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# India

**Skills available for India class VII maths curriculum**

Objectives are in black and IXL maths skills are in dark green. Hold your mouse over the name of a skill to view a sample question. Click on the name of a skill to practise that skill.

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## 7.NS Number System

**7.NS.i Knowing our Numbers: Integers**

**7.NS.i.1 Multiplication and division of integers (through patterns). Division by zero is meaningless**

Integer multiplication and division rules (VII-C.6)

Multiply and divide integers (VII-C.7)

Complete multiplication and division sentences with integers (VII-C.8)

**7.NS.i.2 Properties of integers (including identities for addition & multiplication, commutative, associative, distributive) (through patterns). These would include examples from whole numbers as well. Involve expressing commutative and associative properties in a general form. Construction of counterexamples, including some by children. Counter examples like subtraction is not commutative.**

Properties of addition and multiplication (VII-P.9)

**7.NS.i.3 Word problems including integers (all operations)**

Add and subtract integers: word problems (VII-C.5)

**7.NS.ii Fractions and rational numbers:**

**7.NS.ii.1 Multiplication of fractions**

Multiply fractions and whole numbers (VII-G.7)

Multiply fractions (VII-G.9)

Multiply mixed numbers (VII-G.10)

**7.NS.ii.2 Fraction as an operator**

Multiply fractions and mixed numbers: word problems (VII-G.11)

**7.NS.ii.3 Reciprocal of a fraction**

Multiplicative inverses (VII-A.3)

**7.NS.ii.4 Division of fractions**

Divide fractions (VII-G.13)

Divide mixed numbers (VII-G.14)

**7.NS.ii.5 Word problems involving mixed fractions**

Fractions: word problems with graphs and tables (VII-F.4)

Compare fractions: word problems (VII-F.7)

Add and subtract mixed numbers (VII-G.3)

Multiply fractions and mixed numbers: word problems (VII-G.11)

Divide fractions and mixed numbers: word problems (VII-G.15)

Add, subtract, multiply and divide fractions and mixed numbers: word problems (VII-G.17)

**7.NS.ii.6 Introduction to rational numbers (with representation on number line)**

Equivalent fractions (VII-F.2)

Write fractions in lowest terms (VII-F.3)

Lowest common denominator (VII-F.5)

Compare and order fractions (VII-F.6)

Convert between mixed numbers and improper fractions (VII-F.8)

Compare mixed numbers and improper fractions (VII-F.9)

Identify rational numbers (VII-H.1)

Compare rational numbers (VII-H.3)

Put rational numbers in order (VII-H.4)

**7.NS.ii.7 Operations on rational numbers (all operations)**

Add and subtract rational numbers (VII-H.5)

Multiply and divide rational numbers (VII-H.7)

**7.NS.ii.8 Representation of rational number as a decimal.**

Convert between decimals and fractions or mixed numbers (VII-H.2)

**7.NS.ii.9 Word problems on rational numbers (all operations)**

Add, subtract, multiply and divide fractions and mixed numbers: word problems (VII-G.17)

**7.NS.ii.10 Multiplication and division of decimal fractions**

Multiply decimals (VII-E.3)

Multiply decimals and whole numbers: word problems (VII-E.4)

Divide decimals (VII-E.5)

Divide decimals by whole numbers: word problems (VII-E.6)

**7.NS.ii.11 Conversion of units (length & mass)**

Compare and convert metric units (VII-N.2)

Metric mixed units (VII-N.3)

Convert square and cubic units of length (VII-N.4)

Convert between cubic metres and litres (VII-N.5)

**7.NS.ii.12 Word problems (including all operations)**

Add and subtract decimals: word problems (VII-E.2)

Multiply decimals and whole numbers: word problems (VII-E.4)

Divide decimals by whole numbers: word problems (VII-E.6)

Add, subtract, multiply and divide decimals: word problems (VII-E.8)

Multiply fractions and mixed numbers: word problems (VII-G.11)

Divide fractions and mixed numbers: word problems (VII-G.15)

Add, subtract, multiply and divide fractions and mixed numbers: word problems (VII-G.17)

**7.NS.iii Powers:**

**7.NS.iii.1 Exponents only natural numbers.**

Understanding exponents (VII-I.1)

Evaluate exponents (VII-I.2)

Solve equations with variable exponents (VII-I.3)

