APPENDIX 4: Sample Test Questions

Chapter 1

1. Pascal, the French writer,
   a. wrote only positive things about math.
   b. wrote only negative things about math.
   c. wrote both positive and negative things about math.
   d. never wrote anything about math.
   e. never wrote anything.

Chapter 2

1. If you want to multiply 7x9 by the Egyptian method, the addition you would do is
   a. 9+9+9+9+9+9+9
   b. 9+18+18+18
   c. 9+18+36
   d. 9+54
   e. 27+36

2. In Egyptian mathematics, 7 x 8 would be done this way:
   a. 8+8+8+8+8+8+8
   b. 40+8
   c. 8+16+16+16
   d. 8+16+32
   e. none of the above

3. Use the Egyptian method to multiply 13 x 20

4. If 5 and 12 are the first two numbers of a Pythagorean triple, then the third number is

5. Which of the following “triples” is a Pythagorean triple?
   a. 4,6,8
   b. 4,5,6
   c. 5,7,9
   d. 6,8,10

6. If you want to multiply 12x20 by the Egyptian method, the addition you would do is
   a. 40+40+40+40+40+40
   b. 40+200
   c. 80+80+80
   d. 80+160
   e. 20+40+80+100

7. Give an example of a Pythagorean triple: _____________________
8. One enduring feature of the Babylonian number system that is different from the system we commonly use is that it is base ______

Answers Chapter 2: 1c, 2d, 3. Use 20+80+160, 4. 13, 5d, 6d, 7. Here’s one of many: 8, 15, 17, 8. 60

Chapter 3

In questions 1-8 decide whether the purportedly deductive argument is valid or invalid. Mark your answers for each:

a. valid
b. invalid

1. All scientists are forgetful.
   Albert Einstein was a scientist.
   Hence, Albert Einstein was forgetful.

2. All cookies are sweets.
   All cookies are fattening.
   Hence, all sweets are fattening.

3. All human beings are sinless.
   Jesus was sinless.
   Hence, Jesus was a human being.

4. All fish can swim.
   All trout are fish.
   Hence, all trout can swim.

5. All Christians believe in a literal 7-day creation.
   Charles is not a Christian.
   Hence, Charles does not believe in a literal 7-day creation.

6. No murderers will enter heaven.
   John is a murderer.
   Hence, John will not enter heaven.

7. All Germans are analytical.
   No Italians are analytical.
   Hence, no Italians are Germans.

8. No dogs are insects.
   No cats are insects.
   Hence, no dogs are cats.

In questions 9-10 decide whether the purportedly deductive argument is valid or invalid. Mark your answers for each:

a. valid
b. invalid
9. No politicians are honest.
   All lawyers are honest.
   Hence, no lawyers are politicians.

10. No dogs are brown.
    Fido is a dog.
    Hence, Fido is not brown.

11. The conclusion of an argument is as certain as the information used in the argument if the reasoning
    is valid and

       a. by analogy.
       b. by induction.
       c. by deduction.
       d. by generalization.
       e. none of the above.

   Answers Chapter 3: 1a, 2b, 3b, 4a, 5b, 6a, 7a, 8b, 9a, 10a, 11c

Chapter 4

1. The Greek procedure for establishing mathematical conclusions after starting with axioms was

       a. experimentation
       b. inductive reasoning
       c. deductive reasoning
       d. guessing
       e. none of the above

2. The component which is not a part of the Axiomatic Method used by the Greeks is:

       a. definitions
       b. rules of logic
       c. axioms
       d. decimal system
       e. theorems

3. The Greeks believed that the axioms of mathematics were

       a. revealed by the gods in written form
       b. selected at random
       c. self-evident truths
       d. in need of revision
       e. none of the above

4. Which of the following numbers is not prime:

       a. 13          b. 31          c. 37          d. 73
       e. none of the above (i.e., each number above is prime)

5. Circle the numbers which are prime: 27, 31, 15, 21, 49
6. Write any number that is bigger than 20, but not divisible by 7: _____

7. A triangle contains angles of 40° and 45°. What is the third angle? _________

8. To prove that there are an infinite number of primes, we
   a. assumed that there were only a finite number of primes and deduced a contradiction.
   b. wrote a formula that yields a prime for every counting number n.
   c. listed all of them.
   d. described a computer program that would find all of them.

Answers Chapter 4: 1c, 2d, 3c, 4e, 5, 31, 6. For example: 22, 7, 95°, 8a

Chapter 5

1. Decimal numbers which do not terminate but do have a repeating pattern are
   a. rational.
   b. irrational.
   c. commonly found in Egyptian papyri.
   d. easier to understand in base 20.
   e. none of the above.

2. Add: \( \frac{2}{3} + \frac{1}{9} = \)
   a. \( \frac{3}{12} = \frac{1}{4} \)
   b. \( \frac{3}{9} = \frac{1}{3} \)
   c. \( \frac{2}{27} \)
   d. \( \frac{7}{9} \)
   e. none of the above

3. Multiply: \( \left( \frac{2}{9} \right) \cdot \left( \frac{3}{8} \right) = \)
   a. \( \frac{1}{12} \)
   b. \( \frac{5}{17} \)
   c. \( \frac{5}{72} \)
   d. \( \frac{6}{71} \)
   e. none of the above
4. Divide: \( \left( \frac{9}{2} \right) \div \left( \frac{2}{3} \right) = \)

5. Add: \( \frac{3}{4} + \frac{1}{8} = \)

6. Multiply: \( \left( \frac{2}{9} \right) \cdot \left( \frac{3}{5} \right) = \)

   a. \( \frac{5}{14} \)
   b. \( \frac{6}{14} \)
   c. \( \frac{1}{4} \)
   d. \( \frac{1}{15} \)
   e. none of the above

7. Divide: \( \left( \frac{9}{2} \right) \div \left( \frac{3}{2} \right) = \)

8. \( \frac{0}{5} = \)

   a. 0  b. can't be done  c. 5  d. infinity  e. none of the above (well, left)

9. Add: \( \frac{2}{3} + \frac{1}{5} = \)

10. Add: \( \frac{3}{5} + \frac{3}{10} = \)

11. Divide: \( \frac{2}{\sqrt{3}} = \)

12. 330 is 40% of what number?

