Middle School Division
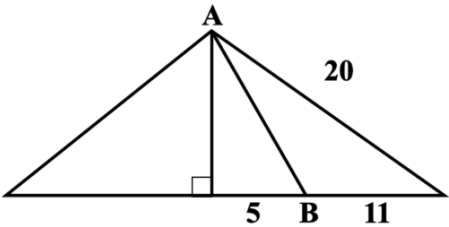# Paper Math Individual Round

30 minutes 20 questions

Name: _____

Team Name: _____   Grade: _____

Instructions

– Do not turn over this test until you are instructed to begin.

– Only answers written in the designated box will be scored.

– Express all of your answers in simplified form.

– Do not include units.

#	Problems	Answers
1	Evaluate $5 \times 4 + 15 - 10$.	
2	While shopping for party supplies, Bessie the Cow sees a group of cows and chickens that she can invite to her Pi Day Party. She counts 23 heads and 48 feet. How many chickens are there?	
3	Becky the Cow wants to invite 2 times as many cows as chickens, 3 times as many chickens as sheep, and 5 times as many sheep as pigs. Becky invites 17 pigs to the party. How many cows should she invite?	
4	Bella the Cow wants to build tables for the party. She doesn't have a ruler, but she knows that the length of 4 pigs standing in a line equals 7 meters. If she wants to make a table that is 20 pigs long and 12 pigs wide, what is the area of the table in square meters?	
5	Abby the Cow brought a group of pigs to play pie roulette. There are 35 pigs total: 15 have brown spots, 4 have black spots, and the rest have no spots. Assuming that every pig has an equal chance of being pied, what is the probability that the pied pig has no spots?	
6	Bobby the Cow is an extremely picky eater. He requests that his pie slice has an angle of 20 degrees. If the pie's diameter is 12 inches long, what is the area of the pie slice that Bobby gets? Leave your answer in terms of π.	
7	Alice the Cow has many hobbies. One of them is making soccer balls. She has 490 pentagonal panels and 921 hexagonal panels. Each ball needs 12 pentagonal panels and 20 hexagonal panels. How many soccer balls can she make?	
8	Alice the Cow also likes selling apples. If an apple sells for $2.50, and an Apple computer costs $1000, how many apples will Alice need to sell to buy an Apple computer?	
9	Farmer Mark recently bought a rectangular plot of land. It has an area of 60 square feet, and it is 15 feet wide. If he wants to build a fence around the perimeter, how many feet of fencing does he need?	
10	Farmer Alex recently registered for his first bank account, and he needs to pick a PIN. It has to be a letter $(A - Z)$ followed by 3 digits $(0 - 9)$. How many different PINs might he choose?	
11	Farmer Isabella plans to steal Farmer Alex's chickens. Isabella knows that Alex has 5 chicken coops and 45 chickens. Every chicken coop has at least one chicken, but Isabella doesn't know exactly how many chickens there are in each chicken coop. She only has time to visit two chicken coops. What is the maximum number of chickens that could be in two coops?	

12	The four-digit number 5X76 is divisible by 3, and the digit X is greater than 6. What is the value of X?	
13	If 1760 yards are in a mile, how many miles are in a yard?	
14	Soolynn and Joyce are in a heated debate about their favorite numbers. Soolynn's favorite number is $\pi \approx 3.14159$. Joyce's favorite number is $\tau \approx 6.28318$. Soolynn claims that the product of the first six digits of her favorite number is greater than the product of the first six digits of Joyce's favorite number. Find the <u>positive</u> difference between those two values.	
15	Erin needs to get from point A to point B. She knows the lengths of the other sides in this diagram. What is AB? A 20 5 B 11	
16	Katie is super enthusiastic about the Fibonacci sequence. It begins $1, 1, 2, 3, 5, 8, \ldots$ What is the 12th term of the Fibonacci sequence?	
17	If $2^x \times 3^y \times 7^z = 252$, what is the value of $2x + 3y + 7z$?	
18	Erin is on another adventure! She starts at M in the diagram and can either move to an adjacent letter to the right, left, up, or down. How many paths can she make that spell the word MATH? H H T H H T A T H H T A M A T H H T A T H H T H H	
19	Given that $3^x = x^3$, what is one possible value of x?	
20	The two roots of the quadratic equation $ax^2 + bx + c = 0$ are given by the equations $$\frac{-b + \sqrt{b^2 - 4ac}}{2a} \quad \text{and} \quad \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$ What is the product of the two roots?	