

**Course Description****Subject: Math Concepts****Grade: 7**

**Overview:** Seventh grade math concepts fills in gaps in knowledge in the use of integers, fractions and decimals; it then moves on to previewing key algebra skills in solving single variable equations. We proceed to develop this skill through calculating the areas of plane figures and the volumes of three dimensional figures.

**Primary Biblical Integration:** Mathematics allows us to see the design in God's universe; it also helps us to understand being parts of a whole as demonstrated in the Body of Christ. We also discover the constancy of God and His promises.

**Unit Description:****Chapter 4: Positive and Negative Numbers****Chapter 2: Number Relationships and Fractions****Chapter 1: Algebra and Decimals****Chapter 3: Fractions and Their Operations****Chapter 6: Ratios and Proportions****Chapter 7: Percents****Chapter 5: Solving Equations****Chapter 8: Geometry in the Plane****Chapter 9: Geometry in Space****Student Materials:****Mathematics: Concepts and Skills, Course 1 by McDougal and Littell****Teacher Materials:****See list of teacher's materials**

# HEIGHTS CHRISTIAN JUNIOR HIGH SCHOOL

# COURSE OUTLINE

Teacher's Name: Lehman		Subject: Math Concepts 7th grade		# of Quarters: 4	
Text (if any): Mathematics: Concepts and Skills Course 1 (McDougal Littell)			Other Materials:		
Recurring Themes, Principles, Skills or Concepts:	1) Order of the world created by God	2) Solving Equations	3) Problem Solving	4) Working with Rational Numbers	5) Geometric Figures
Unit Title & Expected Start Date	Theme	Biblical Application		Key Concepts	
1) Classroom rules and outlines	Same	Community		HW policy; procedures for a successful class; textbooks	
2) Ch. 4 Positive and negative numbers	Same	Light vs. Darkness		Add, subtract, multiply and divide integers, order of operations	
3) Ch. 2 Number relationships and fractions	Same	Relationship; different yet the same		Prime factorization, GCF, LCM	
4) Ch. 1 Algebra and decimals	Same	The Body of Christ, parts of the whole		Order of operations; add, subtract, multiply and divide decimals, exponents	
5) Ch. 3 Fractions and their operations	Same	The Body of Christ, parts of the whole		Add, subtract, multiply and divide fractions	
6) Ch. 6 Ratios and proportions	Same	Wholeness		Writing and solving proportions	
7) Ch. 7 Percents	Same	Wholeness		Percents to decimals to fractions, solving percent problems	
8) Ch. 5 Solving Equations	Same	Loving the Lord your God with your whole mind		Solving single variable equations	
9) Ch 8 Geometry in the plane	Same	Design in God's handiwork		Classifying triangles and quadrilaterals, area and circumference of circles, area of a parallelogram	
10) Ch. 9 Geometry in space	Same	Design in God's handiwork		Volumes of rectangular and triangular prisms; volume of a cylinder; surface area	

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# UNIT PLANNER

Teacher's Name: Lehman		Subject: 7th Grade Math Concepts		Period(s): 2		
Unit #: 1	Dates - Starting:		Ending:	Total Instructional Days:		
Unit Title: Class intro						
Theme: Expectations, organization, orientation and discipline						
Biblical Application: Col. 3:17 Do <u>all</u> for the glory of God; Romans 13:1 Submit/respect for authority						
Key Concepts		Standards/Sub-Strands		Outcomes	Assessment	ESLRs
1)Rules				Talons	Discussion; citizenship grade	2b; 4d
2)Organizer					classroom checks	3b
3)Classroom and school policies				Grade on parent signed regarding classroom policies	Discussion; citizenship and work habit grades	2b
4)Treatment of others				Talons	Verbal encouragment and challenge; citizenship grade	4bc
5)Care of textbook					Homework grade for covering it	4d
Key Activities and Methods: Discussion, graded homework, mimio examples						

