

MATHEMATICS CURRICULUM GUIDELINES

GRADE LEVEL SUBJECT AREA EXPECTATIONS DIOCESE OF FRESNO KINDERGARTEN

EXPECTATIONS FOR RELIGIOUS INTEGRATION AND ARTICULATION

- _____ A. God is the source of all that is – even numbers.
- _____ B. Noah counted by twos to save the animals.
- _____ C. Through the symmetry, precision, and pattern of numbers, students become aware of God’s presence in creation.
- _____ D. Note the significance and symbolism of numbers in the study of sacred Scripture.

ACADEMIC GRADE LEVEL SUBJECT AREA EXPECTATIONS

NUMBER SENSE

There is a distinct relationship between numbers and quantities (i.e., that a set of objects has the same number of objects in different situations, regardless of its position of arrangement).

- | I | R | M | |
|-------|-------|-------|--|
| _____ | _____ | _____ | Count, recognize, represent, name, and order numbers to 30 using objects (e.g., calendar and number line). |
| _____ | _____ | _____ | Compare two or more sets, (up to 10 objects in each group) and identify which set is equal to more than, or less than the other. |
| _____ | _____ | _____ | Know that the larger numbers describe sets with more objects in them than smaller numbers. |
| _____ | _____ | _____ | Write numbers 0-30 in relation to a given set of objects. |
| _____ | _____ | _____ | Identify ordinal numbers to fifth. |

Math begins with simple addition and subtraction using concrete objects to determine the answers to addition and subtraction problems (for two numbers each less than 10).

- | I | R | M | |
|-------|-------|-------|---|
| _____ | _____ | _____ | Recognize when an estimate is reasonable (e.g., using a small jar containing 30 jellybeans, students would guess between 5 and 40). |
| _____ | _____ | _____ | Use manipulatives to solve problems. |
| _____ | _____ | _____ | Identify more than, less than. |
| _____ | _____ | _____ | Count by 1’s, 5’s, and 10’s to 100. |
| _____ | _____ | _____ | Identify language of addition, (plus, how many in all) and language of subtraction, (minus, how many are left). |
| _____ | _____ | _____ | Solve addition and subtraction problems with one digit. |
| _____ | _____ | _____ | Use estimation and problem solving with numbers. |

_____ Explore concepts of whole numbers.

ALGEBRA AND FUNCTIONS

At this age, algebra functions are limited to sorting and classifying.

I	R	M	
_____	_____	_____	Identify, sort, and classify objects by attribute and identify objects that do not belong to a particular grouping (e.g., some tiles are green, some are red).
_____	_____	_____	Introduce the meaning of the symbols +, -, and =.

MEASUREMENT AND GEOMETRY

Time has units to measure it; and objects have properties, such as length, weight, and capacity, and by referring to those properties comparisons can be made.

I	R	M	
_____	_____	_____	Compare the length, weight, and capacity of objects by making direct comparisons with reference objects (e.g., shorter/longer, shorter/taller, lighter/heavier, which holds more).
_____	_____	_____	Locate, describe, and arrange objects in space in terms of proximity, position, and direction (e.g., top/bottom, above/below, right/left).
_____	_____	_____	Demonstrate an understanding of concepts of time (e.g., morning, afternoon, evening, day, yesterday, tomorrow, week, year) including tools that measure time (e.g., analog and digital clock, calendar).
_____	_____	_____	Identify the time of everyday events (e.g., breakfast, lunchtime, and bedtime).
_____	_____	_____	Name the days of the week.
_____	_____	_____	Name the months of the year.
_____	_____	_____	Identify and know value of penny, nickel, and dime.
_____	_____	_____	Recognize and write symbol for cents.
_____	_____	_____	Tell time to the hour.

Common objects in the environment whose geometric features can be described.

I	R	M	
_____	_____	_____	Identify and describe common geometric objects (e.g., circle, triangles, square, rectangle, cube, sphere, and cone).
_____	_____	_____	Compare familiar plane and solid objects by common attributes (e.g., position, shape, size, roundness, number of corners).

STATISTICS, DATA ANALYSIS AND PROBABILITY

The environment holds a world of objects about which information can be collected.

I	R	M	
_____	_____	_____	Collect data and record the results using objects, pictures, and picture graphs (e.g., bar graph).
_____	_____	_____	Identify, describe, and extend simple patterns involving shape, size, or color (e.g., circle or triangles).

MATHEMATICAL REASONING

Manipulatives can be used to help make decisions about setting up problems.

I	R	M	
_____	_____	_____	Determine the approach, materials, and strategies to be used.
_____	_____	_____	Use tools and strategies, such as manipulatives or sketches, to model problems.

Problems are solved in reasonable ways with justification.

I	R	M	
_____	_____	_____	Explain the reasoning used with concrete objects and/or pictorial representations.
_____	_____	_____	Make precise calculations and check the validity of the results in the context of the problem.

GRADE LEVEL SUBJECT AREA EXPECTATIONS
DIOCESE OF FRESNO
FIRST GRADE

EXPECATIONS FOR RELIGIOUS INTEGRATION AND ARTICULATION

- _____ A. God created the earth with plants, and animals, people, birds, and rocks of many kinds.
- _____ B. God made the seasons (4), day and night (2), and oceans (5).
- _____ C. We look to the heavens and sea stars without number.
- _____ D. Through the symmetry, precision, and pattern of numbers, students become aware of God’s presence in creation.
- _____ E. Note the significance and symbolism of numbers in the study of sacred Scripture.

ACADEMIC GRADE LEVEL SUBJECT AREA EXPECTATIONS

NUMBER SENSE

Use of a number line and counting contribute to understanding the number system.

I	R	M	
_____	_____	_____	Count, read, and write whole numbers to 100.
_____	_____	_____	Recognize ordinal numbers to 10 (e.g. first, second...)
_____	_____	_____	Read number words zero to twelve.
_____	_____	_____	Find numbers 1-100 on a number line.
_____	_____	_____	Compare and order whole numbers to 100 using symbols for less than, equal to, or greater than (e.g., <, =, >).
_____	_____	_____	Represent equivalent forms of the same number through the use of physical models, diagrams, and number expressions (to 20).
_____	_____	_____	Count and group objects into ones and tens.
_____	_____	_____	Represent a number from 1 to 100 using tally marks.
_____	_____	_____	Identify and recognize the value of coins and show different combinations of coins that equal the same value.
_____	_____	_____	Solve problems using pennies, nickels and dimes.
_____	_____	_____	Write decimal notation and cent symbol for money.
_____	_____	_____	Recognize and name unit fractions up to $\frac{1}{4}$.

The operations of addition and subtraction are used to solve problems.

I	R	M	
_____	_____	_____	Explore, calculate, and memorize addition facts (sums to 18) and corresponding subtraction facts.
_____	_____	_____	Calculate simple addition and subtraction using mental math.

_____	_____	_____	Use the inverse relation ship between addition and subtraction to solve problems (e.g., $3+2$, $2+3$).
_____	_____	_____	Identify one more than, one less than, ten more than, ten less than a given number.
_____	_____	_____	Count by 1's 2's 5's and 10's.

I	R	M	
_____	_____	_____	Identify the language of addition (plus, how many in all) and the language of subtraction (minus, how many left).
_____	_____	_____	Solve addition and subtraction problems with one-digit and two-digit numbers without regrouping (trading).
_____	_____	_____	Find the sum of three one-digit numbers up to 18.

