

※ You can receive 1.5 points each for problems number 1 to 30.

In problems 1-2, reduce each fraction to its simplest form. 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. $\frac{56}{96}$

2. $\frac{78}{143}$

In problems 3-19, solve the calculation into its simplest form as a proper fraction or a 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. $2\frac{3}{8} + 1\frac{1}{6}$

4. $3\frac{8}{9} + 2\frac{8}{21}$

5. $6\frac{2}{5} - 1\frac{11}{15}$

6. $6\frac{1}{12} - 4\frac{11}{16}$

7. $\frac{3}{5} + \left(\frac{1}{2} - \frac{1}{3}\right)$

8. $4\frac{1}{4} - 3\frac{7}{16} + 3\frac{3}{8}$

9. $4\frac{3}{8} \times 1\frac{2}{7}$

10. $0.54 \times 4\frac{4}{9}$

11. $2\frac{5}{8} \times \frac{5}{7} \times 1\frac{5}{9}$

12. $0.36 \times \frac{4}{9} \times \frac{7}{8}$

13. $3\frac{1}{9} \div \frac{8}{15}$

14. $7\frac{1}{5} \div 9.6$

$$15. 2\frac{9}{13} \div 2\frac{1}{7}$$

$$16. \frac{5}{7} \div 1\frac{7}{9} \div 3\frac{3}{8}$$

$$17. 4\frac{1}{6} \div 3.5 \times 1\frac{5}{9}$$

$$18. 2\frac{1}{7} \times 6\frac{1}{8} \div 4\frac{7}{12}$$

$$19. \left(4\frac{1}{15} - \frac{4}{5}\right) \times 2\frac{2}{7} \div 3\frac{1}{5}$$

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.)

$$20. \begin{array}{r} 2.49 \\ \times 27 \\ \hline \end{array}$$

21.
$$\begin{array}{r} 6.3 \\ \times 2.6 \\ \hline \end{array}$$

22.
$$\begin{array}{r} 2.7 \\ \times 0.75 \\ \hline \end{array}$$

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.
$$6.4 \overline{) 5.64}$$

24.
$$7.8 \overline{) 58.22}$$

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 $4\frac{2}{3}$, write down the final answer as $2 + 3 = 5$.)

25.
$$\left(x \div \frac{6}{7}\right) \times \frac{9}{26} = 1\frac{12}{13}$$

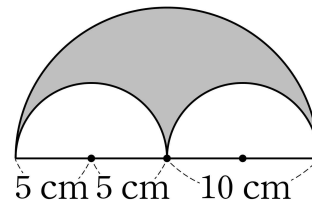
26.
$$2.8 : x = 1\frac{3}{4} : 2\frac{1}{6}$$

In problems 27-28, solve each question.

27. $-11 - (-9 + (3 - 8)) - 16$

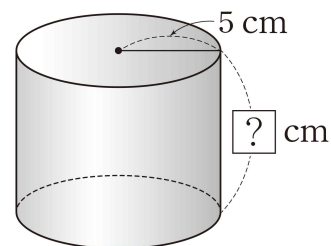
28. $2\frac{5}{8} \times \left(-2\frac{7}{9}\right) \div (-5) \times 4\frac{4}{5} \div (-0.7)$

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



cm

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



Surface area = 408.2 cm^2

cm

※ You can receive 2.0 points each for problems number 31 to 40.

- 31.** Andrew and Bell are running along a track. Andrew takes 4 minutes to go around the track, and Bell takes 3 minutes 20 seconds to go around the track. Andrew and Bell started running around the track at the same time and finished at the same time. Andrew went around the track 10 times: how many times did Bell go around the track?

_____ times

- 32.** Daniel, Marco, and Owen have 25 stickers between them. Marco has 4 fewer stickers than twice of Daniel's, and Owen has 3 more stickers than half of Marco's. How many stickers does Daniel have?

_____ stickers

- 33.** A school has 162 new students. Of these, $\frac{5}{9}$ are male. If $\frac{1}{3}$ of female students wear glasses, how many female students do not wear glasses?

