

# Middle School Division

## Geometry & Number Theory, Section 3

40 minutes, 20 questions

### Instructions

- DO NOT open the test until told to do so.
- Be sure to use your scratch paper!
- Express all of your answers in simplified form.
- Do not include any units.
- Please read the instructions

Please write your name :

Please write your ID number :

**Instructions :** This is Section 3, geometry and number theory. Geometry deals with the properties of shapes, points, lines, etc... Number Theory deals w/ the properties of numbers and solving for big numbers w/ easily with tricks. Again, do not include units.

IF we cannot read your answers, it will be marked wrong.

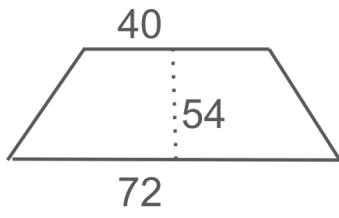
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### Free Response

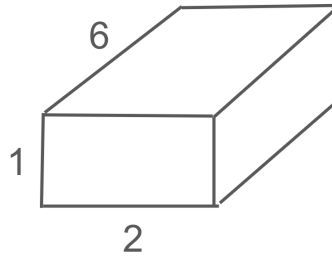
1. Given a triangle w/ legs 8 and 6, find the hypotenuse.
2. Add up all of the interior angles in a triangle. How many degrees is that?
3. What is the 12th prime number?
4. I am describing a number. This number, when multiplied with another number, always ends with a 5 or a 0. What is this number?
5. A right triangle has an angle of 39 degrees. What is the missing angle?
6. How many different numbers are there that when you divide 100 by that number, you end up with a whole number?
7. Refer to diagram #7. What is the area of that trapezoid?
8. If James owes Christopher 1671 dollars, what is the least number of bills that James could use to pay Christopher?
9. Refer to diagram #9. Erin owns 7 iPhones. If each iPhone has a length of 6 inches, a height of 1 inch, and a width of 2 inches, find the surface area. Then, find the volume. What is the sum of the two?
10. Find the largest prime factorization of 1025.
11. How many even factors does 2048 have?
12. If Penelope is 7 years old and her older brother is 17, in how many years will Penelope's age be 80% of her older brother's age?
13. What is the Least Common Multiple of 456 and 789?
14. What is the area of an equilateral triangle with a side length of 12?
15. Find the sum of all positive integers less than 60 that are divisible by 5 or 3.
16. Find the greatest common denominator of 792 and 945.
17. Determine  $x$  if the length of the longest side of a triangle whose sides are 30, 40, and  $x$ .
18. What is the biggest prime number less than 100?
19. What is the 30th prime number?
20. Refer to the diagram for #20. Assuming all of the shapes touch point A, what is the value of  $x$  if the area of the square is 16?

# Diagrams

7.



9.



20.

