallest holds 170/2 = 85 1/x(170+260+310) = 370 →740/370 = x =2 → 170/2 = 85
10	169 [sq. yards]	Increase is 155 sq yds. 25 sq yards would be corner. This leaves 130 sq. yards for the two rectangle portions of increase. Divide this in half = 65. Divide this by 5 and original dimensions were 13 yards. 2(5x) + 5*5 = 155 5x = (155-25)/2 = 130/2 = 65 x = 65/5 = 13 → 13² = 169

Relay #1

#	Answer	Solution
1-1	31 [days]	
1-2	124 [units]	31*4
1-3	50	2/5 * (124+1) = 2/5 * 125
1-4	155 [miles]	3 h 6 min → 50*3 + 50/10 = 155

Relay #2

#	Answer	Solution
2-1	176	16*11
2-2	8	176 – (4*42) = 176 - 168
2-3	28 [handshakes]	7+6+5+4+3+2+1+0 = 28
2-4	27 [papers]	972/(28+8) = 972/36 = 108/4 = 27

College Bowl – Round #1

#	Answer	Solution
1-1	7 [hours]	21/3
1-2	48 [units]	6*8
1-3	3/4	
1-4	12	
1-5	6	$6^2 = 36$
1-6	42	0.7*60=42
1-7	5 [socks]	There are four colors of socks, so after 5 socks, at least two have to have the same color.
1-8	12	4 edges around top, 4 around sides, 4 around the bottom.
1-9	90 [degrees]	$\frac{1}{4}$ of the clock is 90 degrees
1-10	10 [units]	4*5/2

College Bowl – Round #2

#	Answer	Solution
2-1	217	504 – 287
2-2	20 [pieces]	300/15 = 20
2-3	8	2, 3, 5, 7, 11, 13, 17, 19
2-4	140 [outfits]	10*7*2=140
2-5	308 [units^2]	A=bh A=14*22 A=308
2-6	13	(14+8+17+15+11)/5=65/5
2-7	11 [pencils]	27*2 – 43 =11
2-8	16 [pints]	2*4*2
2-9	10 [inches]	3 +7 in brings Eho to Biff's height.
2-10	999	

College Bowl – Round #3

#	Answer	Solution
3-1	12	72/6
3-2	54	77 – 23
3-3	6	24/2/2
3-4	6 [boxes]	104 pencils are needed. 104/20 = 6 since we round up to whole boxes
3-5	1275	15*85
3-6	7	77*11, 7*8
3-7	2 [diagonals]	All quadrilaterals have 2 diagonals.
3-8	23 [degrees]	90 – 67
3-9	73/100 or "73 over 100" or "73-hundredths"	
3-10	4	2+0+2+0=4

College Bowl – Round #4

#	Answer	Solution
4-1	8	16*1/2
4-2	210	93+117
4-3	5/5 or 1	2/5 + 3/5
4-4	42	2+4+6+8+10+12=42
4-5	1/18	There are nine pairs of boots which means there are eighteen total boots.
4-6	53 [degrees]	180-35-92 = 53
4-7	3/6 or ½ or equivalent	Three of the six numbers on a die are odd.
4-8	11,000 [cm]	110*100 = 11,000
4-9	rectangle	
4-10	1	Factors of 9: **1**, 3, 9 Factors of 16: **1**, 2, 4, 8, 16

College Bowl – Round #5

#	Answer	Solution
5-1	91 [days]	7*13 = 91
5-2	40 [cases]	2000/50 = 40
5-3	89 [degrees]	Anything less than 90 degrees is acute
5-4	6	3! = 3*2*1 = 6
5-5	179 [cents]	3(25)+7(10)+5(5) + 9 = 75+70+25+9 = 179
5-6	24	If you multiply the half by two, you get the same number.
5-7	196	
5-8	1	1 is neither prime nor composite, but it IS a counting number.
5-9	7/11	There are a total of eleven socks and seven of them are blue.
5-10	2,100	2075 rounds to 2100

College Bowl – Round #6

#	Answer	Solution
6-1	48	8*6
6-2	120	1*2*3*4*5 = 120
6-3	Sunday	18 ≡ 4 (mod 7), so Wed. + 4 = Su.
6-4	78 [dollars]	10%=6.5 20%=13 13+65=78
6-5	101	Prime numbers
6-6	42 [ways]	7*6=42
6-7	128 [square units]	8*8*2 = 128
6-8	0	Lowest value on a single die is 1, so the lowest on 2 dice is a sum of 2.
6-9	49	56*7/8
6-10	635	512+123 = 635