_____ students

- 34.** Oliver bought $3\frac{1}{2}$ L of disinfectant. He used $\frac{2}{3}$ L the first day and $\frac{2}{5}$ L the next day. How much disinfectant is left? If the answer is $A\frac{C}{B}$ L, write the sum $A + B + C$. (Note that $\frac{C}{B}$ is an irreducible fraction and $C < B$.)
- _____

- 35.** Jessica had some crackers. She gave $\frac{4}{7}$ of the crackers to her brother after eating $\frac{2}{9}$ of them. If Jessica has 21 crackers remaining, how many crackers did Jessica first have?
- _____crackers

- 36.** Marina, Thompson, and Violet were cycling. Marina cycled for $\frac{2}{5}$ hours, Thompson for 25 minutes, and Violet for 1320 seconds. Among the three people, what was the shortest time cycling in minutes?

_____minutes

- 37.** Tyler saves 30 percent of what he earns. If he earned \$78 on the first day and \$92 on the second day, how much did he save in these two days?

\$_____

- 38.** Mary has a cylindrical can. When the radius of this can is 5 cm and the height is 5 cm, what is the surface area of the can? ($\pi = 3.14$)

_____ cm^2

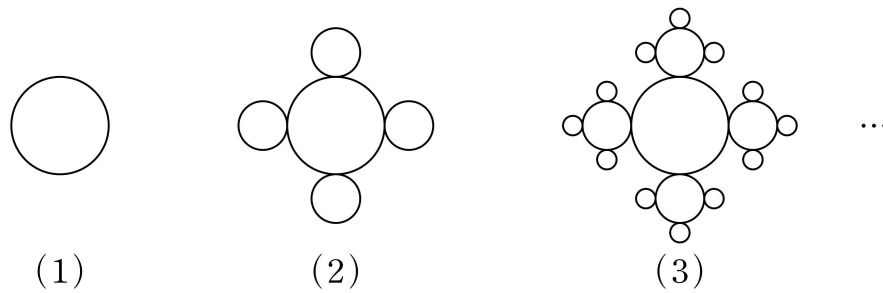
- 39.** Ruby had 2.8 L of milk. She drank $\frac{2}{7}$ of the milk yesterday and 1.4 L of milk today. When you express the ratio of the amount of milk she drank yesterday to the amount of milk she drank today in the simplest form of $A : B$, find the value of $A + B$? (Note that A and B are relatively prime.)
- _____

- 40.** There is a rectangle with a perimeter of 0.6 m. The ratio of the length to the width of this rectangle is $3 : 2$. What is the area of the rectangle?

_____ cm^2

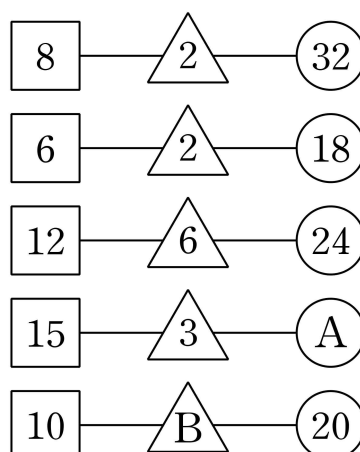
- 41.** In the following figures, circles were arranged according to a certain rule. How many circles should be arranged in the fourth figure?

[2.3 points]



