In problems 1-2, reduce each fraction to its simplest form. Then, add both digits of the numerator and the denominator. (For example, if the fraction is $\frac{2}{3}$, then write the final answer as $2+3=5$.)

1. $\frac{39}{91}$

2. $\frac{96}{108}$

In problems 3-19, solve the calculation into its simplest form as a proper fraction or mixed number. Write the numerator of the fraction as your answer. (For example, if the answer is $3\frac{10}{6}$, make $4\frac{2}{3}$ and write the final answer as 2.)

3. $1\frac{5}{6} + 3\frac{5}{12}$

4. $2\frac{5}{12} + 6\frac{9}{20}$

5. $6\frac{5}{6} - 3\frac{17}{18}$

6. $7\frac{9}{10} - 3\frac{11}{14}$

7. $\dfrac{3}{4} + \left(\dfrac{2}{3} - \dfrac{3}{5} \right)$

8. $6\dfrac{1}{3} - 4\dfrac{11}{12} + 2\dfrac{5}{6}$

9. $5\dfrac{5}{6} \times 3\dfrac{3}{10}$

10. $0.42 \times 4\dfrac{1}{6}$

11. $2\dfrac{5}{14} \times \dfrac{3}{5} \times 2\dfrac{7}{9}$

12. $0.45 \times \dfrac{5}{9} \times \dfrac{16}{25}$

13. $2\dfrac{5}{8} \div \dfrac{7}{12}$

14. $4.8 \div 1\dfrac{13}{15}$

15. $3\dfrac{7}{11} \div 4\dfrac{1}{6}$

16. $\dfrac{5}{6} \div 2\dfrac{2}{9} \div 3\dfrac{3}{14}$

17. $5\dfrac{1}{4} \div 4.2 \times 1\dfrac{5}{11}$

18. $8\dfrac{2}{5} \times 2\dfrac{2}{9} \div 3\dfrac{4}{15}$

19. $\left(2\dfrac{4}{9} - \dfrac{2}{3}\right) \times 2\dfrac{5}{8} \div 1\dfrac{5}{7}$

In problems 20-22, write the decimal part after solving each question. (For example, if the answer is 18.2 or 18.20, then write the final answer as 2. If the answer is 2.54 or 2.054, then write the final answer as 54.)

20.

```
    3 . 1  6
×      2  8
```

21.

$$\begin{array}{r} 5.3 \\ \times \quad 3.8 \\ \hline \end{array}$$

22.

$$\begin{array}{r} 7.6 \\ \times \quad 0.14 \\ \hline \end{array}$$

In problems 23-24, calculate the quotient up to the hundredths place and write the remainder. Then, add the quotient and the remainder. Write the decimal part of this number as your answer (For example, if the quotient is 2.56 and the remainder is 0.004, calculate $2.56 + 0.004 = 2.564$, and write the final answer as 564.)

23.

$$4.7 \overline{) \ 2.98}$$

24.

$$6.9 \overline{) \ 50.73}$$

In problems 25-26, solve each equation as a mixed number in its simplest form. Then, add the numerator and the denominator of the mixed number. (For example, if the answer is $4\dfrac{2}{3}$, write down the final answer as $2 + 3 = 5$.)

**25.** $\left(x \div \dfrac{5}{13} \right) \times \dfrac{15}{28} = 1\dfrac{13}{14}$

26. $2\dfrac{3}{4} : x = 2.4 : 5\dfrac{1}{3}$

In problems 27-28, solve the question. If the result is a positive number, put 1 at the beginning of the number. However, if the result is a negative number, then put 2 to replace the negative sign for the answer. (For example, if the answer is 45, then write the final answer as 145, but if the answer is -3, then write the final answer as 23.)
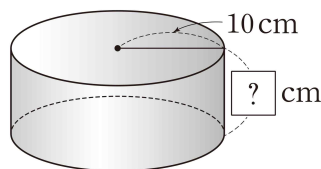
27. $-17 - (-8 + (-9 + 11)) - 4$