**7.NS.iii.2 Laws of exponents (through observing patterns to arrive at generalisation.)**

**7.NS.iii.2.i a to the m power x $a^n$ = a to the m+n power**

Multiplication with exponents (VIII-F.8)

**7.NS.iii.2.ii (a to the m power)$^n$ = a to the mn power**

Power rule (VIII-F.11)

**7.NS.iii.2.iii a to the m power/$a^n$ = a to the m−n power, where m−n $\in$?**

Division with exponents (VIII-F.9)

Multiplication and division with exponents (VIII-F.10)

Evaluate expressions using properties of exponents (VIII-F.12)

# 7.A Algebra

**7.A.A Algebraic Expressions**

**7.A.A.1 Generate algebraic expressions (simple) involving one or two variables**

Write variable expressions for arithmetic sequences (VII-O.7)

Write variable expressions (VII-P.1)

Write variable expressions: word problems (VII-P.2)

**7.A.A.2 Identifying constants, coefficient, powers**

Identify terms and coefficients (VII-P.7)

**7.A.A.3 Like and unlike terms, degree of expressions e.g., $x^2y$ etc. (exponent ≤ 3, number of variables)**

Add and subtract like terms (VII-P.13)

**7.A.A.4 Addition, subtraction of algebraic expressions (coefficients should be integers).**

Add and subtract like terms (VII-P.13)

**7.A.A.5 Simple linear equations in one variable (in contextual problems) with two operations (avoid complicated coefficients)**

Solve equations using properties (VII-P.11)

Write an equation from words (VII-Q.2)

Write and solve equations that represent diagrams (VII-Q.4)

Solve one-step equations (VII-Q.5)

Solve two-step equations (VII-Q.6)

Solve equations: word problems (VII-Q.7)

Solve equations involving like terms (VII-Q.8)

Solve equations: complete the solution (VII-Q.9)

# 7.RP Ratio and Proportion

**7.RP.1 Ratio and proportion (revision)**

Understanding ratios (VII-J.1)

Identify equivalent ratios (VII-J.2)

Write an equivalent ratio (VII-J.3)

Equivalent ratios: word problems (VII-J.4)

Compare ratios: word problems (VII-J.6)

Do the ratios form a proportion? (VII-J.8)

Do the ratios form a proportion: word problems (VII-J.9)

Solve proportions (VII-J.10)

Solve proportions: word problems (VII-J.11)

Estimate population size using proportions (VII-J.12)

### 7.RP.2 Unitary method continued, consolidation, general expression.

Unit rates (VII-J.5)

Unit prices (VII-L.3)

Unit prices: find the total price (VII-L.4)

### 7.RP.3 Percentage - an introduction.

What percentage is illustrated? (VII-K.1)

### 7.RP.4 Understanding percentage as a fraction with denominator 100

Estimate percents of numbers (VII-K.4)

Solve percent equations (VII-K.7)

Solve percent equations: word problems (VII-K.8)

### 7.RP.5 Converting fractions and decimals into percentage and vice-versa.

Convert between percents, fractions and decimals (VII-K.2)

Compare percents to fractions and decimals (VII-K.3)

### 7.RP.6 Application to profit and loss (single transaction only)

Percents of numbers and money amounts (VII-K.5)

Percents of numbers: word problems (VII-K.6)

Price lists (VII-L.2)

Percent of a number, discount and more (VII-L.5)

Find the percent: discount and mark-up (VII-L.6)

Sale prices: find the original price (VII-L.7)

Multi-step problems with percents (VII-L.8)

### 7.RP.7 Application to simple interest (time period in complete years).

Simple interest (VII-L.10)

## 7.G Geometry

### 7.G.i Understanding shapes:

#### 7.G.i.1 Pairs of angles (linear, supplementary, complementary, adjacent, vertically opposite) (verification and simple proof of vertically opposite angles)

Name, measure and classify angles (VII-R.2)

Identify complementary, supplementary, vertical, adjacent and congruent angles (VII-R.13)

Find measures of complementary, supplementary, vertical and adjacent angles (VII-R.14)

#### 7.G.i.2 Properties of parallel lines with transversal (alternate, corresponding, interior, exterior angles)

Transversal of parallel lines (VII-R.15)

### 7.G.ii Properties of triangles:

#### 7.G.ii.1 Angle sum property (with notions of proof & verification through paper folding, proofs using property of parallel lines, difference between proof and verification.)