Estimation and problem solving involve numbers that use the ones, tens, and hundreds places that are necessary when comparing larger or smaller numbers.

I	R	M	
_____	_____	_____	Make reasonable estimates when comparing larger and smaller numbers.

Fractions can refer to parts of a set and parts of a whole.

I	R	M	
_____	_____	_____	Recognize, name, and compare unit fractions up to $\frac{1}{4}$.
_____	_____	_____	Recognize fractions of a whole and parts of a group.
_____	_____	_____	Recognize when all fractional parts are included.

Money problems are solved by adding and subtracting coins.

I	R	M	
_____	_____	_____	Solve problems using combinations of coins.
_____	_____	_____	Write cent symbol for money.

ALGEBRA AND FUNCTIONS

Direct comparison and non-standard units can be used to describe the measurements of objects.

I	R	M	
_____	_____	_____	Write and solve number sentences from problem solving situations that express relationships involving addition and subtraction.
_____	_____	_____	Understand the meaning of the symbols $+$, $-$, $=$, $<$, $>$.
_____	_____	_____	Create problem solving situations that lead to writing number sentences involving addition and subtraction.
_____	_____	_____	Introduce missing variables involving fact families.
_____	_____	_____	Solve addition and subtraction problems using data from charts

pictographs and number sentences.

MEASUREMENT AND GEOMETRY

Direct comparison and non-standard units can be used to describe the measurements of objects.

I	R	M	
_____	_____	_____	Compare the length, weight, and volume of two or more objects using direct comparison or non-standard unit (paper clip, cube).
_____	_____	_____	Measure to the inch and centimeter.
_____	_____	_____	Tell time to the hour and half-hour on an analog clock and digital clock, and compare time related to events (before/after, shorter/longer).
_____	_____	_____	Name the months of the year in sequence.

Geometric figures are classified by common attributes and described by their relative position or location in space.

I	R	M	
_____	_____	_____	Identify, describe, and compare triangles, rectangles, squares, and circles, including the faces of three-dimensional objects.
_____	_____	_____	Classify familiar plane and solid objects by common attributes like color, position, shape, size, roundness, number of corners, and explain which attributes are being used for classification.
_____	_____	_____	Locate, describe, and arrange objects in space in terms of proximity, position, and direction (e.g., near, far, below, above, up, down, behind, in front of, next to, left/right).
_____	_____	_____	Give and follow directions about location.

STATISTICS, DATA, ANALYSIS AND PROBABILITY

Simple graphs and charts are designed to organize, represent, and compare data.

I	R	M	
_____	_____	_____	Sort objects by common attributes and describe the categories.
_____	_____	_____	Represent and compare data using pictures, bar graphs, tally charts, and picture graphs (e.g., largest, smallest, most often, least often).
_____	_____	_____	Gather data and answer questions related to graphs.

Sort objects, create, and describe patterns involving numbers, shape, size, rhythm, or color (e.g., ABBA pattern or clap/snap).

I	R	M	
_____	_____	_____	Describe, extend, and explain how to get to the next element in simple repeating patterns.
_____	_____	_____	Recognize, describe, extend and explain how to get to the next item in a linear pattern.

MATHEMATICAL REASONING

Decisions are made about how to set up a problem.

I	R	M	
_____	_____	_____	Decide about an approach (add or subtract), materials, and strategies to use
_____	_____	_____	Use tools such as manipulatives or sketches to model problems

Reasons are given for the process used to solve problems

I	R	M	
_____	_____	_____	Explain the reasoning used and justify the procedure selected.
_____	_____	_____	Make calculations and check the validity of the results from the context of the problem.
_____	_____	_____	Explain the reasoning used with concrete objects and pictorial representations.

GRADE LEVEL SUBJECT AREA EXPECTATIONS
DIOCESE OF FRESNO
SECOND GRADE

EXPECATIONS FOR RELIGIOUS INTEGRATION AND ARTICULATION

- _____ A. God made us with then toes, two eyes, two ears, 32 teeth, and a mind where numbers can live.
- _____ B. When we look at something as common as a book, we see two covers, many pages, and we can count the number of words on a page.
- _____ C. In second grade we are blessed to receive two of the seven sacraments of our Church.
- _____ D. Through the symmetry, precision, and pattern of numbers, students become aware of God’s presence in creation.
- _____ E. Note the significance and symbolism of numbers in the study of sacred Scripture.

ACADEMIC GRADE LEVEL SUBJECT AREA EXPECTATIONS

NUMBER SENSE

There are relationships between numbers, quantities and place value in whole numbers up to 1000.

- | I | R | M | |
|-------|-------|-------|---|
| _____ | _____ | _____ | Count, read, and write whole numbers and identify the place value for each digit. |
| _____ | _____ | _____ | Use words, models, and expanded forms to represent numbers (to 1000). |
| _____ | _____ | _____ | Order and compare whole numbers and use the symbols +,-,=,<,>. |
| _____ | _____ | _____ | Count odd and even numbers, threes, fours, fives, and tens. |

There are ways to estimate, calculate, and solve problems involving addition and subtraction of two-digit numbers with and without regrouping and three-digit numbers without regrouping.

- | I | R | M | |
|-------|-------|-------|---|
| _____ | _____ | _____ | Understand and use the inverse relationship between addition and subtraction to solve problems and check solutions. |
| _____ | _____ | _____ | Find the sum or difference of two whole numbers up to three digits long. |
| _____ | _____ | _____ | Memorize sums to 18 and corresponding subtraction. |
| _____ | _____ | _____ | Use mental math to find the sum and difference of two-digit numbers. |

Multiplication and division are part of simple problem solving.

I	R	M	
_____	_____	_____	Use repeated addition, arrays, and counting by multiples to do multiplication.

I	R	M	
_____	_____	_____	Use repeated subtraction, equal sharing, and forming equal groups with remainders to do division.

_____	_____	_____	Know the multiplication tables of 2's, 5's, and 10's and commit to memory.
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Fractions and decimals may refer to parts of a set and parts of a whole.

I	R	M	
_____	_____	_____	Recognize, name, and compare unit fractions from $\frac{1}{12}$ to $\frac{1}{2}$.

_____	_____	_____	Recognize fractions of a whole and parts of a group.
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_____	_____	_____	Know that when all fractional parts are included, such as four-fourths, the result is equal to the whole and to one.
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Simple problems are solved by representing, adding, and subtracting amounts of money. Estimating and rounding strategies are used in computation and problem solving that involve numbers using ones, tens, and hundreds.

I	R	M	
_____	_____	_____	Solve problems using combinations of coins and bills.

_____	_____	_____	Write the decimal notation and the dollar and cent symbols for money.
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_____	_____	_____	Recognize when an estimate is reasonable.
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ALGEBRA AND FUNCTIONS

Modeling, representing, and interpreting number relationships are employed to create and solve problems involving addition and subtraction.

I	R	M	
_____	_____	_____	Use the commutative and associative rules to simplify mental calculations and check results.

_____	_____	_____	Relate problem situations to number sentences involving addition and subtraction.
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_____	_____	_____	Solve addition and subtraction problems by using data from simple charts, picture graphs, and number sentences.
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_____	_____	_____	Recognize missing variable involving fact family problems.
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MEASUREMENT AND GEOMETRY

Measurement is achieved by identifying a unit of measure, and iterating (repeating) that unit, comparing it to the item to be measured.