# HEIGHTS CHRISTIAN JUNIOR HIGH SCHOOL

# UNIT PLANNER

Teacher's Name: Lehman		Subject: 7th Grade Math Concepts		Period(s): 2		
Unit #: 2	Dates - Starting: Ending:		Total Instructional Days:			
Unit Title: Chapter 4 Positive and Negative Numbers						
Theme: same						
Biblical Application: Light vs. Darkness						
Key Concepts		Standards/Sub-Strands		Outcomes	Assessment	ESLRs
1) Adding integers		6NS2		Notes and homework	Worksheets, homework, quizzes	3a
2) Subtracting integers		6NS2		Notes and homework	Worksheets, homework, quizzes	2b, 3a
3) Multiplying integers		6NS2		Notes and homework	Worksheets, homework, quizzes	2b, 3a
4) Dividing integers		6NS2		Notes and homework	Worksheets, homework, quizzes	2b, 3a
5) Order of operations		6NS2, 6MR1		Notes and homework	Worksheets, homework, quizzes	2b, 3a
Key Activities and Methods: Discussion, graded homework, mimio examples						

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# UNIT PLANNER

Teacher's Name: Lehman		Subject: 7th Grade Math Concepts		Period(s): 2	
Unit #: 3	Dates - Starting: Ending:		Total Instructional Days:		
Unit Title: Chapter 2 Number Relationships and Fractions					
Theme: same					
Biblical Application: Relationships; different yet the same					
Key Concepts	Standards/Sub-Strands	Outcomes	Assessment	ESLRs	
1) Prime factorization	6NS2	Notes and homework	Worksheets, homework, quizzes	3a	
2) GCF	6NS2, 6MR1	Notes and homework	Worksheets, homework, quizzes	2b, 3a	
3) LCM	6NS2, 6MR1	Notes and homework	Worksheets, homework, quizzes	2b, 3a	
4)					
5)					
Key Activities and Methods: Discussion, graded homework, mimio examples					

# HEIGHTS CHRISTIAN JUNIOR HIGH SCHOOL

# UNIT PLANNER

Teacher's Name: Lehman		Subject: 7th Grade Math Concepts		Period(s): 2		
Unit #: 4	Dates - Starting:		Ending:	Total Instructional Days:		
Unit Title: Chapter 1 Algebra and Decimals						
Theme: same						
Biblical Application: The Body of Christ, parts of a whole						
Key Concepts		Standards/Sub-Strands		Outcomes	Assessment	ESLRs
1)Order of operations		6AF1		Notes and homework	Worksheets, homework, quizzes	3a
2)Adding and subtracting decimals		6SDP1		Notes and homework	Worksheets, homework, quizzes	2b, 3a
3)Multiplyiing and dividing decimals		6SDP1		Notes and homework	Worksheets, homework, quizzes	2b, 3a
4)Exponents		6AF1		Notes and homework	Worksheets, homework, quizzes	2b, 3a
5)						
Key Activities and Methods: Discussion, graded homework, mimio examples						

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# UNIT PLANNER

Teacher's Name: Lehman		Subject: 7th Grade Math Concepts	Period(s): 2	
Unit #: 5	Dates - Starting:	Ending:	Total Instructional Days:	
Unit Title: Chapter 3 Fractions and Their Operations				
Theme: same				
Biblical Application: The Body of Christ, parts of a whole				
Key Concepts	Standards/Sub-Strands	Outcomes	Assessment	ESLRs
1)Add fractions	6MR3, 6NS2	Notes and homework	Worksheets, homework, quizzes	3a
2)Subtracting fractions	6MR3, 6NS2	Notes and homework	Worksheets, homework, quizzes	2b, 3a
3)Multiplying fractions	6MR3, 6NS2	Notes and homework	Worksheets, homework, quizzes	2b, 3a
4)Dividing fractions	6MR3, 6NS2	Notes and homework	Worksheets, homework, quizzes	2b, 3a
5)				
Key Activities and Methods: Discussion, graded homework, mimio examples				

# HEIGHTS CHRISTIAN JUNIOR HIGH SCHOOL

# UNIT PLANNER

Teacher's Name:	Lehman	Subject:	7th Grade Math Concepts	Period(s):	2
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Unit #:	6	Dates - Starting:	Ending:	Total Instructional Days:
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Unit Title: Chapter 6 Ratios and Proportions

