Grade 3 Mathematics

رياضيات الصف الثالث

A Bilingual Learning Guide for Absolute Beginners

دليل تعلّم ثنائي اللغة للمبتدئين تمامًا

From Zero to Ready-to-Teach

من الصفر إلى الاستعداد للتدريس

6 Units • 20 Modules • Real-Life Applications

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Introduction / مقدمة

Welcome to your Grade 3 Mathematics Bilingual Learning Guide! This guide is designed for absolute beginners who want to understand math from the very beginning and become ready to teach it. Every concept is explained step by step, with Arabic translations and real-life applications to help you connect math to the world around you. Grade 3 is a very important year because you learn multiplication and division, which are the building blocks for almost all higher mathematics.

مرحبًا بكم في دليل تعلّم رياضيات الصف الثالث! هذا الدليل مصمم للمبتدئين تمامًا الذين يريدون فهم الرياضيات من البداية والاستعداد لتدريسها. الصف الثالث مهم جدًا لأنك تتعلم الضرب والقسمة اللذين هما أساس كل الرياضيات الأعلى.

Who Founded Mathematics? / من أسس الرياضيات؟

Mathematics was not founded by one single person. It developed over thousands of years across many civilizations. The Babylonians (about 4000 years ago in modern-day Iraq) created one of the first number systems and used math for astronomy and trade. The Ancient Egyptians used geometry to build the pyramids and measure land after the Nile flooded. They needed math to calculate areas and volumes with amazing accuracy.

The Greeks made huge contributions. Pythagoras (about 2500 years ago) discovered famous rules about triangles that we still use today. Euclid wrote a book called 'The Elements' that organized all math knowledge and is still referenced after 2300 years. Archimedes calculated the value of pi and invented many mathematical tools. In Grade 3, you will learn about area, which is exactly what Archimedes studied!

Indian mathematicians invented the most important number in math: zero! They also created the decimal system (0-9) that the whole world uses today. Arab and Islamic mathematicians preserved and advanced this knowledge. Muhammad ibn Musa al-Khwarizmi (about 1200 years ago) is called the Father of Algebra. The word 'algorithm' comes from his name! His work allows computers to function today. Another Arab mathematician, Omar Khayyam, solved cubic equations. In Grade 3, when you learn multiplication, remember that al-Khwarizmi wrote the first systematic treatment of multiplication and division!

الرياضيات لم يؤسسها شخص واحد. البابليون أنشأوا أول نظام عد. المصريون القدماء استخدموا الهندسة لبناء الأهرامات.

اليونان مثل فيثاغورس وإقليدس قدموا إسهامات عظيمة. الرياضيون الهند اخترعوا الصفر والنظام العشري. والعالم العربي الخوارزمي هو أبو الجبر — وكلمة algorithm مشتقة من اسمه!

لماذا نتعلم الرياضيات؟ / Why Do We Learn Math?

Math is everywhere in our daily lives! When you buy groceries, you use addition and subtraction. When you cook, you measure ingredients. When you tell time, you use numbers. Doctors use math to give the right medicine doses. Engineers use math to build bridges and buildings. Shopkeepers use math to calculate prices and change. Without math, we could not build houses, tell time, share food fairly, or use phones and computers. Learning math opens doors to every career and helps you make better decisions every day. Every great civilization that advanced in science and technology first advanced in math!

How to Use This Guide / كيف تستخدم هذا الدليل

1. Read each section in order — each concept builds on the previous one.
2. Green boxes contain Arabic translations of key terms and concepts.
3. Teal boxes explain WHY we learn each topic and how math connects to real life.
4. Purple boxes contain real-life applications showing how the math concept is used in the real world.
5. Blue boxes contain everyday examples from American, British, and Gulf life.
6. Orange boxes contain important warnings and key points to remember.
7. Take your time with each module. There is no rush!

Unit 1: Understand Multiplication and Area

الوحدة الأولى: فهم الضرب والمساحة

Module 1: Understand Multiplication

الموديول الأول: فهم الضرب

Multiplication is a faster way to add equal groups! In Grade 2, you learned about equal groups and repeated addition. Now you take the next step: multiplication is a shortcut for repeated addition. Instead of writing 4 + 4 + 4 = 12, you write 3 × 4 = 12. The × sign means 'groups of.' So 3 × 4 means '3 groups of 4.' The answer (12) is called the product. The numbers you multiply (3 and 4) are called factors. This is one of the most important ideas in all of mathematics!

الترجمة العربية

الضرب هو طريقة أسرع لجمع مجموعات متساوية! بدلًا من 4 + 4 + 4 = 12، نكتب 3 × 4 = 12. علامة الضرب تعني 'مجموعات من'.

Key Vocabulary

Multiplication الضرب — adding equal groups together

Factor عامل — a number being multiplied

Product ناتج الضرب — the answer to a multiplication problem

Equal Groups مجموعات متساوية — groups with the same number in each

Array مصفوفة — objects in rows and columns

Repeated Addition الجمع المتكرر — adding the same number again and again

Understanding Multiplication with Equal Groups

Imagine you have 5 bags, and each bag has 3 apples. How many apples in total? You could add: 3 + 3 + 3 + 3 + 3 = 15. But multiplication is faster: 5 × 3 = 15. The first factor (5) tells you how many groups. The second factor (3) tells you how many are in each group. The product (15) is the total. This works for any number of equal groups! If you have 4 boxes with 6 donuts each, that's 4 × 6 = 24 donuts.

Understanding Multiplication with Arrays

An array is a rectangular arrangement of objects in rows and columns. If you have 3 rows of 5 stars, you can count all the stars by multiplying: 3 × 5 = 15. The rows are one factor, and the columns are the other factor. Arrays are very useful because you can see the multiplication visually. You can also turn the array sideways: 5 rows of 3 stars also equals 15. This shows that 3 × 5 = 5 × 3, which is the Commutative Property of Multiplication!