I	R	M	
_____	_____	_____	Measuring the length of objects by iterating a nonstandard or standard unit.
I	R	M	
_____	_____	_____	Use different units to measure the same object and predict whether the measure will be greater or smaller when a different unit is used
_____	_____	_____	Measure the length of an object to the nearest inch and/or centimeter.
_____	_____	_____	Read a thermometer to the nearest 10 degrees 2 degrees.
_____	_____	_____	Tell time to the nearest five minutes, half and quarter hour, and know relationships of time(e.g., minutes in an hour, days in a month, weeks in a year).
_____	_____	_____	Determine the duration of intervals of time in hours.

It is necessary to identify and describe the elements that compose common figures on a plane and common objects in space.

I	R	M	
_____	_____	_____	Describe and classify plane and solid geometric shapes according to the number and shape of faces, edges, and vertices.
_____	_____	_____	Construct shapes together and take them apart to form other shapes.

STATISTICS, DATA ANALYSIS AND PROBABILITY

Bar graphs and other representations are the result of numerical data that is recorded, organized, displayed and interpreted.

I	R	M	
_____	_____	_____	Record numerical data in systematic ways, keeping track of what has been counted.
_____	_____	_____	Represent the same data set in more than one way.
_____	_____	_____	Identify features of data sets (range and mode).
_____	_____	_____	Ask and answer simple questions related to data representations.

Patterns exist, grow, and can be described.

I	R	M	
_____	_____	_____	Recognize, describe, and extend patterns and determine a next term in linear patterns.
_____	_____	_____	Solve problems involving simple number patterns.

MATHEMATICAL REASONING

Decisions are made about how to set up a problem.

I	R	M	
_____	_____	_____	Determine the approach, materials, and strategies to be used.
_____	_____	_____	Use tools, such as manipulatives or sketches, to model problems.

Reasoning is involved in the setting up and solving of problems.

I	R	M	
_____	_____	_____	Defend the reasoning used and justify the procedures selected.
_____	_____	_____	Make precise calculations and check the validity of the results in the context of the problem.
_____	_____	_____	Solve problems and verbally explain results.
_____	_____	_____	Identify connections between one problem and another.

GRADE LEVEL SUBJECT AREA EXPECTATIONS
DIOCESE OF FRESNO
THIRD GRADE

EXPECATIONS FOR RELIGIOUS INTEGRATION AND ARTICULATION

- _____ A. God gave us minds that can work with numbers and solve problems.
- _____ B. There are many uses of numbers in the Bible (e.g., 10 commandments, 7 sacraments, chapters and verses of the Bible, 12 apostles, etc.)
- _____ C. Through the symmetry, precision, and pattern of numbers, students become aware of God’s presence in creation.
- _____ D. Note the significance and symbolism of numbers in the study of sacred Scripture.

ACADEMIC GRADE LEVEL SUBJECT AREA EXPECTATIONS

NUMBER SENSE

Whole numbers have place value.

- | I | R | M | |
|-------|-------|-------|--|
| _____ | _____ | _____ | Count, read, and write whole numbers to 99,000. |
| _____ | _____ | _____ | Compare and orders whole numbers 99,000. |
| _____ | _____ | _____ | Identify the place value for each digit in numbers to 99,000. |
| _____ | _____ | _____ | Round off numbers to 99,000 to the nearest ten, hundred, thousand, and ten thousand. |
| _____ | _____ | _____ | Use expanded notation to represent numbers. |

Problems are evaluated then solved using addition, subtraction, multiplication, and division.

- | I | R | M | |
|-------|-------|-------|--|
| _____ | _____ | _____ | Find the sum of difference of two whole numbers between 0 and 10,000. |
| _____ | _____ | _____ | Memorize to automaticity the multiplication table for numbers between 1 and 10. |
| _____ | _____ | _____ | Use the inverse relationship of multiplication and division to compute and check results. |
| _____ | _____ | _____ | Solve simple problems involving multiplication of multi-digit numbers by one digit numbers. |
| _____ | _____ | _____ | Solve division problems in which a multi-digit number is evenly divided by a one-digit number. |
| _____ | _____ | _____ | Understand the special properties of 0 and 1 in multiplication and division. |
| _____ | _____ | _____ | Determine the unit cost when given the total cost and number of |

units.
 _____ Solve problems that require two or more of the skills
 forementioned.

Relationships exist between whole numbers, simple fractions and decimals.

I	R	M	
_____	_____	_____	Compare fractions represented by drawings of concrete materials to show equivalency and add and subtract simple fractions in context.
_____	_____	_____	Add and subtract simple fractions.
_____	_____	_____	Solve problems involving addition, subtraction, multiplication, division of money in decimal notation and multiply and divide money amounts in decimal notation by using whole-number multipliers and divisors.
_____	_____	_____	Know and understand that fractions and decimals are two different representations of the same concept.

ALGEBRA FUNCTIONS

Appropriate symbols, operations, and properties are selected to represent, describe, simplify, and solve simple number relationships.

I	R	M	
_____	_____	_____	Represent relationships of quantities in the form of mathematical expressions, equations, or inequalities.
_____	_____	_____	Solve problems involving numeric equations or inequalities.
_____	_____	_____	Select appropriate operational and relational symbols to make and expression true.
_____	_____	_____	Express simple unit conversions in symbolic form (e.g., ___inches = ___feet x 12).
_____	_____	_____	Recognize and use the commutative and associative properties of multiplication.

Simple functional relationships can be represented.

I	R	M	
_____	_____	_____	Solve simple problems involving a functional relationship between two quantities.
_____	_____	_____	Extend and recognize a linear pattern by its rules (e.g., the number of legs on a given number of horses can be calculated by counting by 4's or by multiplying the number of horses by 4).

MEASUREMENT AND GEOMETRY

Appropriate units and measurement tools are needed to qualify the properties of objects.

I	R	M	
_____	_____	_____	Choose the appropriate tools and units (metric and U.S.) and estimate and measure the length, liquid volume, and weight/mass of given objects
_____	_____	_____	Estimate or determine the area and volume of solid figures by covering them with squares or by counting the number of cubes that would fill them.
_____	_____	_____	Find the perimeter of a polygon with integer sides.
_____	_____	_____	Carry out simple unit conversions within a system of measurement.
_____	_____	_____	Tell time to the minute.

Solid geometric figures are described and compared to show relationships and solve problems.

I	R	M	
_____	_____	_____	Identify, describe, and classify polygons (including pentagons, hexagons, and octagons).
_____	_____	_____	Identify attributes of triangles.
_____	_____	_____	Identify attributes of quadrilaterals.
_____	_____	_____	Identify right angles in geometric figures or in appropriate objects and determine whether other angles are greater or less than a right angle.
_____	_____	_____	Identify, describe, and classify common three-dimensional geometric objects.
_____	_____	_____	Identify common solid objects that are the components needed to make a more complex solid object.
_____	_____	_____	Read a thermometer to the nearest ten degrees, two degrees, and to the nearest degree.

STATISTICS, DATA ANALYSIS, AND PROBABILITY

Probability experiments are conducted by determining the number of possible outcomes and making simple predictions.