Theme: same

Biblical Application: Wholeness

Key Concepts	Standards/Sub-Strands	Outcomes	Assessment	ESLRs
1) Writing proportions	6NS1	Notes and homework	Worksheets, homework, quizzes	3a
2) Solving proportions	6NS2	Notes and homework	Worksheets, homework, quizzes	2b, 3a
3)				
4)				
5)				

Key Activities and Methods: Discussion, graded homework, mimio examples

# HEIGHTS CHRISTIAN JUNIOR HIGH SCHOOL

# UNIT PLANNER

Teacher's Name: Lehman		Subject: 7th Grade Math Concepts		Period(s): 2	
Unit #: 7	Dates - Starting:		Ending:	Total Instructional Days:	
Unit Title: Chapter 7 Percents					
Theme: same					
Biblical Application: Wholeness					
Key Concepts	Standards/Sub-Strands	Outcomes	Assessment	ESLRs	
1) Percents to decimals	6NS1, 6NS2	Notes and homework	Worksheets, homework, quizzes	3a	
2) Decimals to fractions	6NS1, 6NS2	Notes and homework	Worksheets, homework, quizzes	2b, 3a	
3) Percents to fractions	6NS1, 6NS2	Notes and homework	Worksheets, homework, quizzes	2b, 3a	
4) Solving percent problems	6MR2, 6AF2	Notes and homework	Worksheets, homework, quizzes	2b, 3a	
5)					
Key Activities and Methods: Discussion, graded homework, mimio examples					

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# UNIT PLANNER

Teacher's Name: Lehman		Subject: 7th Grade Math Concepts	Period(s): 2	
Unit #: 8	Dates - Starting:	Ending:	Total Instructional Days:	
Unit Title: Chapter 5 Solving Equations				
Theme: same				
Biblical Application: Loving the Lord your God with your whole mind				
Key Concepts	Standards/Sub-Strands	Outcomes	Assessment	ESLRs
1) Solving single variable equations	6AF1, 6SDP3	Notes and homework	Worksheets, homework, quizzes	3a
2)				
3)				
4)				
5)				
Key Activities and Methods: Discussion, graded homework, mimio examples				

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# UNIT PLANNER

Teacher's Name: Lehman		Subject: 7th Grade Math Concepts		Period(s): 2	
Unit #: 9	Dates - Starting:		Ending:	Total Instructional Days:	
Unit Title: Chapter 8 Geometry in the Plane					
Theme: same					
Biblical Application: Design in God's handiwork					
Key Concepts	Standards/Sub-Strands	Outcomes	Assessment	ESLRs	
1)Classifying triangles	6MG2	Notes and homework	Worksheets, homework, quizzes	3a	
2)Classifying quadrilaterals	6MG2	Notes and homework	Worksheets, homework, quizzes	2b, 3a	
3)Area of circles	6AF3, 6MG1	Notes and homework	Worksheets, homework, quizzes	2b, 3a	
4)Circumference of circles	6AF3, 6MG1	Notes and homework	Worksheets, homework, quizzes	2b, 3a	
5)Area of parallelograms	6AF3, 6MG1	Notes and homework	Worksheets, homework, quizzes	2b, 3a	
Key Activities and Methods: Discussion, graded homework, mimio examples					

# HEIGHTS CHRISTIAN JUNIOR HIGH SCHOOL

# UNIT PLANNER

Teacher's Name: Lehman		Subject: 7th Grade Math Concepts	Period(s): 2	
Unit #: 10	Dates - Starting:	Ending:	Total Instructional Days:	
Unit Title: Chapter 9 Geometry in Space				
Theme: same				
Biblical Application: Design in God's handiwork				
Key Concepts	Standards/Sub-Strands	Outcomes	Assessment	ESLRs
1) Volume of rectangular prisms	6MG1, 6SDP2	Notes and homework	Worksheets, homework, quizzes	3a
2) Volume of triangular prisms	6MG1, 6SDP2	Notes and homework	Worksheets, homework, quizzes	2b, 3a
3) Volume of a cylinder	6MG1, 6SDP2	Notes and homework	Worksheets, homework, quizzes	2b, 3a
4) Surface area	6MG1, 6SDP2	Notes and homework	Worksheets, homework, quizzes	2b, 3a
5)				
Key Activities and Methods: Discussion, graded homework, mimio examples				