تطبيق في الحياة الحقيقية / Real-Life Application

A baker in London bakes trays of cookies. Each tray has 6 rows with 8 cookies in each row. How many cookies on one tray? 6 × 8 = 48 cookies! Without multiplication, the baker would have to count each cookie one by one, which takes too long. Multiplication saves time in bakeries, factories, and any business that makes items in batches. Car manufacturers use multiplication to calculate how many parts they need: 4 tires × 1000 cars = 4000 tires!

لماذا نتعلم الضرب؟ / Why Learn Multiplication?

Multiplication saves you time and effort! Instead of adding the same number many times, you multiply once. Builders use it to calculate floor tiles: 10 rows × 12 tiles = 120 tiles. Chefs use it to scale recipes: if one recipe serves 4 and you need to serve 20, you multiply by 5. Scientists use it for experiments. Every career uses multiplication daily! It is one of the four fundamental operations of math, along with addition, subtraction, and division.

مثال من الحياة / Everyday Example

At a McDonald's in Dubai, each Happy Meal box contains 4 chicken nuggets. If a family orders 6 Happy Meals, how many nuggets total? 6 × 4 = 24 nuggets! Or think of a Gulf Airlines plane with 30 rows of 6 seats each: 30 × 6 = 180 passengers can fly!

Module 2: Relate Multiplication to Area

الموديول الثاني: ربط الضرب بالمساحة

Area is the amount of space inside a flat shape. You can find the area by counting unit squares — small squares that are all the same size. If a rectangle is covered by 3 rows of 5 unit squares, its area is 15 square units. But notice: 3 × 5 = 15! This is not a coincidence. The area of a rectangle equals its length multiplied by its width. This is why multiplication and area are connected! When you multiply length times width, you are counting unit squares in a fast way.

Area المساحة — the amount of space inside a flat shape

Unit Square مربع وحدة — a square with sides of 1 unit, used to measure area

Square Unit وحدة مربعة — the unit for measuring area (e.g., square cm, square in)

Finding Area by Counting Unit Squares

The simplest way to find area is to count unit squares. Place unit squares inside the shape with no gaps or overlaps, and count how many you used. If a rectangle has 4 rows of 7 unit squares, the area is 28 square units. Half squares and partial squares also need to be counted carefully. Two half squares make one whole square. This method works for any shape, not just rectangles!

Area of a Rectangle

For a rectangle, you do not need to count every square. Just multiply the length by the width! If a rectangle is 8 units long and 5 units wide, the area = 8 × 5 = 40 square units. This is the area formula for rectangles: Area = Length × Width, or A = L × W. This formula works because the length tells you how many squares are in each row, and the width tells you how many rows there are. Multiplying them counts all the squares!

Area of Combined Rectangles

Sometimes a shape is made of two or more rectangles joined together (a composite figure). To find its area, break it apart into smaller rectangles, find the area of each rectangle, then add the areas together. For example, an L-shaped figure can be split into a 3×4 rectangle (area = 12) and a 2×3 rectangle (area = 6). The total area = 12 + 6 = 18 square units. This is the Distributive Property in action!

تطبيق في الحياة الحقيقية / Real-Life Application

An architect in New York is designing a room that is 12 feet long and 10 feet wide. The area = 12 × 10 = 120 square feet. This tells the architect how much carpet to buy, how many tiles are needed for the floor, and how much paint for the walls! If carpet costs $5 per square foot, the total cost is 120 × 5 = $600. Area calculations are used every day in construction, interior design, and landscaping. A farmer in Texas needs to know the area of his field to calculate how many seeds to plant!

نقطة مهمة / Key Point

Area is measured in SQUARE units, not regular units! A rectangle that is 5 cm long and 3 cm wide has an area of 15 square centimeters (15 cm²), NOT 15 centimeters. Regular units measure length (how long), square units measure area (how much space). This is a very common mistake!

Unit 2: Multiplication and Division

الوحدة الثانية: الضرب والقسمة

Module 3: Understand Multiplication Strategies

الموديول الثالث: فهم استراتيجيات الضرب

Now that you understand what multiplication means, you need strategies to find products quickly. The most important strategies are: (1) Skip Counting: to find 4 × 6, count by 6s four times: 6, 12, 18, 24. (2) Draw a Picture: draw 4 groups of 6 circles and count. (3) Use a Known Fact: if you know 5 × 6 = 30, then 6 × 6 = 30 + 6 = 36. (4) Use Arrays: draw rows and columns. These strategies help you find any product, even for facts you have not memorized yet.

Skip Counting العد بقفزات — counting by a number, e.g., 5, 10, 15, 20...

تطبيق في الحياة الحقيقية / Real-Life Application

A cashier at a supermarket in London needs to calculate the price of 7 boxes of biscuits at £3 each. She uses skip counting: 3, 6, 9, 12, 15, 18, 21. The total is £21! A teacher in Riyadh distributing 5 pencils to each of 8 students counts: 5, 10, 15, 20, 25, 30, 35, 40. She needs 40 pencils!

Module 4: Apply Multiplication Properties as Strategies

الموديول الرابع: تطبيق خصائص الضرب كاستراتيجيات

Identity Property of Multiplication

Any number multiplied by 1 equals itself. 7 × 1 = 7. 1 × 345 = 345. Think of it this way: 1 group of 7 apples is just 7 apples! This is the Identity Property because multiplying by 1 does not change the identity of the number. It stays the same.

Zero Property of Multiplication

Any number multiplied by 0 equals 0. 8 × 0 = 0. 0 × 99 = 0. Think of it this way: if you have 8 empty bags (0 apples in each), you have 0 apples total! No matter how many groups of zero you have, you still have nothing. This is the Zero Property of Multiplication.

Commutative Property of Multiplication

You can multiply numbers in any order and get the same product. 3 × 7 = 21 and 7 × 3 = 21. If an array has 3 rows of 7, you can rotate it to see 7 rows of 3. The total is the same! This property is very helpful: if you know 4 × 9 = 36, you automatically know 9 × 4 = 36. It cuts your memorization work in half!