28. $-2\dfrac{2}{9} \times 1\dfrac{13}{15} \div 4 \times 2.7 \div \left(-1\dfrac{2}{5}\right)$

29. What is ten times the perimeter of the shaded area? $(\pi = 3.14)$

$4\,\text{cm}$ $6\,\text{cm}$
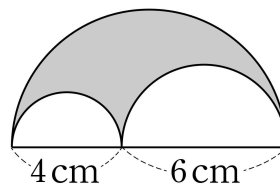
$\boxed{}$ cm

30. Find the height of the cylinder below with the given surface area. $(\pi = 3.14)$

$10\,\text{cm}$

$\boxed{?}$ cm

Surface area $= 1130.4 \text{ cm}^2$

$\boxed{}$ cm

31. When dividing 123 by A, the remainder is 3. When dividing 678 by A, the remainder is 8. What is the value of the natural number A?

_____

32. Ethan's favorite jelly is packed in bags containing 12 jellies each. He ate $1\frac{1}{2}$ bags of jelly in the morning and $2\frac{1}{3}$ bags of jelly in the afternoon. How many jellies did he eat?

_____ jellies

33. Alice was reading a book. After reading $\frac{1}{9}$ of the book, she recommended the book to Bob and resumed reading. Then, Alice read $\frac{1}{2}$ more and Bob read $\frac{1}{3}$ of the same book. At that time, how much more had Alice read than Bob? Write A + B if $\frac{A}{B}$ is the simplest form of the answer.

_____

34. Jenny was busy last week because she had supplementary mathematics classes. She studied fractions for $2\frac{1}{2}$ hours, decimals for $1\frac{1}{5}$ hours and geometry for $3\frac{1}{3}$ hours. How many minutes did Jenny spend on the supplementary classes last week?

_____ minutes

35. 42 fish live in an aquarium. $\frac{1}{3}$ of the fish are blue and half of the blue fish are male. How many blue fish are male?

_____ fish

36. A baker has $3\frac{1}{4}$ pies in her bakery. She cut the pies in pieces that are each $\frac{1}{8}$ of a whole pie. How many pieces of pie does she have?

_____ pieces

37. It is known that 95 percent of a cucumber's weight is just water. How much water does a 300 g cucumber contain?

_____ g

38. A chocolate shop has to package 30 kg of chocolate. Each box contains 0.4 kg of chocolate. Each box is sold for $4.80. If all of the boxes are sold, how much will the chocolate shop earn?

$_____

39. The ratio of the area of a rectangle to the area of a triangle is 2:5. The rectangle has a length of 12 cm and a width of 8 cm. What is the area of the triangle?
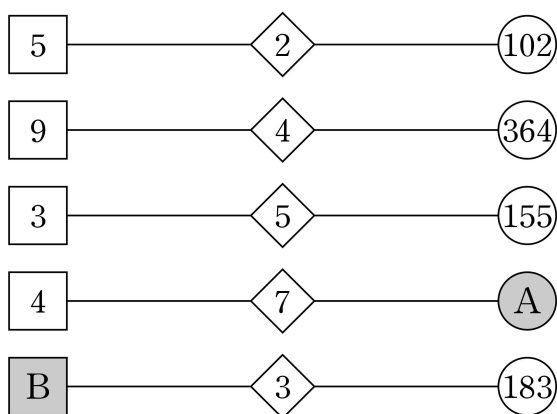
_____ cm^2

40. Hank's mug is a cylinder with a diameter of 10 cm and depth 10 cm. If he fill his mug completely, what is the volume in cm^3? ($\pi = 3.14$)

_____

41. How many triangles made from 4 small triangles can be found in the following figure? [2.3 points]
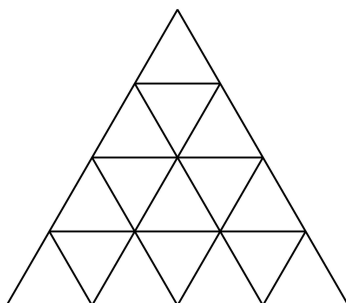
Answer : _____

