

8.10 Exercises

1. A book has 500 pages numbered 1, 2, 3, and so on. How many times does the digit 1 appear in the page numbers?

2. A set of marbles can be divided into equal shares among 2, 3, 4, 5 or 6 children with no marbles left over. What is the least number of marbles that the set could have?

3. Express the following sum as a simple fraction in lowest terms.

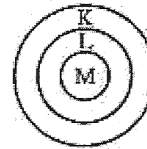
$$\frac{1}{1 \cdot 2} + \frac{1}{2 \cdot 3} + \frac{1}{3 \cdot 4} + \frac{1}{4 \cdot 5} + \frac{1}{5 \cdot 6}$$

4. P and Q represent numbers, and $P \cdot Q$ means $\frac{P+Q}{2}$. What is the value of $3 \cdot (6 \cdot 8)$?

5. Express the extended fraction below as a simple fraction in lowest terms.

$$\frac{1}{2 + \frac{1}{2 + \frac{1}{2 + \frac{1}{2}}}}$$

6. Suppose K , L , and M represent the number of points assigned to the three target regions shown. The sum of K and L is 11, the sum of L and M is 19, and the sum of K and M is 16. How many points are assigned to M ?



7. A circular track is 100 yards in circumference. Cyclists A, B, and C start at the same place and time, and race around the track at the following rates per minute: A at 700 yards per minute, B at 800 yards per minute, and C at 900 yards per minute. What is the least number of minutes it takes for all three to be together again?
8. The product of two whole numbers is 10,000. If neither number contains a zero digit, what are the two numbers?
9. Consecutive numbers are natural numbers that follow in order as in the case of 3, 4, 5, 6, and 7. Find three consecutive numbers whose product is 15,600.
10. Of three numbers, two are $\frac{1}{2}$ and $\frac{1}{3}$. What should the third number be so that the average of all three is 1?

11. When the order of the digits of 2552 is reversed, the number remains the same. How many counting numbers between 100 and 1000 remain the same when the order of the digits is reversed?
12. Tom multiplied a number by $2\frac{1}{2}$ and got 50 as an answer. However, he should have divided the number by $2\frac{1}{2}$ to get the correct answer. What is the correct answer?
13. What is the total of: one plus two plus three plus four plus five plus six plus
 one plus two plus three plus four plus five plus six plus
 one plus two plus three plus four plus five plus six plus
 one plus two plus three plus four plus five plus six plus
 one plus two plus three plus four plus five?
14. Express the sum below as a simple fraction in lowest terms.
- $$\frac{1}{2 + \frac{1}{2}} + \frac{1}{3 + \frac{1}{3}}$$
15. A slow clock loses 3 minutes every hour. Suppose the slow clock and a correct clock both show the correct time at 9 A.M. What time will the slow clock show when the correct clock shows 10 o'clock the evening of the same day?

16. 1^2 means $1 \cdot 1$, 2^2 means $2 \cdot 2$, 3^2 means $3 \cdot 3$ and so forth.

$$\begin{aligned}1^2 + 2^2 + 3^2 + 4^2 + \dots + 25^2 &= 5525, \text{ and} \\ 2^2 + 4^2 + 6^2 + 8^2 + \dots + 50^2 &= N\end{aligned}$$

Find the value of N .

17. When a certain number N is divided by 3, the result is the same as when N is decreased by 8. What is the number N ?

18. The sum $\frac{1}{2} + \frac{1}{2} + \frac{1}{2}$ is equal to the decimal $A.BC$ where A , B , and C may be the same or different digits. What number does $A.BC$ represent?

19. Four numbers are arranged in order of size and the difference between any two adjacent numbers is the same. Suppose $\frac{1}{3}$ is the first and $\frac{1}{2}$ is the fourth of these numbers. What are the two numbers between $\frac{1}{3}$ and $\frac{1}{2}$?

20. A jar contains a large number of pennies. The pennies can be divided into equal shares among 3, 4, 5, 6, 7, or 8 children with no pennies left over each time. What is the least number of pennies that the jar could contain?