Distributive Property

The Distributive Property lets you break apart a factor to make multiplication easier. For example, 8 × 7 can be split: 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. You 'distribute' the 8 to both the 5 and the 2. This is incredibly useful when you do not know a fact. If you forget 6 × 8, think: 6 × (4 + 4) = 24 + 24 = 48, or 6 × (5 + 3) = 30 + 18 = 48.

Associative Property of Multiplication

When you multiply three numbers, the grouping does not matter. (2 × 3) × 4 = 2 × (3 × 4). Both equal 24. You can choose which pair to multiply first based on what's easier. For (3 × 4) × 5, multiply 3 × 4 = 12 first, then 12 × 5 = 60. Or multiply 4 × 5 = 20 first, then 3 × 20 = 60. Choose the grouping that gives you easier facts!

Identity Property خاصية المطابقة — any number × 1 = same number

Zero Property خاصية الصفر — any number × 0 = 0

Commutative Property خاصية التبديل — order does not change the product

Distributive Property خاصية التوزيع — break apart a factor to multiply

Associative Property خاصية التجميع — grouping does not change the product

تطبيق في الحياة الحقيقية / Real-Life Application

A warehouse manager in Dubai needs to organize 6 shelves with 8 boxes each, and each box contains 10 items. Using the Associative Property: (6 × 8) × 10 = 48 × 10 = 480 items, or 6 × (8 × 10) = 6 × 80 = 480 items. Both give the same answer, but the second way might be easier! An American teacher arranging 7 rows of 5 desks knows 7 × 5 = 5 × 7 = 35 desks. The properties make real calculations easier!

نقطة مهمة / Key Point

The Commutative Property works for multiplication but NOT for subtraction or division! 5 × 3 = 3 × 5 (yes), but 8 - 3 does NOT equal 3 - 8, and 10 ÷ 2 does NOT equal 2 ÷ 10. Only addition and multiplication are commutative.

Module 5: Multiplication with Multiples of 10

الموديول الخامس: الضرب بمضاعفات العشرة

A multiple of 10 is any number that ends in zero: 10, 20, 30, 40, 50, 60, 70, 80, 90. Multiplying by these numbers is easy when you understand place value! For 4 × 30, think of 30 as 3 tens. So 4 × 3 tens = 12 tens = 120. You can also use the Distributive Property: 4 × 30 = 4 × (3 × 10) = (4 × 3) × 10 = 12 × 10 = 120. The pattern is: multiply the non-zero digits, then add the zeros!

Multiple مضاعف — the product of a number and a whole number

تطبيق في الحياة الحقيقية / Real-Life Application

A school in Manchester orders 30 packs of pencils. Each pack has 8 pencils. Total pencils = 30 × 8 = 240! A hotel in Abu Dhabi has 40 rooms on each floor and 6 floors. Total rooms = 40 × 6 = 240 rooms! A factory in Detroit produces 50 toy cars per hour. In 7 hours: 50 × 7 = 350 cars! Multiplying by multiples of 10 is essential in business and manufacturing.

Module 6: Understand Division

الموديول السادس: فهم القسمة

Division is the opposite of multiplication! It means splitting a total into equal groups. There are two types: Sharing Division (finding how many in each group) and Measurement Division (finding how many groups). Example of sharing: 12 cookies shared among 3 friends = 4 cookies each (12 ÷ 3 = 4). Example of measurement: 12 cookies, put 3 in each bag = 4 bags (12 ÷ 3 = 4). The answer is called the quotient. The total is the dividend. The number you divide by is the divisor.

Division القسمة — splitting into equal groups

Dividend مقسم — the total being divided

Divisor مقسم عليه — the number you divide by

Quotient الناتج — the answer to a division problem

Division as Repeated Subtraction

Division can also be thought of as repeated subtraction. For 20 ÷ 5, keep subtracting 5: 20 - 5 = 15, 15 - 5 = 10, 10 - 5 = 5, 5 - 5 = 0. You subtracted 5 four times, so 20 ÷ 5 = 4. A number line can show this: start at 20 and make jumps of -5 until you reach 0. The number of jumps is the quotient!

Division with Arrays

Just as multiplication uses arrays, so does division! If you have 18 stars arranged in 3 rows, how many stars are in each row? 18 ÷ 3 = 6. You can see it in the array: 3 rows of 6 = 18 total. Or if you have 18 stars in rows of 6, how many rows? 18 ÷ 6 = 3. The array shows both the sharing and measurement interpretations of division.

Division Rules for 1 and 0

Important rules: (1) Any number divided by 1 equals itself: 7 ÷ 1 = 7. (2) Any number divided by itself equals 1: 8 ÷ 8 = 1. (3) Zero divided by any number equals 0: 0 ÷ 5 = 0. (4) You CANNOT divide by zero! 5 ÷ 0 is undefined. Why? Because there is no number that, when multiplied by 0, gives you 5. Division by zero is impossible.

تطبيق في الحياة الحقيقية / Real-Life Application

A teacher in Kuwait has 24 pencils to share equally among 6 students. 24 ÷ 6 = 4 pencils each! A pizza restaurant in Chicago cuts each pizza into 8 slices. If 3 friends share equally, each gets 8 ÷ 3... wait, that gives a remainder! You will learn about remainders later. For now, 8 slices ÷ 2 people = 4 slices each. Division is used whenever you share, split, or distribute things equally.

نقطة مهمة / Key Point

You can NEVER divide by zero! 5 ÷ 0 is undefined. It does not equal 0 or 5 — it is impossible. Think about it: 'How many groups of 0 are in 5?' You cannot make groups of 0 and get a total of 5. This rule is absolute in mathematics!

Module 7: Relate Multiplication and Division

الموديول السابع: ربط الضرب والقسمة

Multiplication and division are inverse operations — they are opposites, like addition and subtraction. If you know 3 × 7 = 21, you also know 21 ÷ 3 = 7 and 21 ÷ 7 = 3. These are called related facts (or a fact family). A fact family for 3, 7, and 21 includes: 3 × 7 = 21, 7 × 3 = 21, 21 ÷ 3 = 7, and 21 ÷ 7 = 3. Knowing this connection means if you memorize your multiplication facts, you automatically know your division facts too!

