

High School Mathematics Elements

This is the entry-level course in mathematics for students who need to upgrade their arithmetic skills. Topics will include review of fractions, metric and customary measurement, ratio and proportion, graphs and tables, percents, basic statistics and probability, and an introduction to geometry, including exponents, area and volume. There will be opportunities for learning and applying problem solving, thinking, and reasoning skills.

Learning opportunities

Students will use various learning tools throughout the year, including, but not limited to: group work, note making from lecture, math labs, portfolio problems, and use of technology (calculators, geometry tools, etc.)

Standards

Fields of Knowledge: Science, Math, and Technology

Mathematical Understanding:

7.6 Arithmetic, Number, and Operation Concepts: Students understand arithmetic in computation, and they select and use, in appropriate situations, mental arithmetic, pencil and paper, calculator, and computer. (aa, bb,f,g,h)

7.7 Geometric and Measurement Concepts: Students use geometric and measurement concepts.

7.9 Statistic and Probability Concepts: Students use statistics and probability concepts. (aa-cc, e)

Mathematical Problem Solving and Reasoning

7.10 Applications: Students use concrete, formal, and informal strategies to solve mathematical problems, apply the process of mathematical modeling and extend and generalize mathematical concepts. Students apply mathematics as they solve scientific and technological problems or work with technological systems. (bb)

June 2004

Content Knowledge and Skills

Semester 1: adding, subtracting, multiplying, and dividing fractions.
Metric and customary measurements, basic statistics and graphing,
ratio/proportions and percents.

Semester 2: basic probability, basic geometry, including geometric figures,
compass and straightedge, blueprints. Square roots and exponents,
perimeter and area of polygons, surface area and volume of solids; negative
integers, and introduction to pre-Algebra.

Assessment criteria

In fractions review students will be able to:
find common denominators
reduce fractions to lowest terms
understand reciprocals
turn improper fractions into mixed numbers and vice versa
add, subtract, multiply, and divide
and recognize real world applications.

In units of measurement students will be able to:
read a ruler to the nearest 16^{th} of an inch and to the nearest millimeter;
convert all units of customary length ;
convert all units of customary weight;
convert all units of customary capacity ;
convert customary units of length into metric units and vice versa ;
convert customary units of weight into metric units and vice versa;
calculate elapsed time;
convert Fahrenheit to Celsius and vice versa using tables and formulas;
and recognize real world applications.

In graphing students will be able to:
understand the difference between a line, bar, and circle graph;
define and locate the horizontal and vertical axes on a graph;
create a legend or key;
plot points on a coordinate system;
apply proper intervals such that all information uniformly fits on a graph;
and recognize real world applications.

June 2004

In statistics students will be able to:
define and calculate the mean, median, mode, and range of a set of numbers;
graphically represent data gathered from a poll;
and recognize real world applications.

In ratios and proportion students will be able to:
write a ratio in three different ways;
define proportion and determine by cross multiplication if proportions are equal;
find the better buy of a series of products by calculating unit prices;
create scale drawings, and introduce the concept of housing blueprints;
use similar figures to find the missing lengths of a polygon;
and recognize real world applications.

In percents, students will be able to:
turn fraction and decimals into percents and vice versa;
find the percents of a number;
find what percent one number is of another;
find a number when a percent of it is known;
find the percent of increase or decrease of a pair of numbers;
find sales tax, sale price, and restaurant tips, etc;
and recognize real world applications.

In probability students will be able to:
define probability and odds as well as relate the two;
identify the difference between experimental and theoretical probability;
identify the difference between independent and dependent events;
compute single event probability;
construct tree diagrams and use the counting principle;
and recognize real world applications

In angles students will be able to:
identify rays, segments, and lines;
identify parallel, intersection, and perpendicular lines;
identify acute, right, obtuse, and straight angles;
define supplemental and complementary angles;
find and construct an angle using a protractor;
identify angles knowing two parallel lines and a transversal;
and recognize real world applications.

June 2004

In two-dimensional geometry students will be able to:
identify all regular polygons of sides 3, 4, 5, 6, 8, 10, and 12 by name;
define and calculate the perimeter of polygons;
define and calculate the area of triangles, trapezoids, and parallelograms;
discover π through experimentation;
calculate the circumference and the area of a circle;
measure the perimeter and area of objects by using measuring tools;
and recognize real work applications

In three dimensional geometry students will be able to :
identify cubes, pyramids, prisms, cones, cylinders, and spheres;
define and calculate the surface area and volume by experimentation;
and recognize real world applications.

In introduction to algebra students will be able to:
define variable, expression, and equation;
perform the four basic arithmetic functions with positive and negative integers;
solve one and two step equations;
plot points on an xy coordinate plane;
and recognize real world applications

Resources

Globe Fearon Mathematics, 2000