



San Diego Middle School Math Field Day 2017

Math Wits Finals

Basic Rules

All answers are in the simplest (radical, fractional, etc.) forms, unless otherwise specified

All drawings are not to scale

No units necessary

Each problem is worth a maximum of 5 points if answered first correctly

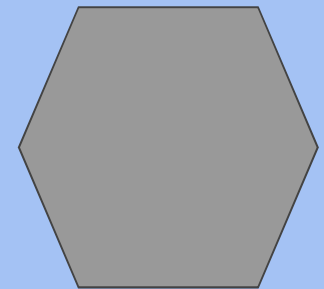
Cheering is allowed in between questions, but please keep it to a reasonable level

No interactions between contestant and spectator allowed

Please be quiet when the students are working

Have fun!

1. What is the perimeter of a regular hexagon with side-length 15?



2. $f(x)=4x+1$. Compute $f(f(3))$.

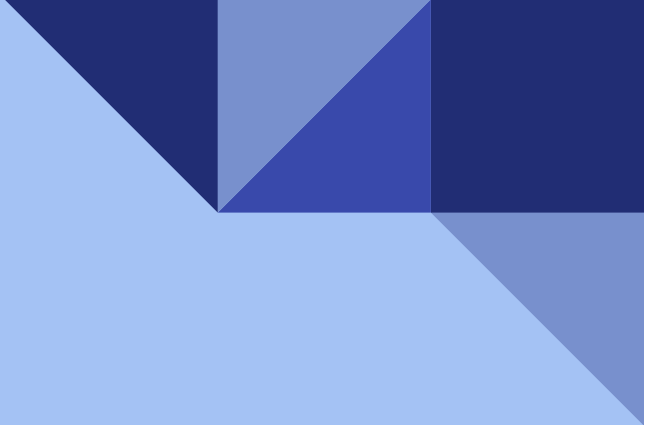
3. The lines $y=x+4$ and $y=2x-3$ intersect at the lattice point (a, b) .
What is the sum $a+b$?



4. How many positive factors does the number 72 have?

5. Bob the builder sleeps 3 hours on weekday nights (Monday-Friday) and 17 hours on weekend nights (Saturday and Sunday). What is the average amount of sleep he gets, in hours?

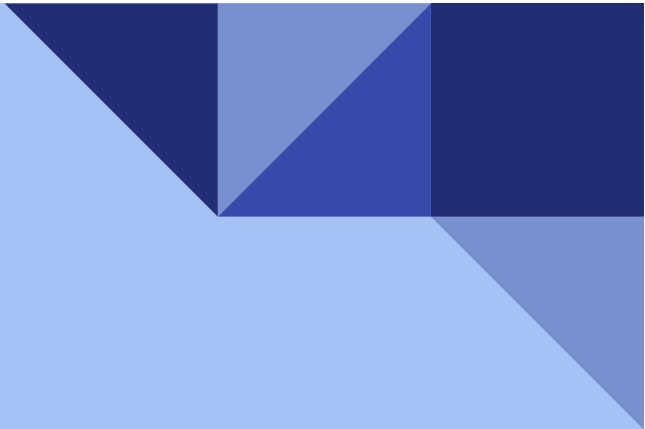
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY



6. What is the sum of the first 2017 positive integers?

7. Lucy has a bag of apples, and Anne has 30 tomatoes. If two-thirds of the amount of Lucy's apples is equal to the amount of Anne's tomatoes, how many apples does Lucy have?

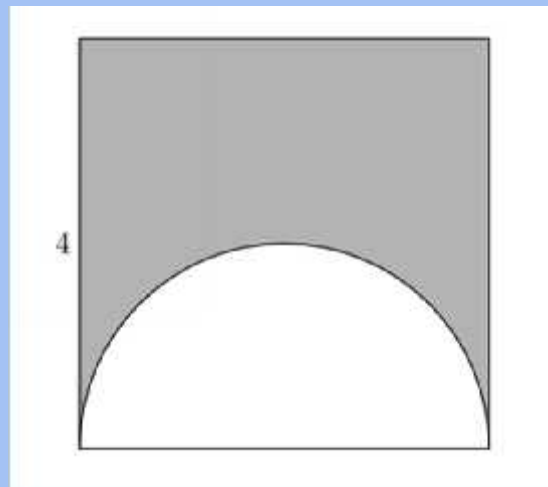





8. What is the area of a triangle with side lengths 12, 16, and 20?

9. If $X * Y = (X + Y) / 2 + X + Y$,
what is $2 * 14$?

10. In the following figure, the semicircle is inscribed in a square with side length 4. What is the exact area of the shaded region?






11. Find the sum of the roots of the following polynomial: $2x^2 + 5x - 3$. Simplify your answer either as an improper fraction or a mixed number.

12. If Amy rolls a fair 6-sided die numbered 1 to 6 twice, what is the probability she gets an odd number both times?



13. What is the units digit of 2017^{2017} ?

14. Find the sum of all real values of x such that $2x - 13 = (x - 8)^2$.



15. Circle A has a circumference of 36 and circle B has an area of 36 . What is the ratio of the radius of circle A to the radius of circle B?

16. $\sqrt{2 + \sqrt{2 + \sqrt{2 + \dots}}}$
can be expressed as an
integer n . What is n ?

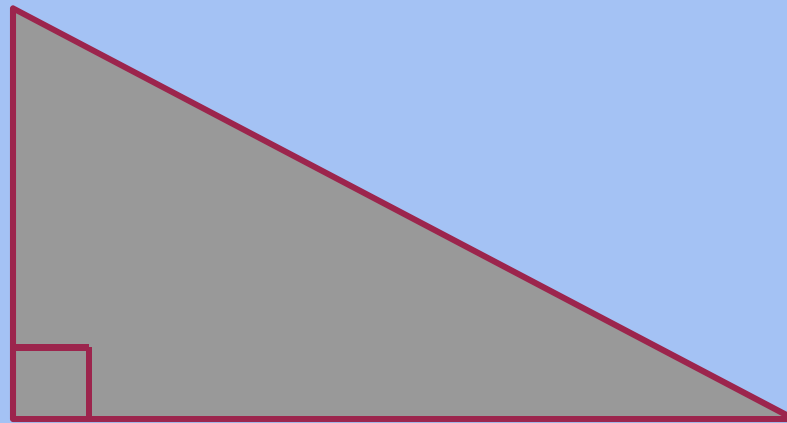
17. Jason has 5 brown candies, 3 red candies, 8 green candies, 2 yellow candies, and 10 purple candies. What is the minimum amount of candies he must pick out to guarantee 3 candies of the same color?



18. 8 players wish to divide themselves into 2 teams of 4 players for an ice hockey game. Each team must choose a goalie. How many ways can the two teams be formed?



19. The sides of a right triangle form an arithmetic sequence. If the area of the triangle is 384, what is the perimeter of the triangle?



20. Let $5^{(1/x)} = x$ for a real number x .
Compute $2(x^2)^x$.



Math Wits (8) Solutions

Student:	A	B	C	D	E	Final scores
1. 90						Student A:
2. 53						
3. 18						
4. 12						
5. 7						Student B:
6. 2035153						
7. 45						
8. 96						
9. 24						Student C:
10. $16-2\pi$						
11. $-5/2$						
12. $1/4$						
13. 7						Student D:
14. 11						
15. 3						
16. 2						
17. 11						Student E:
18. 560						
19. 96						
20. 50						