Inverse Operations عمليات عكسية — operations that undo each other

Related Facts حقائق مرتبطة — multiplication and division facts using the same numbers

Fact Family عائلة الحقائق — all related facts for a set of numbers

Multiply and Divide with 2, 4, and 8

These numbers are connected! If you know the 2s facts, you can find the 4s: just double! 2 × 6 = 12, so 4 × 6 = 24 (double 12). And if you know the 4s, you can find the 8s: double again! 4 × 6 = 24, so 8 × 6 = 48 (double 24). For division: 48 ÷ 8 = 6, 48 ÷ 6 = 8, 24 ÷ 4 = 6, 24 ÷ 6 = 4. The doubling pattern makes these facts easier to remember!

Multiply and Divide with 5 and 10

The 5s and 10s are the easiest facts! For ×10, just add a zero: 6 × 10 = 60. For ×5, multiply by 10 and then halve: 6 × 5 = (6 × 10) ÷ 2 = 60 ÷ 2 = 30. Or use the clock pattern: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60. For division: 60 ÷ 10 = 6, 60 ÷ 5 = 12.

Multiply and Divide with 3 and 6

For the 3s, skip count: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30. For the 6s, use the double-3 strategy: 6 × 7 = (3 × 7) × 2 = 21 × 2 = 42. Or think of 6s as 5s plus 1 more group: 6 × 7 = (5 × 7) + (1 × 7) = 35 + 7 = 42. For division: 42 ÷ 6 = 7, 42 ÷ 7 = 6.

Multiply and Divide with 7 and 9

The 7s can be found using the Distributive Property: 7 × 8 = (5 + 2) × 8 = 40 + 16 = 56. The 9s have a finger trick! Hold up 10 fingers. For 9 × 3, put down your 3rd finger. You have 2 fingers on the left and 7 on the right: 27! Another 9s trick: the digits of any 9s fact always add up to 9. For 9 × 6 = 54: 5 + 4 = 9! For 9 × 7 = 63: 6 + 3 = 9!

تطبيق في الحياة الحقيقية / Real-Life Application

A bookshop in London has 56 books arranged on 8 shelves. How many books per shelf? 56 ÷ 8 = 7 books per shelf. A school in Doha has 45 students going on a field trip, with 9 students per van. How many vans? 45 ÷ 9 = 5 vans. A parent in Boston packs 7 apples for each of 5 school days: 7 × 5 = 35 apples for the week! These multiplication and division facts are used constantly in everyday planning and organization.

لماذا نتعلم الضرب والقسمة؟ / Why Learn Multiplication and Division?

Multiplication and division are used in every single career! Chefs multiply recipes. Builders divide materials. Doctors calculate medicine doses using division. Shopkeepers use multiplication for inventory. Pilots calculate fuel using both operations. These four operations (addition, subtraction, multiplication, division) are the foundation of ALL mathematics. Everything else you learn in math — fractions, algebra, geometry — builds on these four operations!

Module 8: Apply Multiplication and Division

الموديول الثامن: تطبيق الضرب والقسمة

Patterns

Arithmetic patterns follow a rule. For example: 4, 8, 12, 16, 20... the rule is 'add 4' or 'multiply by the position.' The 5th number is 5 × 4 = 20. Patterns help you predict what comes next without calculating every number. A growing pattern increases by a fixed amount each time, like adding 3 chairs for each new row in a classroom.

Finding Unknown Numbers

Sometimes a number in an equation is missing. For 6 × ? = 42, use division: 42 ÷ 6 = 7. For ? ÷ 5 = 9, use multiplication: 5 × 9 = 45. The key is: use the opposite operation to find the unknown. If the equation uses multiplication, divide to find the missing number. If it uses division, multiply!

Two-Step Problems

Some problems need two steps to solve. Example: 'A store has 5 boxes of markers with 8 markers in each box. The teacher gives away 12 markers. How many are left?' Step 1: Find the total: 5 × 8 = 40 markers. Step 2: Subtract the ones given away: 40 - 12 = 28 markers left. Always read carefully and decide what to do first, then what to do second.

تطبيق في الحياة الحقيقية / Real-Life Application

A family in Edinburgh goes to a theme park. Tickets cost £8 each for 5 family members. They also buy lunch for £25 total. Step 1: Ticket cost = 5 × 8 = £40. Step 2: Total spent = 40 + 25 = £65. Two-step problems happen all the time in budgeting! A worker in Dubai earns 500 dirhams per day for 5 days, then spends 800 dirhams on rent. How much is left? 5 × 500 = 2500, then 2500 - 800 = 1700 dirhams left.

Unit 3: Addition and Subtraction Strategies and Applications

الوحدة الثالثة: استراتيجيات الجمع والطرح وتطبيقاتها

Module 9: Addition and Subtraction Strategies

الموديول التاسع: استراتيجيات الجمع والطرح

In Grade 3, you extend your addition and subtraction skills to work with numbers up to 1,000. You learn mental math strategies that let you calculate in your head without paper! For example, to add 298 + 6 mentally, think: 298 + 2 = 300, then 300 + 4 = 304. To subtract 500 - 297, think: 297 + 3 = 300, 300 + 200 = 500, so the answer is 3 + 200 = 203. These strategies use compatible numbers — numbers that combine easily, like numbers that make 100 or 1000.

Mental Math الحساب الذهني — calculating in your head without writing

Compatible Numbers أعداد متوافقة — numbers that are easy to compute mentally

Rounding التقريب — finding the nearest 10 or 100

Estimate تقدير — finding an approximate answer

Rounding to the Nearest Ten and Hundred

Rounding means finding the closest multiple of 10 or 100. To round 47 to the nearest ten: is 47 closer to 40 or 50? It is 3 away from 50 and 7 away from 40, so round to 50. Rule: if the digit in the ones place is 5 or more, round up. If it is less than 5, round down. For hundreds: 349 rounded to the nearest hundred is 300 (the tens digit is 4, which is less than 5, so round down). 350 rounded to the nearest hundred is 400 (the tens digit is 5, so round up).