**PACING GUIDE**

 Subject: Math Concepts

 Grade: 7

 Total number of standards: 13

Quarter	Units Taught	Standards Taught	Standards Assessed
1	<b>Chapter 4</b> (Positive and Negative Numbers); <b>Chapter 2</b> (Number Relationships and Fractions)	6NS2, 6MR1	6NS2, 6MR1
2	<b>Chapter 3</b> (Fractions and Their Operations); <b>Chapter 1</b> (Algebra and Decimals)	6AF1, 6SDP1, 6MR3	6AF1, 6SDP1, 6MR3
3	<b>Chapter 6</b> (Ratios and Proportions); <b>Chapter 7</b> (Percents)	6NS1, 6AF2, 6MR2	6NS1, 6AF2, 6MR2
4	<b>Chapter 8</b> (Geometry in the Plane); <b>Chapter 9</b> (Geometry in Space)	6AF3, 6MG1, 6MG2, 6SDP2, 6SDP3	6AF3, 6MG1, 6MG2, 6SDP2, 6SDP3
<b>Omitted Standards and why</b>	Elements of <b>Chapter 5</b> (Solving Equations), <b>Chapter 10</b> (Data Analysis and Statistics) and <b>Chapter 11</b> (Probability and Discrete Mathematics) are taught throughout the year		

# HEIGHTS CHRISTIAN JUNIOR HIGH SCHOOL

## Mission Statement

"Our mission is to educate students to know Christ personally, excel academically, think biblically, and positively impact their community for Christ."

## Expected Schoolwide Learning Results (ESLRs)

### 1. Biblical World View

*Graduates of HCJH are expected to be individuals who . . .*

- a) know how to study the Bible.
- b) recognize that all people are created in the image of the one true God.
- c) acknowledge the Bible as the infallible Word of God.
- d) use God's Word to discern truth.

### 2. Effective Communicators

*Graduates of HCJH are expected to be effective communicators who . . .*

- a) listen objectively and critically.
- b) understand and follow directions.
- c) write and speak clearly and accurately.
- d) express and support opinions using objective evidence.
- e) utilize various modalities effectively.
- f) can demonstrate a personal relationship with Jesus Christ verbally and in writing.

### 3. Proficient Learners

*Graduates of HCJH are expected to be proficient learners who . . .*

- a) demonstrate grade appropriate skills in reading, writing, and mathematics.
- b) have effective work habits and study skills.
- c) are self-directed and able to produce cooperatively and independently.
- d) can utilize technology.
- e) have a firm grasp of scripture and are able to apply it to life situations.

### 4. Personal Responsibility

*Graduates of HCJH are expected to be responsible individuals who . . .*

- a) show patriotism through respect for flag, country, leaders and laws.
- b) demonstrate self-control based on biblical standards.
- c) exhibit respect for others.
- d) accept the consequences and benefits of their actions.
- e) are aware of career opportunities.
- f) practice goal setting with a biblical perspective.
- g) are involved in serving the community.
- h) have a personal relationship with Jesus Christ.
- i) have the tools to share their faith.
- j) demonstrate an urgency to share their faith.

### 5. Problem Solvers

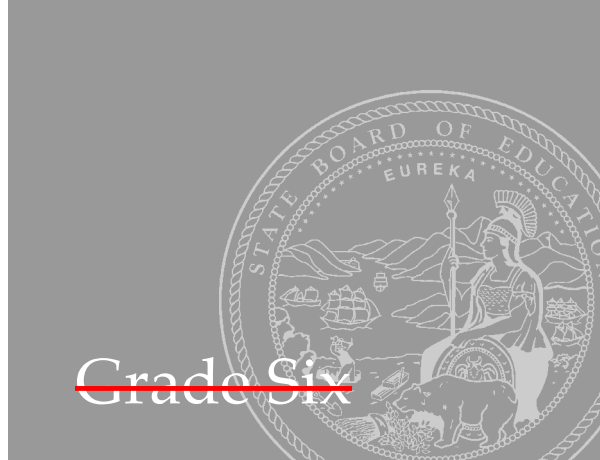
*Graduates of HCJH are expected to be perceptive thinkers and problem solvers who . . .*

- a) evaluate current topics using a biblical perspective.
- b) use available technology to obtain, access and integrate relevant information.
- c) think analytically and creatively.
- d) are well-informed and open-minded.
- e) apply academic learning to life.