I	R	M	
_____	_____	_____	Identify whether common events are certain, likely, unlikely, or impossible.
_____	_____	_____	Record the possible outcomes for a simple event and systematically keep track of the outcomes when the event is repeated many times.
_____	_____	_____	Summarize and display the results of probability experiments in a clear and organized way.

I	R	M	
_____	_____	_____	Use the results of probability experiments to predict future events.
_____	_____	_____	Interpret a pie graph.

MATHEMATICAL REASONING

Decisions are made about how to approach problems.

I	R	M	
_____	_____	_____	Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, sequencing and prioritizing information, and observing patterns.
_____	_____	_____	Determine when and how to break a problem into simpler parts.

Strategies, skills, and concepts are necessary to find solutions to problems.

I	R	M	
_____	_____	_____	Use estimation to verify the reasonableness of calculated results.
_____	_____	_____	Apply strategies and results from simpler problems to move more complex problems.
_____	_____	_____	Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.
_____	_____	_____	Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.
_____	_____	_____	Indicate the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.
_____	_____	_____	Make precise calculations and check the validity of the results from the context of the problem.

Solving a particular problem leads to generalizing in other situations.

I	R	M	
_____	_____	_____	Evaluate the reasonableness of the solution in the context of the original situation.
_____	_____	_____	Note the method of deriving the solution and demonstrate a conceptual understanding of derivations by solving similar problems.
_____	_____	_____	Develop generalizations from the results obtained and apply them in other circumstances.

GRADE LEVEL SUBJECT AREA EXPECTATIONS
DIOCESE OF FRESNO
FOURTH GRADE

EXPECATIONS FOR RELIGIOUS INTEGRATION AND ARTICULATION

- _____ A. In Religion we study the 10 Commandments this year, and Jesus’ two great commandments.
- _____ B. In God’s wisdom, there are 24 hours in a day, 7 days in a week, approximately 30 days in a month, 10 years in a decades, 10 decades in a century, and numbers, clocks, and calendars to keep track.
- _____ C. Through the symmetry, precision, and pattern of numbers, students become aware of God’s presence in creation.
- _____ D. Note the significance and symbolism of numbers in the study of sacred Scripture.
- _____ E. There is moral responsibility to use money rightly.

ACADEMIC GRADE LEVEL SUBJECT AREA EXPECTATIONS

NUMBER SENSE

Relationships exist between whole numbers, decimals, and fractions, and the use of negative numbers begins.

I	R	M	
_____	_____	_____	Read an write whole numbers in the millions.
_____	_____	_____	Order and compare whole numbers and decimals to two decimal places.
_____	_____	_____	Round whole numbers through the millions to the nearest ten, hundred, thousand, ten thousand, or hundred thousand.
_____	_____	_____	Decide when a rounded solution is called for and explain why such a solution may be appropriate.
_____	_____	_____	Explain different interpretations of fractions: parts of a whole, parts of a set, and division of a whole numbers by whole numbers; explain equivalents of fractions.
_____	_____	_____	Write tenths and hundredths in decimal and fraction notation and know the fraction and decimal equivalents for halves and fourths.
_____	_____	_____	Write the fraction represented by drawing of parts of a figure; represent a given fraction by using drawings; relate a fraction to a simple decimal on a number line.
_____	_____	_____	Use concepts of negative numbers as related to temperature.
_____	_____	_____	Identify on a number line the relative position of positive fractions, positive mixed numbers, and positive decimals to two decimal places.

The addition and subtraction of simple decimals is an extension of the understanding of whole numbers.

I	R	M	
_____	_____	_____	Estimate and compare the sum or difference of whole numbers and positive decimals to two places.
_____	_____	_____	Round two-place decimals to one decimal or the nearest whole number and judge the reasonableness of the rounded answer.

The relationship between whole numbers, simple fractions, and decimals is extended.

I	R	M	
_____	_____	_____	Compare fractions represented by drawings or concrete materials to show equivalency, and to add and subtract fractions through twelfths.
_____	_____	_____	Represent mixed numbers as decimals.
_____	_____	_____	Compare and order simple fractions.
_____	_____	_____	Calculate for common denominators.
_____	_____	_____	Add and subtract simple fractions with like and unlike denominators, and solve for the common denominator where needed.
_____	_____	_____	Express fractions in their simplest form.

Problems involving addition, subtraction, multiplication, and division of whole numbers are solved. There are relationships among the operations.

I	R	M	
_____	_____	_____	Demonstrate an understanding of, and the ability to use, standard algorithms for the addition and subtraction of multi-digit numbers.
_____	_____	_____	Demonstrate an understanding of, and the ability to use, standard algorithms for multiplying a multi-digit number by a two-digit number and for dividing a multi-digit number by a one-digit number; use relationships between them to simplify computations and check results
_____	_____	_____	Solve problems involving multiplication of multi-digit numbers by two-digit numbers.
_____	_____	_____	Solve problems involving division of multi-digit number by one-digit and two-digit numbers.
_____	_____	_____	Reinforce multiplication tables through twelve.

Whole numbers can be factored.

I	R	M	
_____	_____	_____	Understand that many whole numbers break down in different ways.

_____ _____ _____ Recognize that numbers such as 2,3,5,7, and 11 do not have any factors except 1 and themselves and that such numbers are called prime numbers.

ALGEBRA AND FUNCTIONS

Variables, mathematical symbols, and properties are used to write and simplify expressions and sentences.

I	R	M	
_____	_____	_____	Use letters, boxes, or other symbols to stand for any number in simple expressions or equations.
_____	_____	_____	Interpret and evaluate mathematical expressions that now use parentheses.
_____	_____	_____	Use and interpret formulas to answer questions about quantities and their relationships.
_____	_____	_____	Use parentheses to indicate which operations to perform first when writing expressions containing more than two terms and different operations.
_____	_____	_____	Understand that an equation such as $y = 3x + 5$ is a prescription for determining a second number when a first number is given.

Equations are manipulated to solve problems.

I	R	M	
_____	_____	_____	Identify that equals added to equals are equal
_____	_____	_____	Identify that equals multiplied by equals are equals.

MEASUREMENT AND GEOMETRY

Geometric shapes are measured using formulas for perimeter and area.

I	R	M	
_____	_____	_____	Measure the areas of rectangular shapes by using appropriate square centimeter, square meter, square kilometer, square inch, square yard, or square mile.
_____	_____	_____	Recognize that rectangles that have the same area can have different perimeters.
_____	_____	_____	Recognize that rectangles that have the same perimeter can have different areas.
_____	_____	_____	Recognize and use formulas to solve problems involving perimeters and areas of rectangles and squares; use those formulas to find the areas of more complex figures by dividing the figures into basic shapes.
_____	_____	_____	Calculate elapsed time.

- _____ Express simple unit conversions in symbolic form.
- _____ Identify U.S. and metric units of liquid volume.

Coordinated grids are used to represent points and graph lines and simple figures.

- | I | R | M | |
|-------|-------|-------|---|
| _____ | _____ | _____ | Plot the points corresponding linear relationships on graph paper. |
| _____ | _____ | _____ | Recognize that the length of a horizontal line segment equals the difference of the x -coordinates. |
| _____ | _____ | _____ | Recognize that the length of a vertical line segment equals the difference of the y -coordinates. |

The knowledge of plane and solid geometric objects is used to show relationship and solve problems.