Estimating Sums and Differences

Estimating gives you an approximate answer quickly. To estimate 487 + 312, round both: 500 + 300 = 800. The exact answer is 799, so the estimate is very close! Estimating helps you check if your exact answer makes sense. If you calculate 487 + 312 and get 7999, you know that is wrong because the estimate is around 800. Always estimate first, then calculate exactly!

Addition Properties

The Commutative Property of Addition says order does not matter: 23 + 67 = 67 + 23 = 90. The Associative Property of Addition says grouping does not matter: (25 + 30) + 45 = 25 + (30 + 45). Both equal 100. These properties let you rearrange numbers to add more easily. For 23 + 67 + 77, group 23 + 77 first (= 100), then add 67 to get 167. Smart grouping makes mental math much faster!

تطبيق في الحياة الحقيقية / Real-Life Application

A shopper in London buys items for £47, £23, and £11. Using mental math: 47 + 23 = 70, then 70 + 11 = £81. A contractor in Riyadh estimates the cost of two materials: €485 + €320 ≈ 500 + 300 = €800 (approximate). Estimating helps you know if you have enough money before you get to the checkout!

Module 10: Addition and Subtraction Within 1,000

الموديول العاشر: الجمع والطرح ضمن 1000

Expanded Form Addition

To add using expanded form, break each number into its place values and add separately. For 347 + 268: 300 + 40 + 7 + 200 + 60 + 8. Add hundreds: 300 + 200 = 500. Add tens: 40 + 60 = 100. Add ones: 7 + 8 = 15. Then combine: 500 + 100 + 15 = 615. This method helps you understand what is happening at each place value, not just following steps blindly.

Place Value Addition with Regrouping

To add with regrouping, stack the numbers vertically. For 269 + 378: Add ones: 9 + 8 = 17 (write 7, carry 1). Add tens: 6 + 7 + 1 (carried) = 14 (write 4, carry 1). Add hundreds: 2 + 3 + 1 (carried) = 6. Answer: 647. Always add from right to left (ones first), and carry when the sum in any column is 10 or more.

Place Value Subtraction

To subtract with regrouping, stack vertically. For 509 - 248: You cannot subtract 8 from 9? Actually you can: 9 - 8 = 1. But then 0 - 4 cannot be done. So regroup: take 1 hundred from 5 hundreds (making it 4 hundreds) and give it to the 0 tens (making it 10 tens). Now 10 - 4 = 6 tens, and 4 - 2 = 2 hundreds. Answer: 261. Always subtract from right to left, and regroup when the top digit is smaller.

تطبيق في الحياة الحقيقية / Real-Life Application

A bank account in New York has $735. You deposit $248 more: 735 + 248 = $983. A warehouse in Jeddah had 603 boxes and shipped 287: 603 - 287 = 316 boxes remaining. Every financial transaction in the world uses addition and subtraction within thousands! Bank tellers, accountants, and business owners rely on these skills every single day.

Module 11: Understand Perimeter

الموديول الحادي عشر: فهم المحيط

Perimeter is the distance around the outside of a shape. Think of it as walking around the edge of a playground — the total distance you walk is the perimeter! To find perimeter, add up the lengths of all the sides. For a rectangle that is 8 cm long and 5 cm wide: P = 8 + 5 + 8 + 5 = 26 cm. There is also a formula: P = 2 × (length + width) = 2 × (8 + 5) = 2 × 13 = 26 cm. Perimeter is measured in regular units (cm, m, in, ft), NOT square units!

Perimeter المحيط — the distance around a shape

Same Area, Different Perimeter

Two rectangles can have the same area but different perimeters! A 4 × 9 rectangle has area = 36 and perimeter = 26. A 6 × 6 square has area = 36 and perimeter = 24. Same area, but the square has a smaller perimeter! This is important in real life: a square room and a rectangular room can have the same floor space (area) but need different amounts of baseboard (perimeter).

Same Perimeter, Different Area

Two rectangles can also have the same perimeter but different areas! A 1 × 11 rectangle has perimeter = 24 and area = 11. A 6 × 6 square has perimeter = 24 and area = 36. Same perimeter, but the square has a much bigger area! Among all rectangles with the same perimeter, the square always has the greatest area. This is why cities often build square parks — they give the most usable space for the same amount of fencing!

تطبيق في الحياة الحقيقية / Real-Life Application

A farmer in Kansas needs to fence a rectangular garden. If he has 40 meters of fencing, what dimensions give the biggest garden? A 10 × 10 square gives area = 100 square meters. A 5 × 15 rectangle gives only 75 square meters. The square is best! An architect in London calculates how much trim is needed around a room: perimeter = 2 × (12 + 8) = 40 feet of trim. A family in Abu Dhabi wants to install a fence around their pool — they need to calculate the perimeter to know how much fencing to buy!

نقطة مهمة / Key Point

Perimeter uses regular units (cm, m, in, ft). Area uses square units (cm², m², in², ft²). Do NOT confuse them! Perimeter = distance AROUND. Area = space INSIDE. A room can have a large perimeter but a small area, or vice versa.

Module 12: Time Measurement and Intervals

الموديول الثاني عشر: قياس الوقت والفترات الزمنية

In Grade 2, you learned to tell time to the nearest 5 minutes. Now in Grade 3, you tell time to the nearest minute! You also learn about a.m. and p.m., and how to calculate elapsed time — the amount of time that passes between a start time and an end time. A clock has 60 minute marks. The minute hand moves from one mark to the next in 1 minute. When the minute hand points to a number, multiply that number by 5 to find the minutes past the hour.

Minute دقيقة — 1/60 of an hour

A.M. صباحًا — from midnight to noon (ante meridiem)

P.M. مساءً — from noon to midnight (post meridiem)

Midnight منتصف الليل — 12:00 a.m.

Noon منتصف النهار — 12:00 p.m.

Elapsed Time الوقت المنقضي — the time between start and end

Measuring Time Intervals

To find elapsed time, use a number line. If you start reading at 2:15 p.m. and finish at 2:47 p.m., draw a number line from 2:15 to 2:47. Jump from 2:15 to 2:20 (5 min), then to 2:40 (20 min), then to 2:47 (7 min). Total: 5 + 20 + 7 = 32 minutes. You can also subtract: 2:47 - 2:15. Subtract minutes: 47 - 15 = 32 minutes.