### 6. Well-Rounded

*Graduates of HCJH are expected to be well-rounded individuals who . . .*

- a) have been exposed to a variety of elective opportunities and experiences.
- b) are challenged beyond academics through a variety of extracurricular activities.
- c) lead lives that are balanced intellectually, spiritually, physically and emotionally.
- d) develop an appreciation for teamwork during school activities.
- e) understand God's involvement in every area of their lives.



~~By the end of grade six, students have mastered the four arithmetic operations with whole numbers, positive fractions, positive decimals, and positive and negative integers; they accurately compute and solve problems. They apply their knowledge to statistics and probability. Students understand the concepts of mean, median, and mode of data sets and how to calculate the range. They analyze data and sampling processes for possible bias and misleading conclusions; they use addition and multiplication of fractions routinely to calculate the probabilities for compound events. Students conceptually understand and work with ratios and proportions; they compute percentages (e.g., tax, tips, interest). Students know about  $\pi$  and the formulas for the circumference and area of a circle. They use letters for numbers in formulas involving geometric shapes and in ratios to represent an unknown part of an expression. They solve one step linear equations.~~

## Number Sense

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- 1.0 Students compare and order positive and negative fractions, decimals, and mixed numbers. Students solve problems involving fractions, ratios, proportions, and percentages:**
- 1.1 Compare and order positive and negative fractions, decimals, and mixed numbers and place them on a number line.
  - 1.2 Interpret and use ratios in different contexts (e.g., batting averages, miles per hour) to show the relative sizes of two quantities, using appropriate notations ( $a/b$ ,  $a$  to  $b$ ,  $a:b$ ).
  - 1.3 Use proportions to solve problems (e.g., determine the value of  $N$  if  $4/7 = N/21$ , find the length of a side of a polygon similar to a known polygon). 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.
  - 1.4 Calculate given percentages of quantities and solve problems involving discounts at sales, interest earned, and tips.

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- 2.0 Students calculate and solve problems involving addition, subtraction, multiplication, and division:**
- 2.1 Solve problems involving addition, subtraction, multiplication, and division of positive fractions and explain why a particular operation was used for a given situation.
  - 2.2 Explain the meaning of multiplication and division of positive fractions and perform the calculations (e.g.,  $\frac{5}{8} \div \frac{15}{16} = \frac{5}{8} \times \frac{16}{15} = \frac{2}{3}$ ).
  - 2.3 Solve addition, subtraction, multiplication, and division problems, including those arising in concrete situations, that use positive and negative integers and combinations of these operations.
  - 2.4 Determine the least common multiple and the greatest common divisor of whole numbers; use them to solve problems with fractions (e.g., to find a common denominator to add two fractions or to find the reduced form for a fraction).

## Algebra and Functions

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- 1.0 Students write verbal expressions and sentences as algebraic expressions and equations; they evaluate algebraic expressions, solve simple linear equations, and graph and interpret their results:**
- 1.1 Write and solve one-step linear equations in one variable.
  - 1.2 Write and evaluate an algebraic expression for a given situation, using up to three variables.
  - 1.3 Apply algebraic order of operations and the commutative, associative, and distributive properties to evaluate expressions; and justify each step in the process.
  - 1.4 Solve problems manually by using the correct order of operations or by using a scientific calculator.
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- 2.0 Students analyze and use tables, graphs, and rules to solve problems involving rates and proportions:**
- 2.1 Convert one unit of measurement to another (e.g., from feet to miles, from centimeters to inches).
  - 2.2 Demonstrate an understanding that *rate* is a measure of one quantity per unit value of another quantity.
  - 2.3 Solve problems involving rates, average speed, distance, and time.

