

CTJAN27 SCHOOL OF ENGLISH & MATHEMATICS PTY LTD.

INSPIRING KNOWLEDGE AND ACADEMIC SUCCESS



Study Guide

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Addition and subtraction of fractions and mixed numbers

To add or subtract fractions, they must have a common denominator. Find the least common multiple (LCM) of the denominators to use as the common denominator. Convert each fraction to an equivalent fraction with the common denominator, then add or subtract the numerators while keeping the denominator the same. For mixed numbers, convert them to improper fractions first or add/subtract the whole numbers and fractional parts separately (regrouping if necessary).

Multiplication of fractions and mixed numbers

To multiply fractions, multiply the numerators together and the denominators together. Simplify the resulting fraction if possible, preferably by canceling common factors before multiplying. To multiply mixed numbers, first convert them to improper fractions, then multiply as with regular fractions.

Division of fractions and mixed numbers

To divide by a fraction, multiply by its reciprocal. The reciprocal of a fraction is obtained by swapping its numerator and denominator. To divide mixed numbers, first convert them to improper fractions, then divide as with regular fractions (multiply the first fraction by the reciprocal of the second).

Solving word problems involving fractions

Solving word problems involving fractions requires understanding the context to determine the appropriate operation (addition, subtraction, multiplication, or division). Represent the problem using fractions, perform the calculations, and ensure the answer is in the correct format and unit.

Operations with decimals (addition, subtraction, multiplication, division)

Operations with decimals follow similar rules to whole number operations, paying close attention to decimal placement. For addition and subtraction, align the decimal points. For multiplication, multiply as if they were whole numbers, then place the decimal point in the product so that the number of decimal places equals the sum of the decimal places in the factors. For division, move the decimal point in the divisor to make it a whole number and move the decimal point in the dividend the same number of places; then divide as usual, placing the decimal point in the quotient directly above the new position of the decimal point in the dividend.

Conversion between fractions, decimals, and percentages

Fractions, decimals, and percentages are different ways of representing parts of a whole. To convert a fraction to a decimal, divide the numerator by the denominator. To convert a decimal to a percentage, multiply by 100 and add the % sign. To convert a percentage to a decimal, divide by 100. To convert a percentage to a fraction, write it as a fraction out of 100 and simplify. To convert a decimal to a fraction, write the decimal as a fraction with a denominator of a power of 10 (e.g., $0.25 = 25/100$) and simplify.

Calculating percentage of a quantity

To calculate the percentage of a quantity, convert the percentage to a decimal or fraction and multiply it by the quantity. For example, 25% of 80 can be calculated as $0.25 * 80$ or $(25/100) * 80$.

Solving word problems involving percentage

Word problems involving percentage often ask to find a percentage of a number, find the percentage one number is of another, or find the original number when a percentage and the resulting value are known. Set up equations based on the problem description, often using the formula: $\text{Part} = \text{Percentage (as decimal)} * \text{Whole}$.

Understanding ratio and its different forms

A ratio is a comparison of two or more quantities of the same kind, typically expressed as $a:b$ or a/b . Ratios can be written in different forms (e.g., using 'to', a colon, or a fraction). Ratios can be simplified by dividing all parts by their greatest common divisor, similar to simplifying fractions.

Solving word problems involving ratio and proportion

Word problems involving ratio and proportion require setting up a proportion, which is an equation stating that two ratios are equal. If three of the four terms in a proportion are known, the fourth can be found by cross-multiplication. Understanding the context of the problem is key to setting up the correct ratio and proportion.

Question 1

A recipe requires $\frac{3}{4}$ cup of flour. If you want to make $\frac{2}{3}$ of the recipe, how much flour do you need? Express your answer as a fraction in simplest form.

Question 2

Calculate $\frac{5}{6} + \frac{1}{4}$. Give your answer as a mixed number in simplest form.

Question 3

Subtract $1\frac{2}{3}$ from $3\frac{4}{5}$. Give your answer as a mixed number in simplest form.

Enter your answer

Question 4

Calculate $\frac{9}{10} \div 1\frac{1}{2}$. Give your answer as a fraction in simplest form.