Finding Start and End Times

If you know the elapsed time and the start time, add to find the end time. If a movie starts at 3:10 p.m. and lasts 1 hour 35 minutes, add: 3:10 + 1:35 = 4:45 p.m. If you know the elapsed time and the end time, subtract to find the start time. If a bus arrives at 5:30 p.m. and the trip took 45 minutes, subtract: 5:30 - 0:45. Since you cannot subtract 45 from 30, borrow 1 hour: 4:90 - 0:45 = 4:45 p.m.

تطبيق في الحياة الحقيقية / Real-Life Application

A student in Manchester has a test that starts at 9:15 a.m. and lasts 50 minutes. When does it end? 9:15 + 50 minutes = 10:05 a.m. A flight from London to Dubai departs at 11:30 p.m. and takes 7 hours. Arrival time: 11:30 p.m. + 7 hours = 6:30 a.m. (next day). A doctor in Boston schedules appointments for 20 minutes each. If the first appointment is at 2:00 p.m., the third appointment starts at 2:40 p.m. Time calculations are essential in healthcare, travel, and scheduling!

Unit 4: Fractions

الوحدة الرابعة: الكسور

Module 13: Understand Fractions as Numbers

الموديول الثالث عشر: فهم الكسور كأعداد

A fraction is a number that describes equal parts of a whole. The top number is the numerator — it tells how many parts you have. The bottom number is the denominator — it tells how many equal parts the whole is divided into. For example, 3/4 means 3 out of 4 equal parts. The whole must be divided into EQUAL parts! If a pie is cut into 4 pieces and one piece is bigger, those are NOT fourths. A unit fraction has a numerator of 1, like 1/2, 1/3, 1/4, 1/6, 1/8. Every fraction is built from unit fractions: 3/4 = 1/4 + 1/4 + 1/4.

Fraction كسر — a number that names equal parts of a whole

Numerator البسط — the top number (how many parts you have)

Denominator المقام — the bottom number (total equal parts)

Unit Fraction كسر وحدة — a fraction with numerator 1

Halves أنصاف — 2 equal parts

Thirds أثلاث — 3 equal parts

Fourths أرباع — 4 equal parts

Sixths أسداس — 6 equal parts

Eighths أثمان — 8 equal parts

Fractions on a Number Line

A number line can show fractions! Between 0 and 1, mark equal parts. For fourths, divide the space into 4 equal segments and label them 0, 1/4, 2/4, 3/4, 1. Each mark is one more fourth. The number line shows that fractions are NUMBERS, not just parts of shapes. They have a specific position between whole numbers, just like 1/2 is exactly between 0 and 1.

Whole Numbers as Fractions

Any whole number can be written as a fraction! 1 = 4/4 = 3/3 = 2/2. 2 = 4/2 = 6/3 = 8/4. The rule is: any number divided by itself equals 1, so any fraction where the numerator equals the denominator equals 1. And n = n × 1, so 3 = 3 × (4/4) = 12/4. This is important for understanding fractions greater than 1.

Fractions Greater Than 1 and Mixed Numbers

A fraction greater than 1 has a numerator larger than its denominator, like 5/4 (five fourths). This is also called an improper fraction. You can write it as a mixed number: 5/4 = 1 and 1/4 (one whole and one fourth). To convert: 5/4 means 5 quarters. Since 4 quarters = 1 whole, 5 quarters = 1 whole + 1 quarter = 1 1/4. Mixed numbers show how many wholes and how many extra parts you have.

Measuring Length with Fractions

A ruler has fractional marks! Between each inch, there are marks for halves (1/2), fourths (1/4, 2/4, 3/4), and sometimes eighths. To measure 3 and 1/2 inches, go past the 3-inch mark to the halfway mark between 3 and 4. Reading a ruler accurately requires understanding fractions!

تطبيق في الحياة الحقيقية / Real-Life Application

A baker in New York uses fractions every day! A chocolate chip cookie recipe calls for 3/4 cup of brown sugar. If she makes a double batch, she needs 3/4 + 3/4 = 6/4 = 1 and 1/2 cups. A carpenter in London measures wood to 2 and 3/8 inches. A tailor in Dubai cuts fabric at 1 and 1/4 meters. Without understanding fractions, you cannot cook, build, sew, or measure accurately! Even music uses fractions: a half note lasts 1/2 of a beat, a quarter note lasts 1/4!

Module 14: Relate Shapes, Fractions, and Area

الموديول الرابع عشر: ربط الأشكال والكسور والمساحة

Shapes can be divided into equal parts, and each part can be described as a fraction of the whole area. If a rectangle is divided into 6 equal squares and 4 are shaded, the shaded area is 4/6 of the total area. The key word is EQUAL: the parts must have the same area. Parts can be different shapes but still have equal area! For example, a rectangle can be divided diagonally into two triangles of equal area, each being 1/2 of the rectangle.

تطبيق في الحياة الحقيقية / Real-Life Application

A landscape designer in Seattle divides a square garden into 4 equal triangular sections for different flowers. Each section is 1/4 of the total garden area. A flag designer in Bahrain creates a flag with 3 equal horizontal stripes: each stripe is 1/3 of the flag. When architects design floor plans, they use fractions to divide spaces: a living room might take up 1/3 of the floor area, bedrooms 1/3, and kitchen/dining 1/3.

Module 15: Compare Fractions

الموديول الخامس عشر: مقارنة الكسور

When comparing fractions, ask: which is bigger? There are two main rules: (1) Same Denominator: if the denominators are the same, the fraction with the bigger numerator is bigger. 3/8 > 2/8 because 3 pieces is more than 2 pieces when the pieces are the same size. (2) Same Numerator: if the numerators are the same, the fraction with the smaller denominator is bigger. 1/4 > 1/8 because fourths are larger pieces than eighths. Think of it like pizza: one slice of a pizza cut into 4 is bigger than one slice of the same pizza cut into 8!

