

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

9. Which positive real number is 4 less than its own reciprocal? Express your answer as a common fraction in simplest radical form.

10. How many two-digit positive integers have exactly 12 positive divisors?

**Extra:** Let  $F_n$  denote the  $n$ -th Fibonacci number, where  $F_1 = F_2 = 1$  and  $F_n = F_{n-1} + F_{n-2}$  for all integers  $n$ . How many digits does  $\gcd(F_{308069}, F_{451631})$  have? [Each member of your team gets 1 token for being within 20% of the answer, an additional token for being within 10% of the answer, and an additional token for getting the exact answer.]