- | I | R | M | |
|-------|-------|-------|--|
| _____ | _____ | _____ | Identify lines that are parallel and perpendicular. |
| _____ | _____ | _____ | Identify radius and diameter of a circle. |
| _____ | _____ | _____ | Identify congruent figures. |
| _____ | _____ | _____ | Identify figures that have bilateral and rotational symmetry. |
| _____ | _____ | _____ | Define: right angle, acute angle, obtuse angle and know the 90 degrees, 180 degrees, and 360 degrees are associated with $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and full turns. |
| _____ | _____ | _____ | Visualize, describe and make models of geometric solids (prisms, pyramids) in terms of the number and shape of faces, edges, and vertices; interpret two-dimensional representations of three-dimensional objects: and draw patterns (of faces) for a solid that, when cut and folded, will make a model of the shape. |
| _____ | _____ | _____ | Identify and define equilateral, isosceles, and scalene and identify their attributes. |
| _____ | _____ | _____ | Identify and define a rhombus, square, rectangle, parallelogram and trapezoid. |

STATISTICS, DATA ANALYSIS AND PROBABILITY

Numerical and categorical data is organized, represented, and interpreted to communicate findings.

- | I | R | M | |
|-------|-------|-------|--|
| _____ | _____ | _____ | Formulate survey questions; systematically collect and represent data on a number line; and coordinate graphs, tables, and charts. |
| _____ | _____ | _____ | Identify the mode(s) for sets of categorical data and the mode(s), median, and any apparent outliers for numerical data sets. |
| _____ | _____ | _____ | Interpret one- and two-variable data graphs to answer questions about a situation. |

Predictions are made for simple probability situations.

I	R	M	
_____	_____	_____	Represent all possible outcomes for a single probability situation in an organized way.
_____	_____	_____	Express outcomes of experimental probability situations verbally and numerically.

MATHEMATICAL REASONING

Decisions are made about how to approach problems.

I	R	M	
_____	_____	_____	Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, sequencing and prioritizing information, and observing patterns.
_____	_____	_____	Determine when and how to break a problem into simpler parts.

Finding solutions involves the knowledge of concepts, strategies, and skills.

I	R	M	
_____	_____	_____	Use estimation to verify the reasonableness of calculated results.
_____	_____	_____	Apply strategies and results from simpler problems to more complex problems.
_____	_____	_____	Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.
_____	_____	_____	Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.
_____	_____	_____	Indicate the relative advantages if exact and approximate solutions to problems and give answers to a specified degree of accuracy.
_____	_____	_____	Make precise calculations and check the validity of the results from the context of the problem.

Particular problems lead to generalizing in other situations.

I	R	M	
_____	_____	_____	Evaluate the reasonableness of the solution in the context of the original situation.
_____	_____	_____	Note the method of deriving the solution and demonstrate a conceptual understanding of the derivation by solving similar problems.
_____	_____	_____	Develop generalizations of the results obtained and apply them in other circumstances.

GRADE LEVEL SUBJECT AREA EXPECTATIONS
DIOCESE OF FRESNO
FIFTH GRADE

EXPECATIONS FOR RELIGIOUS INTEGRATION AND ARTICULATION

- _____ A. Our wise God so made the universe that temperature changes with the seasons, and during the days and nights.
- _____ B. Since we cannot count everything that God made, God gave us minds that can count and estimate.
- _____ C. Through the symmetry, precision, and pattern of numbers, students become aware of God’s presence in creation.
- _____ D. Note the significance and symbolism of numbers in the study of sacred Scripture.

ACADEMIC GRADE LEVEL SUBJECT AREA EXPECTATIONS

NUMBER SENSE

It is necessary to compute accurately with large and small numbers, decimals and fractions, and to understand the relationship among decimals, fractions, and percents in order to understand the relative magnitude of numbers.

- | I | R | M | |
|-------|-------|-------|--|
| _____ | _____ | _____ | Estimate, round, and manipulate very large and very small numbers. |
| _____ | _____ | _____ | Identify and write whole numbers, decimals, fractions, and mixed numbers on a number line. |
| _____ | _____ | _____ | Interpret percents as part of a hundred; find the decimal and percent equivalents for common fractions and explain why they represent the same value; compute a given percent of a whole number. |
| _____ | _____ | _____ | Understand and compute positive integer powers of nonnegative integers; compute examples as repeated multiplication. |
| _____ | _____ | _____ | Determine the prime factors of all numbers through 50 and write numbers as the product of their prime factors by using exponents to show multiples of a factor. |
| _____ | _____ | _____ | Identify and represent on a number line decimals, fractions, mixed numbers, and positive and negative integers. |

Calculations are performed and problems are solved involving addition, subtraction, and simple multiplication and division of fractions and decimals.

- | I | R | M | |
|-------|-------|-------|---|
| _____ | _____ | _____ | Add, subtract, multiply, and divide with decimals; add with |

_____	_____	_____	negative integers; subtract positive integers from negative integers; and verify the reasonableness of the results.
I	R	M	Demonstrate proficiency with division, including division with positive decimals and long division with multi-digit divisors.
_____	_____	_____	Solve simple problems, including ones arising in concrete situations, involving the addition and subtraction of fractions and mixed numbers (like and unlike denominators of 20 or less), and express answers in the simplest form.
_____	_____	_____	Identify the concept of multiplication and division of fractions.
_____	_____	_____	Compute and perform simple multiplication and division of fractions and apply these procedures to solving problems.

ALGEBRA AND FUNCTIONS

Use variables in simple expressions, compute the value of the expression for specific values of the variable, and plot and interpret the results.

_____	_____	_____	Use information taken from a graph or equation to answer questions about a problem situation.
I	R	M	Use a letter to represent an unknown number; write and evaluate simple algebraic expressions in one variable by substitution.
_____	_____	_____	Know and use the distributive property in equations and expressions with variables.
_____	_____	_____	Identify and graph ordered pairs in the four quadrants of the coordinate plane.
_____	_____	_____	Solve problems involving linear functions with integer values; write the equation; and graph the resulting ordered pairs of integers on a grid.

MEASUREMENT AND GEOMETRY

The volumes and areas of simple objects are computed.

_____	_____	_____	Derive and use the formula for the area of a triangle and of a parallelogram by comparing it with the formula for the area of a rectangle.
I	R	M	Construct a cube and rectangular box from two-dimensional patterns and use these patterns to compute the surface area for these objects.
_____	_____	_____	Understand the concept of volume and use the appropriate units in common measuring systems to compute the volume of rectangular solids.
_____	_____	_____	Differentiate between, and use appropriate units of measures for,

two- and three-dimensional objects.

Identify, describe, and classify the properties of, and the relationships between, plane and solid geometric figures.

I	R	M	
_____	_____	_____	Measure, identify, and draw angles, perpendicular and parallel lines, rectangles, and triangles by using appropriate tools.
_____	_____	_____	Know that the sum of the angles of any triangle is 180 degrees and the sum of the angles of any quadrilateral is 360 degrees and use this information to solve problems.
_____	_____	_____	Visualize and draw two-dimensional views of three-dimensional objects made from rectangular solids.
_____	_____	_____	Select, use, and change appropriate units of measurement in grams, liters, meters, gallons, inches, etc..
_____	_____	_____	Effectively use a ruler, scale, compass, protractor, and thermometer to determine measurements.
_____	_____	_____	Draw and use scale drawings.