تطبيق في الحياة الحقيقية / Real-Life Application

At a pizza restaurant in Chicago, you can choose between 3/8 of a pepperoni pizza or 3/8 of a veggie pizza — they are equal! But 3/8 of a pizza is less than 3/4 of a pizza (same numerator, smaller denominator means bigger pieces). In a Gulf bakery, would you rather have 2/6 or 2/3 of a chocolate cake? 2/3 is bigger because thirds are larger pieces than sixths! Understanding fraction comparison helps you make fair choices every day.

Module 16: Understand Equivalent Fractions

الموديول السادس عشر: فهم الكسور المتساوية

Equivalent fractions are different fractions that name the same amount. 1/2 = 2/4 = 3/6 = 4/8. They look different but represent the same quantity! You can see this with fraction strips: if you line up 1/2, 2/4, and 4/8, they are all the same length. You can create equivalent fractions by multiplying (or dividing) both the numerator and denominator by the same number. 1/2 = (1×2)/(2×2) = 2/4. 4/8 = (4÷2)/(8÷2) = 2/4. The key rule: whatever you do to the numerator, you must do the same to the denominator!

Equivalent Fractions كسور متساوية — different fractions that name the same amount

تطبيق في الحياة الحقيقية / Real-Life Application

A recipe in an American cookbook calls for 1/2 cup of milk, but your measuring cup only has fourths marked. You know 1/2 = 2/4, so you measure 2/4 cup! A British builder needs 3/4 of a meter of pipe, but the ruler shows eighths. Since 3/4 = 6/8, he measures to the 6/8 mark. In Kuwait, a tailor needs 1/3 yard of fabric, but the pattern shows sixths: 1/3 = 2/6. Equivalent fractions let you work with the tools and measurements you have available!

نقطة مهمة / Key Point

You must multiply or divide BOTH the numerator and denominator by the SAME number. If you change only one, the fraction changes! 1/2 ≠ 2/2 (wrong! you changed only the numerator). 1/2 = 2/4 (correct! both were multiplied by 2). This is the Golden Rule of equivalent fractions!

Unit 5: Measurement and Data

الوحدة الخامسة: القياس والبيانات

Module 17: Liquid Volume and Mass

الموديول السابع عشر: الحجم السائل والكتلة

Liquid volume is the amount of space a liquid takes up. We measure it in liters (L). A liter is about the size of a large bottle of water. A small juice box might hold about 200 milliliters, and a bathtub might hold about 150 liters. You can estimate liquid volume by thinking about familiar containers. Mass is the amount of matter in an object. We measure it in grams (g) and kilograms (kg). A paper clip has a mass of about 1 gram. A textbook has a mass of about 1 kilogram. 1 kilogram = 1000 grams.

Liquid Volume الحجم السائل — the amount of space a liquid takes up

Liter (L) لتر — a unit for measuring liquid volume

Mass الكتلة — the amount of matter in an object

Gram (g) غرام — a small unit for measuring mass

Kilogram (kg) كيلوغرام — 1000 grams; a larger unit for mass

تطبيق في الحياة الحقيقية / Real-Life Application

A pharmacist in London must measure exactly 5 milliliters of medicine for a child — too much could be dangerous! A chef in New York adds 2 liters of water to a soup pot. A grocer in Dubai weighs fruit on a scale: 3 kilograms of oranges costs 15 dirhams. An athlete in Boston checks that his gym bag weighs less than 8 kilograms for the flight. Every day, people around the world measure liquid volume and mass to cook, take medicine, shop, and travel!

مثال من الحياة / Everyday Example

A bottle of Coca-Cola in the UAE contains 2 liters. A bag of basmati rice from India weighs 5 kg. A small bottle of Tabasco sauce from the USA holds 60 milliliters. A British jar of Marmite weighs 250 grams. These are all examples of liquid volume and mass measurements you see in stores!

نقطة مهمة / Key Point

Mass is NOT the same as weight! Mass is the amount of matter in an object and stays the same everywhere. Weight depends on gravity and changes on different planets. A 10 kg mass on Earth still has 10 kg of mass on the Moon, but it weighs less because the Moon has less gravity. In everyday life, we use the words interchangeably, but scientists make this distinction!

Module 18: Represent and Interpret Data

الموديول الثامن عشر: تمثيل البيانات وتفسيرها

In Grade 2, you learned about picture graphs and bar graphs. Now in Grade 3, you learn about scaled picture graphs (where each picture represents more than 1), scaled bar graphs, and line plots. A scaled picture graph might use a key where each symbol = 5 votes. A bar graph might have a scale that counts by 10s. A line plot shows data on a number line, using X marks above each value. These tools help you organize, display, and analyze data to make decisions.

Picture Graph رسم بياني صوري — a graph using pictures/symbols to show data

Bar Graph رسم بياني عمودي — a graph using bars of different lengths

Scale مقياس — the numbers on a graph that show quantity

Line Plot رسم بياني خطي — a graph showing data on a number line with X marks

Reading and Making Graphs

When reading a graph, always check the title, labels, and scale/key first. A picture graph of favorite sports might show: Basketball = 4 symbols, Soccer = 6 symbols, Swimming = 3 symbols. If the key says each symbol = 5 students, then: Basketball = 20 students, Soccer = 30 students, Swimming = 15 students. A bar graph makes comparison easy: the tallest bar shows the most popular. A line plot is perfect for showing measurements: if students measure pencils, the X marks above each length show how many pencils are that length.

Solving Problems with Data

Graphs help you answer questions: 'How many more students prefer soccer than swimming?' = 30 - 15 = 15 more. 'How many students were surveyed in total?' = 20 + 30 + 15 = 65. Some problems need two steps: 'If 5 more students join the swimming group, how many would that be?' = 15 + 5 = 20. Would swimming still be the least popular? Yes, because basketball would still have 20 (tied) and soccer would have 30 (most). Data interpretation is critical in every field!