Triangle angle-sum property (VII-R.7)

#### 7.G.ii.2 Exterior angle property

Exterior angle property (VII-R.8)

**7.G.ii.3 Sum of two sides of a it's third side**

**7.G.ii.4 Pythagoras Theorem (Verification only)**

Converse of Pythagoras' theorem: is it a right triangle? (VII-U.4)

## 7.G.iii Symmetry

**7.G.iii.1 Recalling reflection symmetry**

Symmetry (VII-R.18)

**7.G.iii.2 Idea of rotational symmetry, observations of rotational symmetry of 2-D objects. (900, 1200, 1800)**

Rotational symmetry (VI-T.2)

**7.G.iii.3 Operation of rotation through 900 and 1800 of simple figures.**

**7.G.iii.4 Examples of figures with both rotation and reflection symmetry (both operations)**

**7.G.iii.5 Examples of figures that have reflection and rotation symmetry and vice-versa**

## 7.G.iv Representing 3-D in 2-D:

**7.G.iv.1 Drawing 3-D figures in 2-D showing hidden faces.**

Nets of three-dimensional figures (VII-V.2)

**7.G.iv.2 Identification and counting of vertices, edges, faces, nets (for cubes cuboids, and cylinders, cones).**

Count vertices, edges and faces (VI-V.2)

**7.G.iv.3 Matching pictures with objects (Identifying names)**

Bases of three-dimensional figures (VII-V.1)

**7.G.iv.4 Mapping the space around approximately through visual estimation.**

Front, side and top view (VII-V.3)

## 7.G.v Congruence

**7.G.v.1 Congruence through superposition (examples-blades, stamps, etc.)**

**7.G.v.2 Extend congruence to simple geometrical shapes e.g. triangles, circles.**

Side lengths and angle measures of congruent figures (VII-S.2)

Congruence statements and corresponding parts (VII-S.3)

**7.G.v.3 Criteria of congruence (by verification) SSS, SAS, ASA, RHS**

Congruent triangles: SSS, SAS and ASA (VIII-P.4)

## 7.G.vi Construction (Using scale, protractor, compass)

**7.G.vi.1 Construction of a line parallel to a given line from a point outside it. (Simple proof as remark with the reasoning of alternate angles)**

Construct parallel lines (VII-T.4)

**7.G.vi.2 Construction of simple triangles. Like given three sides, given a side and two angles on it, given two sides and the angle between them.**

# 7.MEN Mensuration

**7.MEN.1 Revision of perimeter, Idea of, Circumference of Circle**

Perimeter (VII-W.1)

Area and perimeter: word problems (VII-W.4)

Circles: calculate area, circumference, radius and diameter (VII-W.5)

**7.MEN. Area**

**7.MEN.1 Concept of measurement using a basic unit area of a square, rectangle, triangle, parallelogram and circle, area between two rectangles and two concentric circles. Data**

Area of rectangles and parallelograms (VII-W.2)

Area of triangles (VII-W.3)

Circles: calculate area, circumference, radius and diameter (VII-W.5)

Semicircles: calculate area, perimeter, radius and diameter (VII-W.7)

Quarter circles: calculate area, perimeter and radius (VII-W.8)

Area of compound figures with triangles, semicircles and quarter circles (VII-W.9)

Area between two shapes (VII-W.10)

# 7.DH Data handling

**7.DH.i Collection and organisation of data – choosing the data to collect for a hypothesis testing.**

Interpret tables (VII-X.1)

Interpret line plots (VII-X.2)

Create line plots (VII-X.3)

Interpret stem-and-leaf plots (VII-X.4)

Interpret bar graphs (VII-X.5)

Create bar graphs (VII-X.6)

Interpret histograms (VII-X.7)

Create histograms (VII-X.8)

Create frequency charts (VII-X.9)

Interpret line graphs (VII-X.10)

Create line graphs (VII-X.11)

**7.DH.ii Mean, median and mode of ungrouped data – understanding what they represent.**

Calculate mean, median, mode and range (VII-Y.1)

Interpret charts to find mean, median, mode and range (VII-Y.2)

**7.DH.iii Constructing bargraphs**

Create bar graphs (VII-X.6)

**7.DH.iv Feel of probability using data through experiments. Notion of chance in events like tossing coins, dice etc. Tabulating and counting occurrences of 1 through 6 in a number of throws. Comparing the observation with that for a coin. Observing strings of throws, notion of randomness.**

Probability of simple events (VII-Z.1)

Experimental probability (VII-Z.3)

Make predictions (VII-Z.4)