STATISTICS, DATA ANALYSIS AND PROBABILITY

Display, analyze, compare, and interpret different data sets, including data sets of different sizes.

I	R	M	
_____	_____	_____	Calculate the mean, median, and mode; compute and compare simple examples to show that they may differ.
_____	_____	_____	Organize and display single-variable data in appropriate graphs and representations and explain which types of graphs are appropriate for various data sets.
_____	_____	_____	Use fractions and percents to compare data sets of different sizes.
_____	_____	_____	Identify ordered pairs of data from a graph and interpret the meaning of the data in terms of the situation depicted by the graph.
_____	_____	_____	Write ordered pairs correctly; for example. (x,y) .

MATHEMATICAL REASONING

Decisions are made about how to approach problems.

I	R	M	
_____	_____	_____	Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, sequencing and prioritizing information, and observing patterns.
_____	_____	_____	Determine when and how to break a problem into simpler parts.

Strategies, skills, and concepts are used to find solutions to problems.

I	R	M	
_____	_____	_____	Verify the reasonableness of calculated results using estimation.
_____	_____	_____	Apply strategies and results from simpler problems to more complex problems.
_____	_____	_____	Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models to explain mathematical reasoning.
_____	_____	_____	Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.
_____	_____	_____	Indicate the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.
_____	_____	_____	Make precise calculations and check the validity of the results from the context of the problem.

Particular problems lead to being able to generalize in other situations.

I	R	M	
_____	_____	_____	Note method of deriving a solution and demonstrate conceptual understanding by solving similar problems.
_____	_____	_____	Evaluate the reasonableness of the solution in the context of the original situation.
_____	_____	_____	Develop generalizations of the results obtained and apply them in other circumstances.

GRADE LEVEL SUBJECT AREA EXPECTATIONS
DIOCESE OF FRESNO
SIXTH GRADE

EXPECATIONS FOR RELIGIOUS INTEGRATION AND ARTICULATION

- _____ A. Over the millenniums mathematicians developed new formulas for solving problems all of which were in the mind of God during the six days of creation.
- _____ B. God rested on the seventh day.
- _____ C. The shapes and lengths of roots, trunks, branches, and leaves are an example of beginning geometric concepts.
- _____ D. Through the symmetry, precision, and pattern of numbers, students become aware of God’s presence in creation.
- _____ E. Note the significance and symbolism of numbers in the study of sacred Scripture.

ACADEMIC GRADE LEVEL SUBJECT AREA EXPECTATIONS

NUMBER SENSE

Compare and order positive and negative fractions, decimals, and mixed numbers. Solve problems involving fractions, ratios, proportions, and percentages.

- | I | R | M | |
|-------|-------|-------|---|
| _____ | _____ | _____ | Compare and order positive and negative fractions, decimals, and mixed numbers and place value them on a number line. |
| _____ | _____ | _____ | Interpret and use ratios in different contexts to show the relative sizes of two quantities using appropriate notation. |
| _____ | _____ | _____ | Use proportions to solve problems. Use cross multiplication as a method for solving such problems, understanding it as the multiplication of both sides of an equation by a multiplicative inverse. |
| _____ | _____ | _____ | Calculate given percentages of quantities and solve problems involving discounts at sales, interest earned, and tips. |
| _____ | _____ | _____ | Rounding and estimating whole numbers and decimal numbers. |

Solving problems involves calculating using addition, subtraction, multiplication, and division.

- | I | R | M | |
|-------|-------|-------|--|
| _____ | _____ | _____ | Solve problems involving addition, subtraction multiplication, and division of positive fractions and explain why a particular operation was used for a given situation. |
| _____ | _____ | _____ | Explain the meaning of multiplication and division of positive |

- | | | | |
|-------|-------|-------|--|
| _____ | _____ | _____ | fractions and perform the calculations. |
| _____ | _____ | _____ | Solve additions, subtraction, multiplication, and division problems, including those arising in concrete situations, that use positive and negative integers and combinations of these operations. |
| _____ | _____ | _____ | Determine the least common multiple and the greatest common divisor of whole numbers; use them to solve problems with fractions. |

Writing and evaluating algebraic expressions and equations leads to solving simple linear equations, graphing, and interpreting results.

- | | | | |
|-------|-------|-------|--|
| I | R | M | |
| _____ | _____ | _____ | Write and solve one-step linear equations in one variable. |
| _____ | _____ | _____ | Write and evaluate an algebraic expression for a given situation, using up to three variables. |
| _____ | _____ | _____ | Apply algebraic order of operations and the commutative, associative, and distributive properties to evaluate expressions; and justify each step in the process. |
| _____ | _____ | _____ | Solve problems manually by using the correct order of operations or by using a scientific calculator. |

Tables, graphs, and rules are used to solve problems involving ratios and proportions.

- | | | | |
|-------|-------|-------|--|
| I | R | M | |
| _____ | _____ | _____ | Convert one unit of measurement to another. |
| _____ | _____ | _____ | Demonstrate an understanding that <i>rate</i> is a measure of one quantity per unit value of another quantity. |
| _____ | _____ | _____ | Solve problems involving rates, average speed, distance, and time. |

Geometric patterns are investigated and described algebraically.

- | | | | |
|-------|-------|-------|--|
| I | R | M | |
| _____ | _____ | _____ | Use variables in expressions describing geometric quantities. |
| _____ | _____ | _____ | Express in symbolic form simple relationships arising from geometry. |

MEASUREMENT AND GEOMETRY

Planes and solid shapes are measured in order to solve problems.

- | | | | |
|-------|-------|-------|--|
| I | R | M | |
| _____ | _____ | _____ | Memorize the formula for circumference and area of a circle. Use common estimates of pi to calculate area and circumference; compare with actual measurements. |

_____ _____ _____ Derive and use the formulas for determining the perimeter and area of triangles, parallelograms, squares, rhombus. Rectangles, and other polygons.

Properties of two-dimensional figures are identified and described.

I	R	M	
_____	_____	_____	Identify angles as vertical, adjacent, complementary, or supplementary and provide descriptions of these terms.
_____	_____	_____	Use the properties of complementary and supplementary angles and the sum of the angles of a triangle to solve problems involving and unknown angle.
_____	_____	_____	Draw and classify quadrilaterals and triangles from given information about them.

STATISTICS, DATA ANALYSIS, AND PROBABILITY

Statistical measurement for data sets are computed and analyzed.

I	R	M	
_____	_____	_____	Compute the range, mean, median, and mode of data sets.
_____	_____	_____	Understand how additional data added to data sets may affect these computation of measures of central tendency.
_____	_____	_____	Identify how the inclusion or exclusion of outliers affects measures of central tendency.
_____	_____	_____	Determine why a specific measure of central tendency (mean, median, mode) provides the most useful information in given context.

Data samples of a population are used to describe the characteristics and limitations of the sample.

I	R	M	
_____	_____	_____	Compare different samples of a population with the data from the entire population and identify a situation in which it makes sense to use a sample.
_____	_____	_____	Identify different ways of selecting a sample and which method makes a sample more representative for a population.
_____	_____	_____	Analyze data displays and explain why the way in which the question was asked might have influenced the results obtained and why the way in which the results were displayed might have influenced the conclusions reached.
_____	_____	_____	Identify data that represent sampling errors and explain why the sample (and the display) might be biased.
_____	_____	_____	Identify claims based on statistical data and, in cases, evaluate the validity of the claims.