Enter your answer

Question 5

A bag contained 10 kg of rice. $\frac{2}{5}$ of it was cooked on Monday. On Tuesday, $\frac{1}{2}$ of the remaining rice was cooked. How many kilograms of rice were cooked in total over the two days?

Enter your answer

Question 6

Calculate $12.35 + 4.8$.

Enter your answer

Question 12

A shirt costs \$50. During a sale, its price is reduced by 20%. What is the sale price of the shirt?

Question 13

The ratio of boys to girls in a class is 3 : 2. If there are 15 boys, how many girls are there?

Question 14

The ratio of red balls to blue balls in a bag is 4 : 7. If there are 55 balls in total, how many blue balls are there?

Question 15

The ratio of the amount of money Alex has to the amount of money Ben has is 2 : 5. If Ben has \$40 more than Alex, how much money do they have altogether?

Question 16

Tom increased his collection of marbles by 20%, which was an increase of 20 marbles. How many marbles did he have originally?

Enter your answer

Question 17

A book costs \$25 before GST. If the GST rate is 7%, what is the total cost of the book?

Enter your answer

Question 18

A tank was $\frac{1}{3}$ full of water. After adding 15 litres of water, the tank became $\frac{2}{5}$ full. What is the capacity of the tank in litres?

Enter your answer

Question 19

John read $\frac{1}{4}$ of a 240-page book on Friday. On Saturday, he read $\frac{2}{3}$ of the remaining pages. How many pages had he read by the end of Saturday?

Enter your answer

Question 20

A television costs \$800. Mr. Tan paid a deposit of 20% and the remaining amount in 8 equal monthly instalments. How much was each monthly instalment?

Enter your answer

Study Guide

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Introduction to algebraic terms and expressions

Algebraic terms are parts of an expression separated by plus or minus signs. They consist of a coefficient (a number), one or more variables (letters representing unknown numbers), and exponents. An algebraic expression is a combination of terms connected by mathematical operations (+, -, *, /).

Writing simple algebraic expressions from word descriptions

This involves translating phrases describing mathematical operations and relationships into symbols using numbers, variables, and operation signs. Keywords like 'sum', 'difference', 'product', 'quotient', 'more than', 'less than', 'times', 'divided by' are important cues.

Evaluating simple algebraic expressions by substituting values

Evaluating an expression means finding its numerical value by replacing each variable with a given number and then performing the indicated operations according to the order of operations (PEMDAS/BODMAS).

Simplifying simple algebraic expressions by collecting like terms

Like terms are terms that have the same variables raised to the same powers. Simplifying involves combining like terms by adding or subtracting their coefficients, which makes the expression shorter and easier to work with.

Introduction to simple linear equations with one variable

A simple linear equation is an equation that can be written in the form $ax + b = c$, where x is the single variable, and a , b , and c are constants. It represents a statement that two expressions are equal, and the highest power of the variable is 1.

Solving simple linear equations (e.g., $x + a = b$, $ax = b$, $x/a = b$)

Solving an equation means finding the value(s) of the variable that make the equation true. This is done by isolating the variable on one side of the equation using inverse operations (addition/subtraction, multiplication/division) while maintaining balance on both sides.

Solving word problems leading to simple linear equations

This involves translating a real-world scenario described in words into a mathematical equation. Steps typically include identifying the unknown quantity and assigning a variable, writing the equation that represents the problem's relationships, solving the equation, and checking if the solution makes sense in the context of the problem.

Question 1

Write an algebraic expression for the total cost of x pencils at 0.50 each and y erasers at 0.80 each.

Enter your answer

Question 2

John is p years old. His father is 3 times his age, and his mother is 5 years younger than his father. Write an expression for his mother's age in terms of p .

Enter your answer

Question 3

Write an algebraic expression for the perimeter of a triangle with sides measuring k cm, $(k + 2)$ cm, and $(2k - 1)$ cm.

Enter your answer

Question 4

Evaluate the expression $4a + 7b - 5$ when $a = 3$ and $b = 2$.

Enter your answer

Question 5

Evaluate the expression $2(x - 3) + 5y$ when $x = 5$ and $y = 1$.