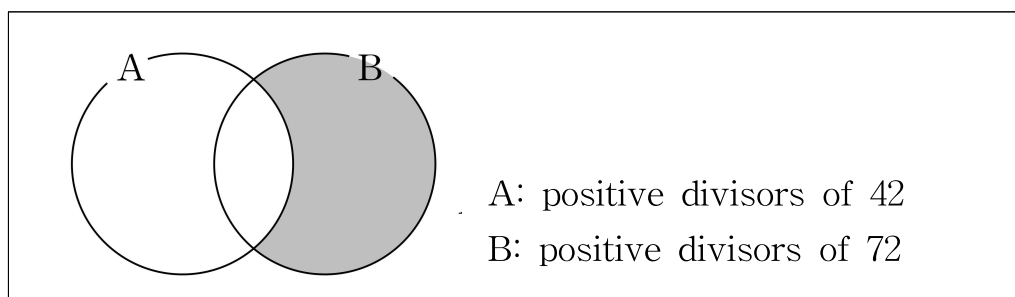
Answer : _____ circles

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



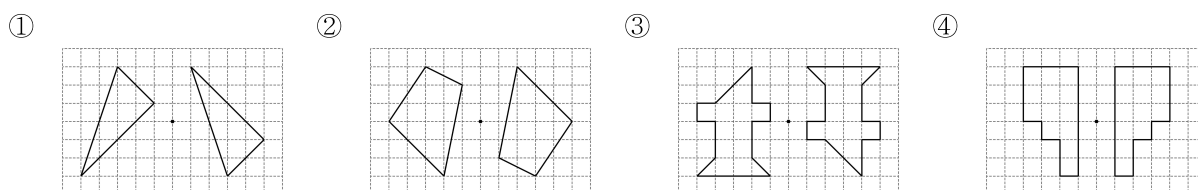
Answer : _____

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



Answer : _____

44. Which pair of figures is a correct rotation of 180° about the given point of symmetry. [3.3 points]



Answer : _____

45. There are nine cards: 1, 2, ..., and 9. Arthur, Carrie, and Samuel picked one card each. Based on the following descriptions, find the sum of the numbers on their cards. [3.3 points]

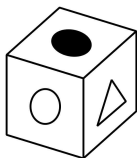
Descriptions

- (1) The number on Arthur's card is odd.
(2) The number on Samuel's card is equal to the product of the numbers on Arthur's card and Carrie's card.

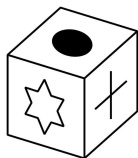
Answer : _____

46. Three of the figures show various sides of the same cube. Which figure shows a different cube? [3.3 points]

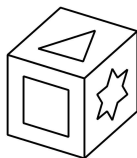
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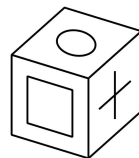
②



③



④



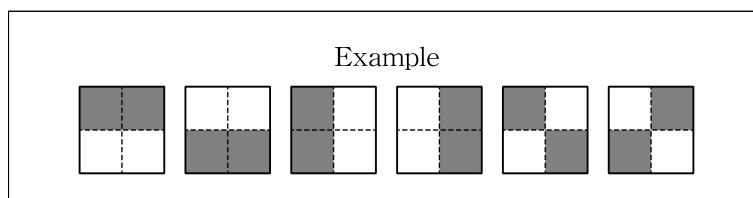
Answer : _____

47. You can select three cards from the following five cards $\boxed{3}$, $\boxed{4}$, $\boxed{5}$, $\boxed{6}$, $\boxed{7}$, and complete the multiplication below. A is a 3-digit number. When you do not consider the order of the three numbers, how many unique calculations of A are possible? [4.3 points]

$$\boxed{} \times \boxed{} \times \boxed{} = A$$

Answer : _____

48. The example shows that there are 6 ways to place blocks $\left(\begin{array}{|c|c|} \hline \blacksquare & \blacksquare \\ \hline \end{array}\right)$ in 4 empty boxes $\left(\begin{array}{|c|c|c|c|} \hline & & & \\ \hline & & & \\ \hline \end{array}\right)$. Find the number of ways to place blocks $\left(\begin{array}{|c|c|} \hline \blacksquare & \blacksquare \\ \hline \end{array}\right)$ in 6 empty boxes $\left(\begin{array}{|c|c|c|c|c|c|} \hline & & & & & \\ \hline & & & & & \\ \hline \end{array}\right)$. [4.3 points]



Answer : _____

49. The following boxes show the division process of the 3-digit number ABB by the 1-digit number C . The letters A , B and C are all different, and C is not zero. Find the value of $A+B+C$. [4.3 points]

$$\begin{array}{r}
 \overline{C B} \\
 C \overline{) A B} \\
 \underline{ } \\
 5 \\
 \underline{ } \\
 2
 \end{array}$$

Answer : _____

50. You should fill the following box with all natural numbers from 1 to 9. The product of the numbers in each column is written underneath the table and the sum of the numbers in each row is written on the right, outside the table. What is the 3-digit number ABC ? [4.3 points]

A			23
	B		12
		C	10
168	54	40	

Answer : _____