Theoretical and experimental probabilities are gathered to make predictions about events.

I	R	M	
_____	_____	_____	Represent all possible outcomes for compound events in an organized way and express the theoretical probability of each outcome.
_____	_____	_____	Estimate the probability of future events.
_____	_____	_____	Represent probabilities as ratios, proportions, decimals between 0 and 1, and percentages between 0 and 100 and verify that the probabilities computed are reasonable; know that if P is the probability of an event, $1-P$ is the probability of an event not occurring.
_____	_____	_____	Identify the probability of either of two disjoint events occurring is the sum of the two individual probabilities and that the probability of one event following another, in independent trials, is the product of two probabilities.
_____	_____	_____	Identify the difference between independent and dependent events.

MATHEMATICAL REASONING

Decisions are made about how to approach problems.

I	R	M	
_____	_____	_____	Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns.
_____	_____	_____	Formulate and justify mathematical conjectures based on general description of the mathematical question or problem posed.
_____	_____	_____	Determine when and how to break a problem into simpler parts.

Solving problems requires the knowledge of concepts and the ability to use skills and strategies.

I	R	M	
_____	_____	_____	Predict outcomes and make estimates to verify the reasonableness of calculated results.
_____	_____	_____	Apply strategies and results from simpler problems to move complex problems.
_____	_____	_____	Estimate unknown quantities graphically and solve for them by using logical reasoning and arithmetic and algebraic techniques.
_____	_____	_____	Use a variety of methods, such as words, numbers, symbols, charts, graphs, logical reasoning and arithmetic and algebraic techniques.

I	R	M	
_____	_____	_____	Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.
_____	_____	_____	Identify the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.
_____	_____	_____	Make precise calculations and check the validity of the results from the context of the problem.

GRADE LEVEL SUBJECT AREA EXPECTATIONS
DIOCESE OF FRESNO
SEVENTH GRADE

EXPECATIONS FOR RELIGIOUS INTEGRATION AND ARTICULATION

- _____ A. Every living or non-living entity in our world is made up of a single cell or many, of a molecule or millions of them.
- _____ B. The same cells or molecules separate, divide, multiply and produce more of the same.
- _____ C. The language of mathematics is God’s language of creation.
- _____ D. Through the symmetry, precision, and pattern of numbers, students become aware of God’s presence in creation.
- _____ E. Note the significance and symbolism of numbers in the study of sacred Scripture.

ACADEMIC GRADE LEVEL SUBJECT AREA EXPECTATIONS

NUMBER SENSE

Know the properties of, and compute with, rational numbers expressed in a variety of forms.

- | I | R | M | |
|-------|-------|-------|---|
| _____ | _____ | _____ | Read, write , and compare rational numbers in scientific notation (positive and negative powers of 10) with approximate numbers using scientific notation. |
| _____ | _____ | _____ | Add subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number power. |
| _____ | _____ | _____ | Convert fractions to decimals and percents and use these representations in estimations, computations, and applications. |
| _____ | _____ | _____ | Differentiate between rational and irrational numbers. |
| _____ | _____ | _____ | Identify that every rational number is either a terminating or repeating decimal and the able to convert terminating decimals into reduced fractions. |
| _____ | _____ | _____ | Calculate the percentage of increases and decreases of quantity. |
| _____ | _____ | _____ | Solve problems that involve discounts, markups, commissions, and profit and compute simple and compound interest. |

Exponents, powers, and roots are employed in working with fractions.

- | I | R | M | |
|-------|-------|-------|---|
| _____ | _____ | _____ | Identify and understand negative whole-number exponents.
Multiply and divide expressions involving exponents with a common base. |
| _____ | _____ | _____ | Add and subtract fractions by using factoring to find common |

_____ denominators.
_____ Multiply, divide, and simplify rational numbers by using exponent rules.

I	R	M	
_____	_____	_____	Use the inverse relationship between raising to a power and extracting the root of a perfect square integer; for an integer that is not square, determine the two integers between which its square root lies and explain why.
_____	_____	_____	Understand the meaning of the absolute value of a number; interpret the absolute value as the distance of the number from zero on a number line; and determine the absolute value of real numbers.

ALGEBRA AND FUNCTIONS

Quantitative relationships are expressed by using algebraic terminology, expressions, equations, inequalities, and graphs.

I	R	M	
_____	_____	_____	Use algebraic terminology appropriately.
_____	_____	_____	Use variables and appropriate operations to write an expression, an equation, an inequality, or a system of equations or inequalities that represents a verbal descriptive.
_____	_____	_____	Use the correct order of operations to evaluate algebraic expressions.
_____	_____	_____	Simplify numerical expressions by applying properties of rational numbers (e.g., identity, inverse, distributive, associative, commutative) and justify the process used.
_____	_____	_____	Represent quantitative relationships graphically and interpret the meaning of a specific part of a graph in the situation represented by the graph.

Integers, powers, and simple roots are interpreted and evaluated.

I	R	M	
_____	_____	_____	Interpret positive whole-number powers as repeated multiplication and negative whole-number powers as repeated division or multiplication by the multiplicative inverse. Simplify and evaluate expressions that include exponents.
_____	_____	_____	Multiply and divide monomials; extend the process of taking powers and extracting roots to monomials when the latter results in a monomial with an integer exponent.

Graph and interpret linear and some nonlinear functions.

I	R	M	
_____	_____	_____	Graph functions and use in solving problems.
_____	_____	_____	Plot values of 3-D shapes for various values of the edge lengths.
_____	_____	_____	Graph linear functions, noting that the vertical change per unit of horizontal change is always the same and know that the ration is called the slope.
_____	_____	_____	Plot the values of quantities whose rations are always the same. Fit a line to the plot and understand that the slope of the line equals the quantities.

Solve simple linear equations and inequalities over the rational numbers.

I	R	M	
_____	_____	_____	Solve 2-step linear equations and inequalities in one variable over the rational numbers, interpret the solution(s) in the context from which they arose, a verify the reasonableness of the results.
_____	_____	_____	Solve multi-step problems involving rate, average speed, distance, and time of a direct variation.

MEASEUREMENT AND GEOMETRY

Appropriate units of measure are chosen and rations used to convert within and between measurement systems to solve problems.

I	R	M	
_____	_____	_____	Compare weights, capacities, geometric measures, time, and temperature within and between measurement systems.
_____	_____	_____	Construct and read drawings and models made to scale.
_____	_____	_____	Use measures expressed as rates and measures expressed as products; use dimensional analysis to check the reasonableness of the answer.

Compute the perimeter, area, and volume of common geometric objects and use the results to find measures of less common objects. Perimeter, area, and volume are affected by changes of scale.

I	R	M	
_____	_____	_____	Use formulas to find the perimeter and area of basic 2-dimensional figures and surface area and volume of 3-D figures.
_____	_____	_____	Estimate and compute the area of more complex or irregular two- and three-dimensional figures by breaking the figures down into more basic geometric objects.
_____	_____	_____	Relate the changes in measurement with a change of scale to the units used.

Knowledge of the Pythagorean theorem and an understanding of plan and solid geometric shapes is exhibited by constructing figures that meet given conditions and by identifying attributes of figures.