42. The numbers in each row are arranged following the same mathematical rule. Find the sum of A and B. [2.3 points]
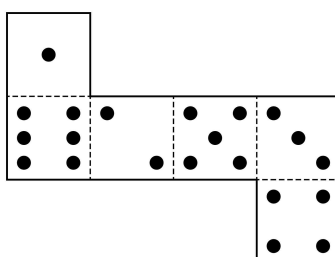

Answer : _____

43. How many natural numbers should be placed in the shaded area in the Venn diagram shown below? [3.3 points]

A: 2-digit multiples of 2

B: 2-digit multiples of 3
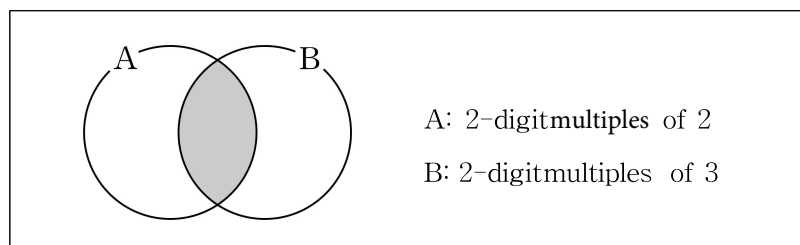
Answer : _____

44. You can fold the net below into a cube. Then, you can see three faces of the cube at once. What is the greatest number of dots on three faces that you could see? [3.3 points]
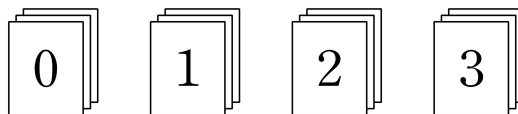

Answer : _____

45. There is a deck of nine cards numbered 1, 2, ⋯ , and 9. Fred and his 2 friends picked one card each. Based on the following descriptions, find the product of the three digits on their cards. [3.3 points]

Descriptions
(1) Fred had the greatest number among the three cards but it was not 9.
(2) The sum and the product of their numbers are both odd.
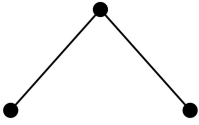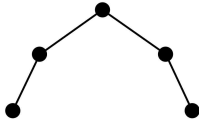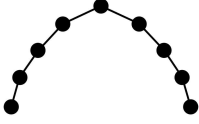(3) The sum of two friends' numbers is greater than Fred's number.

Answer : _____

46. Using the following four kinds of cards, you are going to make 3-digit numbers. You are allowed to use the same cards more than once. You can make 48 possible 3-digit numbers - from the smallest number 100 to the greatest number 333. When you arrange the numbers in ascending order, what is the 17th number? [3.3 points]
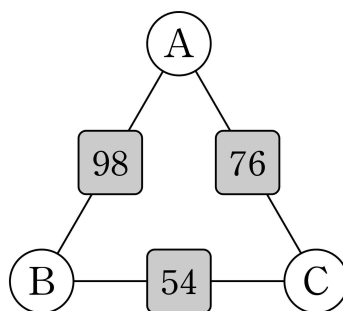
0 1 2 3

Answer : _____

47. The figures shown below follow a certain pattern. Find the number of dots in the 4th place. [4.3 points]

Answer : _____ dots

48. The number in each ▢ is the sum of the two numbers on either end of the line. Find the value of A+B+C. [4.3 points]

Answer : _____

49. The following box shows the division process of the 3-digit number ABC by the 1-digit number C. The letters A, B and C are all different and C is not zero. What is the 3-digit number ABC? [4.3 points]

```
            C C
        ┌─────────
    C ) A B C
        □□
        ─────
          □□
          □□
          ─────
           4
```

Answer : _____

50. If the numbers beside the table are the sum of each row, and the numbers below the table are the product of each column, what is the value of A? [4.3 points]

3			8
	5		10
		4	10
24	A	36	

× (down), + → (right)

Answer : _____