تطبيق في الحياة الحقيقية / Real-Life Application

A school principal in Edinburgh uses bar graphs to see which after-school clubs are most popular. A hospital in Abu Dhabi uses line plots to track patient temperatures over time. A supermarket in London uses picture graphs to show which products sell best. A weather station in Dubai uses line plots to display daily temperatures. Every business, government, and organization uses data graphs to make informed decisions! Without data skills, you cannot understand charts in news reports, medical reports, or financial statements.

Unit 6: Geometry

الوحدة السادسة: الهندسة

Module 19: Define Two-Dimensional Shapes

الموديول التاسع عشر: تعريف الأشكال المسطحة

Two-dimensional (2D) shapes are flat shapes that have length and width but no thickness. They are also called plane shapes. Every 2D shape has attributes (properties) that describe it: the number of sides, the number of angles (corners), whether the sides are equal in length, and whether any sides are parallel. A polygon is a closed shape made of straight line segments. Shapes that are not closed or have curved lines are NOT polygons. A circle is NOT a polygon because it has no straight sides!

Polygon مضلع — a closed shape with straight sides

Angle زاوية — the corner where two sides meet

Side ضلع — a straight line segment of a shape

Vertex رأس — a corner point of a shape (plural: vertices)

Right Angle زاوية قائمة — a 90-degree corner, like the corner of a square

Parallel Lines خطوط متوازية — lines that never cross, always the same distance apart

Closed Shape شكل مغلق — a shape with no openings

Open Shape شكل مفتوح — a shape with a gap or opening

Describing Angles

Angles come in different sizes. A right angle is a perfect corner, like the corner of a book or a square tile. It measures exactly 90 degrees. An angle smaller than a right angle is called an acute angle (think: 'a cute little angle'). An angle larger than a right angle is called an obtuse angle (think: 'obese' or large). You can check if an angle is a right angle by placing the corner of a piece of paper in the angle — if it fits perfectly, it is a right angle!

Quadrilaterals

A quadrilateral is any polygon with 4 sides. There are many types: (1) Parallelogram: opposite sides are parallel and equal in length. (2) Rectangle: a parallelogram with 4 right angles. (3) Square: a rectangle with all sides equal in length (it is both a rectangle and a rhombus!). (4) Rhombus: a parallelogram with all sides equal in length. (5) Trapezoid: a quadrilateral with exactly 1 pair of parallel sides. Every square IS a rectangle, every rectangle IS a parallelogram, and every parallelogram IS a quadrilateral!

Quadrilateral رباعي الأضلاع — any polygon with 4 sides

Parallelogram متوازي الأضلاع — opposite sides parallel and equal

Rectangle مستطيل — a parallelogram with 4 right angles

Square مربع — a rectangle with all sides equal

Rhombus معين — a parallelogram with all sides equal

Trapezoid شبه منحرف — exactly 1 pair of parallel sides

تطبيق في الحياة الحقيقية / Real-Life Application

A jewelry designer in London uses geometric shapes to create patterns: diamonds are rhombuses, picture frames are rectangles, and tiles are squares. An architect in Dubai designs buildings with specific shapes: rectangular windows, square tiles, and trapezoidal supports. A game designer in Tokyo creates 2D character shapes using polygons. Understanding shape attributes is essential in art, architecture, engineering, and design! Every building, every product, and every digital image starts with geometric shapes.

نقطة مهمة / Key Point

A square IS a rectangle! Many people think squares and rectangles are different, but a square has all the properties of a rectangle (4 right angles, opposite sides parallel and equal) PLUS the extra property that all sides are equal. So a square is a special kind of rectangle, just like a rectangle is a special kind of parallelogram.

Module 20: Categorize Two-Dimensional Shapes

الموديول العشرون: تصنيف الأشكال المسطحة

Categorizing shapes means grouping them based on their attributes. Shapes that share attributes belong to the same category. For example, all quadrilaterals have 4 sides. Within quadrilaterals, some have right angles (rectangles, squares) and some do not (some parallelograms, some trapezoids). Some have all sides equal (squares, rhombuses) and some do not. A shape can belong to multiple categories at once! A square is a quadrilateral, a parallelogram, a rectangle, and a rhombus all at the same time. This is called a hierarchy of shapes.

Drawing Quadrilaterals

You can draw quadrilaterals that belong to specific categories. To draw a rectangle that is NOT a square: make the length different from the width (like 4 cm long and 3 cm wide). To draw a parallelogram that is NOT a rectangle: make the angles NOT 90 degrees (tilt the sides). To draw a rhombus that is NOT a square: make all sides equal but the angles NOT 90 degrees (like a diamond shape). Each shape must have ALL the attributes of its category!

Categorizing Plane Shapes

To categorize any plane shape, check its attributes: How many sides? How many angles? Are any sides parallel? Are any sides equal in length? Are there right angles? Then classify it. A triangle has 3 sides. A pentagon has 5 sides. A hexagon has 6 sides. Within triangles, there are also categories: right triangles (have 1 right angle), equilateral triangles (all sides equal), and isosceles triangles (2 sides equal). Categorization helps us understand and communicate about shapes precisely.

تطبيق في الحياة الحقيقية / Real-Life Application

A fashion designer in Milan uses shape categories to create clothing patterns: A-line skirts are trapezoids, collars might be parallelograms, and pockets are rectangles. A park designer in Chicago categorizes spaces: rectangular basketball courts, circular fountains, and hexagonal gazebos. A computer graphics artist in Dubai uses shape categories to create 3D models from 2D shapes. Understanding shape categories lets professionals communicate precisely about design and construction, avoiding costly mistakes!

لماذا نتعلم الهندسة؟ / Why Learn Geometry?

Geometry is the mathematics of shapes and space. Every object you see has a shape! Architects use geometry to design buildings. Engineers use geometry to build bridges. Artists use geometry to create beautiful patterns. Doctors use geometry to read X-rays and MRI scans. navigators use geometry to find the shortest route. Even your phone screen is a rectangle made up of tiny squares (pixels)! Without geometry, we could not build anything, design anything, or navigate anywhere. It is one of the oldest and most practical branches of mathematics!