I	R	M	
_____	_____	_____	Identify and construct basic elements of geometric figures by using a compass and straightedge.
_____	_____	_____	Use coordinate graphs to plot simple figures, determine lengths and areas related to them, and determine their image under translations and reflections.
_____	_____	_____	Use the Pythagorean theorem to find the length of the missing side of a right triangle and lengths of the other line segments.
_____	_____	_____	Identify the meaning of congruence.
_____	_____	_____	Construct two-dimensional patterns for three-dimensional models.
_____	_____	_____	Identify elements of 3-D geometric objects and describe how two or more objects are related in space.

STATISTICS, DATA ANALYSIS, AND PROBABILITY

Collect, organize, and represent data sets that have one or more variables and identify relationships among variables within a data set by hand and through the use of an electronic spreadsheet.

I	R	M	
_____	_____	_____	Identify and use various forms of display for data sets, including stem-and-leaf plot or box-and-whisker plot; use the forms to display a single set of data or to compare two sets of data.
_____	_____	_____	Represent two numerical variables on a scatter plot and informally describe how the data points are distributed and any apparent relationship that exists between the two variables.
_____	_____	_____	Compute and define, the minimum, the lower quartile, the median, the upper quartile, and the maximum of a data set.

MATHEMATICAL REASONING

Decisions are made about how to approach problems.

I	R	M	
_____	_____	_____	Analyze problems by identifying relationships.
_____	_____	_____	Formulate and justify mathematical conjectures based on a general description of the mathematical question of problem posed.
_____	_____	_____	Determine when and how to break a problem into simpler parts.

Strategies, skills, and concepts are implemented in order to find solutions to problems.

I	R	M	
_____	_____	_____	Use estimation to verify the reasonableness of calculated results.
_____	_____	_____	Apply strategies and results from simpler problems to more complex problems.
_____	_____	_____	Estimate unknown quantities graphically and solve for them by using logical reasoning and arithmetic and algebraic techniques.
_____	_____	_____	Make and test conjectures by using both inductive and deductive reasoning.
_____	_____	_____	Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.
_____	_____	_____	Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.
_____	_____	_____	Indicate the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.
_____	_____	_____	Make precise calculations and check the validity of the results from the context of the problem.

The ability to generalize to other situations involves completing and moving beyond a particular problem.

I	R	M	
_____	_____	_____	Evaluate the reasonableness of the solution in the context of the original situation.
_____	_____	_____	Note the method of deriving the solution and demonstrate a conceptual understanding of the derivation by solving problems.
_____	_____	_____	Develop generalizations of the results obtained and the strategies used and apply them to new problem situations.

GRADE LEVEL SUBJECT AREA EXPECTATIONS
DIOCESE OF FRESNO
EIGHTH GRADE

EXPECATIONS FOR RELIGIOUS INTEGRATION AND ARTICULATION

- _____ A. God wisely predicted our universe not just about which kinds but how many.
- _____ B. Balance is brought about through multiples, parts, and wholes.
- _____ C. The God of infinite numbers blessed us with minds to solve problems.
- _____ D. Through the symmetry, precision, and pattern of numbers, students become aware of God’s presence in creation.
- _____ E. Note the significance and symbolism of numbers in the study of sacred Scripture.

ACADEMIC GRADE LEVEL SUBJECT AREA EXPECTATIONS

ALGEBRA

Linear and basic non-linear functions are graphed and interpreted.

I	R	M	
_____	_____	_____	Identify and use the arithmetic properties of subsets of integers and rational, irrational, and real numbers, including closure properties for the four basic arithmetic operations where applicable.
_____	_____	_____	Use properties of numbers to demonstrate whether assertions are true or false.
_____	_____	_____	Identify and use such operations as taking the opposite, finding the reciprocal, taking a root, and raising to a fractional power.
_____	_____	_____	Identify and use the rules of exponents
_____	_____	_____	Solve equations and inequalities involving absolute values.
_____	_____	_____	Simplify expressions before solving linear equations and inequalities.

Simple linear equations and inequalities involving the rational numbers are solved.

I	R	M	
_____	_____	_____	Solve multi-step problems, including word problems,, involving linear equations and linear inequalities in one variable and provide justification for each step.
_____	_____	_____	Graph a linear equation and compute the x - and y - intercepts.
_____	_____	_____	Sketch the region defines by linear inequality.
_____	_____	_____	Demonstrate that a point lies on a line, given and equation of the line.
_____	_____	_____	Derive linear equations by using the point-slope formula.
_____	_____	_____	Identify the concepts of parallel lines and perpendicular lines and

how their slopes are related.

_____ Find the equation of a line perpendicular to a given line that passes through a given point.

I	R	M	
_____	_____	_____	Solve a system of two linear equations in two variables algebraically and able to interpret the answer graphically.
_____	_____	_____	Solve a system of two linear inequalities in two variables and to sketch the solution set.
_____	_____	_____	Add subtract, multiply, and divide monomials and polynomials
_____	_____	_____	Solve multi-step problems, including word problems, by using addition, subtraction, multiplication or division.
_____	_____	_____	Apply basic factoring to second- and simple third degree polynomials.
_____	_____	_____	Simplify fractions with polynomials in the numerator and denominator by factoring both and reducing them to lowest terms.
_____	_____	_____	Add subtract, multiply, and divide rational expressions and functions. Solve both computationally and conceptually challenging problems by using these techniques.
_____	_____	_____	Solve quadratic equation by factoring of completing the square.
_____	_____	_____	Apply algebraic techniques to solve rate problems, work problems, and percent mixture problems.
_____	_____	_____	Identify the concepts of a relation and a function, determine whether a given relation defines a function, and give pertinent information about given relations and functions.
_____	_____	_____	Determine the domain of independent variables and the range of dependent variables defined by a graph, a set of ordered pairs, or a symbolic expression.
_____	_____	_____	Determine whether a relation defined by a graph, a set of ordered pairs, or a symbolic expression is a function and justify the conclusion.
_____	_____	_____	Identify the quadratic formula and are familiar with its proof by completing the square.
_____	_____	_____	Use the quadratic formula to find the roots of a second-degree polynomial and use to solve quadratic equations.
_____	_____	_____	Graph quadratic functions and know that their roots are the x -intercepts.
_____	_____	_____	Use the quadratic formula or factoring techniques or both to determine whether the graph of a quadratic function will intersect the x -axis in zero, one, or two points.
_____	_____	_____	Apply quadratic equations to physical problems, such as the motion of an object under the force of gravity.

Simple aspects of logical argument are used.

I R M

_____ _____ _____ Explain the difference between inductive and deductive reasoning and identify and provide examples of each.

_____ _____ _____ Identify the hypothesis and conclusion in logical deduction.

I	R	M	
_____	_____	_____	Use counterexamples to show that an assertion is false and recognize that a single counterexample is sufficient to refuse and assertion.

Use properties of the number system to judge the validity of results, to justify each step of a procedure, and to prove or disprove statements.

I	R	M	
_____	_____	_____	Use properties of numbers to construct simple, valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions.
_____	_____	_____	Judge the validity of an argument according to whether the properties of the real number system and the order of operations have been applied correctly at each step.
_____	_____	_____	Given a specific algebraic statement involving linear, quadratic, or absolute value expressions or equations or inequalities, students determine whether the statement is true sometimes, always, or never.