Enter your answer

Question 6

Evaluate the expression $\frac{10}{p} + 3q$ when $p = 2$ and $q = 4$.

Enter your answer

Question 7

Simplify the expression $5m + 3n - 2m + 6n$.

Enter your answer

Question 8

Simplify the expression $4(y + 2) - 3$.

Enter your answer

Question 9

Simplify the expression $7p - (2p - 4)$.

Enter your answer

Question 10

Simplify the expression $9a - 3a + 5 - 2$.

Enter your answer

Question 11

Solve the equation $x + 12 = 30$.

Enter your answer

Question 12

Solve the equation $y - 8 = 17$.

Enter your answer

Question 13

Solve the equation $6m = 42$.

Enter your answer

Question 14

Solve the equation $\frac{n}{5} = 9$.

Enter your answer

Question 15

Solve the equation $2p + 3 = 15$.

Enter your answer

Question 16

Solve the equation $3q - 5 = 13$.

Enter your answer

Question 17

Solve the equation $\frac{r}{4} + 1 = 6$.

Enter your answer

Question 18

A number multiplied by 4 is 60. Find the number.

Enter your answer

Question 19

The cost of a shirt is s . The cost of a pair of shorts is 10 less than the shirt. If the shorts cost 25, what is the cost of the shirt?

Enter your answer

Question 1

If $p = 3$ and $q = 5$, evaluate the expression $5(2p - q) + 3q$.

Enter your answer

Question 2

John has x stamps. Mary has twice as many stamps as John. Peter has 10 fewer stamps than Mary. If the total number of stamps they have is 140, how many stamps does John have?

Enter your answer

Question 3

A rectangle's length is $3y$ cm and its width is 5 cm. Its perimeter is 56 cm. Find the value of y .

Enter your answer

Question 4

Simplify the expression $7k + 5m - 3k + 2m - 10$.

Enter your answer

Question 5

Solve for n in the equation $4n - 7 = 21$.

Enter your answer

Question 6

Solve for x in the equation $\frac{x}{3} + 5 = 11$.

Enter your answer

Question 7

A tank contains V litres of water. If 15 litres are added, the tank becomes half full. If the capacity of the tank is 80 litres, what is the value of V ?

Enter your answer

Question 8

If $a = 4$ and $b = 7$, evaluate the expression $\frac{ab}{2} - (b - a)$.

Enter your answer

Question 9

Sarah is x years old. Her brother is 3 years older than her. Her mother is 4 years less than thrice Sarah's age. Write an expression for the sum of their ages.

Enter your answer

Question 10

Solve for x in the equation $3x + 7 = 25$.

Enter your answer

Question 11

A bag of apples costs $\$(2a + 3)$. A bag of oranges costs $\$a$. If the total cost of 2 bags of apples and 3 bags of oranges is $\$34$, find the value of a .

Enter your answer

Question 12

Simplify the expression $4(2p + 3) - 3p + 5$. Then evaluate the simplified expression when $p = 2$.

Enter your answer

Question 13

Solve for m in the equation $\frac{m-2}{4} = 3$.

Enter your answer

Question 14

The sum of three consecutive whole numbers is 75. If the smallest number is k , write an equation in terms of k and solve for k .

Enter your answer

Question 15

If $x = 6$, evaluate the expression $(\frac{x}{2} + 3)^2$.

Enter your answer

Question 16

A taxi charges a flag-down fee of \$3 and \$0.50 for every kilometre travelled. Write an expression for the cost of a journey of d kilometres.

Enter your answer

Question 17

Solve for z in the equation $15 = \frac{z}{5} - 2$.

Enter your answer

Question 18

In a class of 35 students, there are x boys and $x + 3$ girls. Find the number of boys.

Enter your answer

Question 19

Simplify the expression $10 - 3(2y - 4)$.

Enter your answer

Question 20

Sarah spent $\$(3w + 5)$ on a book and $\$2w$ on a pen. She had \$40 at first and was left with \$5. Write an equation for the total amount spent and solve for w .

Enter your answer

Question 20

Sarah had some cookies. She ate 5 and shared half of the remaining with her brother. If she was left with 10 cookies, how many did she start with?

Enter your answer