

## Real number, Linear inequality

1

(1) Express the following fractions in decimals.

①  $\frac{1}{12}$

②  $\frac{3}{16}$

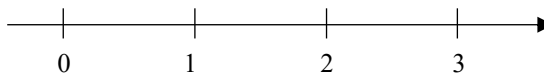
(2) Express the following circular decimals in fractions.

①  $0.\dot{8}$

②  $1.\dot{2}\dot{3}$

2

(1) Take points  $P\left(\frac{7}{4}\right)$  and  $Q(\sqrt{3})$



on the right number line.

(2) Find the following values.

①  $\left| -\frac{1}{2} \right|$

②  $|\sqrt{2} - \sqrt{3}|$

③  $|1| - |-2|$

(3) Find the value of  $|2 + \sqrt{5}| |2 - \sqrt{5}|$ .

3

(1) Find the following values.

①  $(-\sqrt{5})^2$

②  $-\sqrt{3^2}$

(2) Simplify the following expressions involving square roots.

①  $\sqrt{27}$

②  $\sqrt{6} \sqrt{15}$

③  $\frac{\sqrt{50}}{\sqrt{2}}$

④  $\sqrt{0.12}$

4

(1) Calculate the following expressions involving square roots.

①  $\sqrt{54} + \sqrt{96}$

②  $(3 - \sqrt{6})(3 + \sqrt{6})$

③  $(2 - \sqrt{2})^2$

④  $(1 + 2\sqrt{3})(3 - \sqrt{3})$

(2) Rationalize the denominator of the following expressions involving square roots.

①  $\frac{2}{\sqrt{3}}$

②  $\frac{1 - \sqrt{6}}{\sqrt{2}}$

③  $\frac{1}{\sqrt{2} - \sqrt{5}}$

④  $\frac{3 - 2\sqrt{2}}{3 + 2\sqrt{2}}$

5

If  $a < b$ , put an inequality sign in the following blanks  .

(1)  $a+5$    $b+5$

(2)  $3a$    $3b$

(3)  $-\frac{1}{4}a$    $-\frac{1}{4}b$

(4)  $\frac{a}{2}-5$    $\frac{b}{2}-5$

(5)  $-2a+6$    $-2b+6$

6

Solve the following inequalities.

(1)  $x+2 \leq -3$

(2)  $-3x > -9$

(3)  $2x-5 \geq -1$

(4)  $-5x-3 < 7$

(5)  $2x+3 \geq -2x-5$

(6)  $x+4 \leq 10+4x$

(7)  $2(3x-1) > 3(4x+5)+1$

(8)  $\frac{x+8}{6} < \frac{x}{4} + 1$

7

(1) Solve the following simultaneous inequalities.

$$\textcircled{1} \begin{cases} x+6 \leq 4x \\ 1-3x < 15-5x \end{cases}$$

$$\textcircled{2} \begin{cases} 2(x+6) \leq 3(4-x) \\ 0.7x+0.5 < x+2 \end{cases}$$

(2) Solve inequality  $x-2 < -\frac{1}{2}x + 1 < -3x-4$ .

8

Solve the following equations and inequalities.

(1)  $|2x-5| = 3$

(2)  $|x+4| \leq 6$

(3)  $|3x-1| > 2$



9

Solve the following equations and inequalities.

(1)  $|x| = 3x - 2$

(2)  $|3x - 2| \geq x + 2$

**Study 1**

If the integer part of  $2\sqrt{3}$  is  $a$  and the decimal part is  $b$ , find the value of the following expressions.

(1)  $a$

(2)  $b$

(3)  $\frac{a}{b}$

**Study 2**

Put the following expressions involving square roots into simple form.

(1)  $\sqrt{3+2\sqrt{2}}$

(2)  $\sqrt{7-2\sqrt{6}}$

(3)  $\sqrt{7-4\sqrt{3}}$

(4)  $\sqrt{2+\sqrt{3}}$

**Study 3**

$x = \frac{3-\sqrt{6}}{3+\sqrt{6}}$ ,  $y = \frac{3+\sqrt{6}}{3-\sqrt{6}}$ , find the value of the following expressions.

(1)  $x+y$ ,  $xy$

(2)  $x^2+y^2$

(3)  $x^3+y^3$