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**3.0 Students investigate geometric patterns and describe them algebraically:**

- 3.1 Use variables in expressions describing geometric quantities (e.g.,  $P = 2w + 2l$ ,  $A = \frac{1}{2}bh$ ,  $C = \pi d$ —the formulas for the perimeter of a rectangle, the area of a triangle, and the circumference of a circle, respectively).
- 3.2 Express in symbolic form simple relationships arising from geometry.

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**Measurement and Geometry**

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**1.0 Students deepen their understanding of the measurement of plane and solid shapes and use this understanding to solve problems:**

- 1.1 Understand the concept of a constant such as  $\pi$ ; know the formulas for the circumference and area of a circle.
- 1.2 Know common estimates of  $\pi$  (3.14;  $\frac{22}{7}$ ) and use these values to estimate and calculate the circumference and the area of circles; compare with actual measurements.
- 1.3 Know and use the formulas for the volume of triangular prisms and cylinders (area of base  $\times$  height); compare these formulas and explain the similarity between them and the formula for the volume of a rectangular solid.

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**2.0 Students identify and describe the properties of two-dimensional figures:**

- 2.1 Identify angles as vertical, adjacent, complementary, or supplementary and provide descriptions of these terms.
- 2.2 Use the properties of complementary and supplementary angles and the sum of the angles of a triangle to solve problems involving an unknown angle.
- 2.3 Draw quadrilaterals and triangles from given information about them (e.g., a quadrilateral having equal sides but no right angles, a right isosceles triangle).

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**Statistics, Data Analysis, and Probability**

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**1.0 Students compute and analyze statistical measurements for data sets:**

- 1.1 Compute the range, mean, median, and mode of data sets.
- 1.2 Understand how additional data added to data sets may affect these computations of measures of central tendency.
- 1.3 Understand how the inclusion or exclusion of outliers affects measures of central tendency.
- 1.4 Know why a specific measure of central tendency (mean, median, mode) provides the most useful information in a given context.

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**2.0 Students use data samples of a population and describe the characteristics and limitations of the samples:**

- 2.1 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.
- 2.2 Identify different ways of selecting a sample (e.g., convenience sampling, responses to a survey, random sampling) and which method makes a sample more representative for a population.
- 2.3 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.
- 2.4 Identify data that represent sampling errors and explain why the sample (and the display) might be biased.
- 2.5 Identify claims based on statistical data and, in simple cases, evaluate the validity of the claims.

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**3.0 Students determine theoretical and experimental probabilities and use these to make predictions about events:**

- 3.1 Represent all possible outcomes for compound events in an organized way (e.g., tables, grids, tree diagrams) and express the theoretical probability of each outcome.
- 3.2 Use data to estimate the probability of future events (e.g., batting averages or number of accidents per mile driven).
- 3.3 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.
- 3.4 Understand that 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 the two probabilities.
- 3.5 Understand the difference between independent and dependent events.

## Mathematical Reasoning

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### 1.0 Students make decisions about how to approach problems:

- 1.1 Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns.
  - 1.2 Formulate and justify mathematical conjectures based on a general description of the mathematical question or problem posed.
  - 1.3 Determine when and how to break a problem into simpler parts.
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### 2.0 Students use strategies, skills, and concepts in finding solutions:

- 2.1 Use estimation to verify the reasonableness of calculated results.
  - 2.2 Apply strategies and results from simpler problems to more complex problems.
  - 2.3 Estimate unknown quantities graphically and solve for them by using logical reasoning and arithmetic and algebraic techniques.
  - 2.4 Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.
  - 2.5 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.
  - 2.6 Indicate the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.
  - 2.7 Make precise calculations and check the validity of the results from the context of the problem.
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### 3.0 Students move beyond a particular problem by generalizing to other situations:

- 3.1 Evaluate the reasonableness of the solution in the context of the original situation.
- 3.2 Note the method of deriving the solution and demonstrate a conceptual understanding of the derivation by solving similar problems.
- 3.3 Develop generalizations of the results obtained and the strategies used and apply them in new problem situations.