Answers Chapter 5: 1a, 2d, 3a, 4, 5, 6e, 7, 3, 8a, 9, 13, 15, 10, 9, 11, 5, 12, 825

Chapter 6

1. \( \sqrt{5} \cdot \sqrt{10} = \)

2. A negative number added to a negative number is
a. always positive  
b. always negative  
c. sometimes positive, sometimes negative  
d. always zero  
e. can’t be done

3. \[
\frac{\sqrt{8}}{\sqrt{2}} = \]

4. \((-3) \cdot (-4) = \)
   a. -12  
b. can’t be done  
c. -7  
d. 12  
e. none of the above

5. The number which caused a philosophical crisis for the Pythagoreans was: ____

6. \[\sqrt{9} + \sqrt{16} = \]

7. A negative number divided by a negative number is
   a. negative  
b. positive  
c. a rational number  
d. sometimes zero  
e. none of the above

Answers Chapter 6: 1. \(\sqrt{50}\), 2. b, 3. 2, 4. d, 5. \(\sqrt{2}\), 6. 7, 7. b

Chapter 7

1. In the mathematical method of India,
   \[\sqrt{3} + \sqrt{6} = \]
   a. \(\sqrt{18}\)  
b. \(\sqrt{9} = 3\)  
c. \(\sqrt{9} + \sqrt{18}\)  
d. \(\sqrt{9} + 2\sqrt{18}\)  
e. \(\sqrt{12}\)

2. The idea of using zero as a number was first conceived by the
   a. Babylonians  
b. Egyptians  
c. Greeks  
d. Romans  
e. none of the above

Answers Chapter 7: 1d, 2e (Hindus)
Chapter 8

1. \(4(2x - 3) =\)

2. Calculate: \(\frac{8 - 2x}{2}\)
   
   a. \(3x\)
   b. \(4 - 2x\)
   c. \(4 - x\)
   d. \(8 - x\)
   e. none of the above

3. Four of the following equations are true for all values of \(a\) and \(b\). Find the one which is not.
   
   a. \(3(a+b) = 3a + 3b\)
   b. \(5ab = 5a \cdot 5b\)
   c. \(\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}\)
   d. \(a + b = b + a\)
   e. \(\frac{a+6}{3} = \frac{a}{3} + \frac{6}{3}\)

4. \(3(2x - 5) =\)

5. Calculate: \(\frac{6 + 4x}{2}\)

Answers Chapter 8: 1. \(8x - 12\), 2. c, 3. b, 4. \(6x - 15\), 5. \(3 + 2x\)

Chapter 9

1. Ordering dinner at a certain restaurant involves choosing one of four soups, one of six salad dressings, one of two vegetables, and one of four desserts. In how many different ways can all these choices be made?
   
   a. 16
   b. 20
   c. 96
   d. 192
   e. none of the above

2. If you walk uphill for 2 hours at a rate of 2 miles per hour and then walk for one hour at 3 miles per hour, what is your average speed for the entire walk?
   
   a. 5 miles per hour
   b. 2 1/3 miles per hour
   c. 2 1/2 miles per hour
   d. 1 2/5 miles per hour
   e. none of the above
3. Mary’s grade in a class is based on 3 equally-weighted tests and a final exam worth 2 tests. Her first 3 test scores were 85, 75, and 82. Her final exam score was 89. Find Mary’s weighted average. ____

4. Using A = 4, B = 3, C = 2, D = 1, F = 0, the GPA for a student who got a C in a 4 unit class, 2 A’s and a B in 3 unit classes, and an A in a 1 unit class would be (rounded to 2 decimal places): ____

5. Last semester, Mark had a GPA of 3.72 for 16 units. For his previous 71 units, he had a cumulative GPA of 3.58. Find his current cumulative GPA. ______

6. A course has two tests worth 20% each, a research paper worth 35% and a final exam worth 25%. If you got a 70 and 92 on the tests, an 88 on the research paper, and an 85 on the final exam, what is your weighted average for the semester?

   a. 83.75
   b. 84.45
   c. 85.3
   d. 86.25
   e. none of the above

7. If four equally weighted test scores are 78, 90, 86, and 87, then the average of these scores is

   a. 85  
   b. 85.25  
   c. 86  
   d. 87.75  
   e. none of the above

8. At Prince Burgers, a hamburger can be ordered with or without cheese, with or without tomato, with or without lettuce, with or without onion, with or without pickle, and with or without special sauce. How many different ways can a hamburger be ordered? ____

9. A man rows a boat upstream at 4 mph for 3 hours and downstream at 8 mph for 1.5 hours. The average speed for this trip is:

   Answers Chapter 9: 1. d, 2. b, 3. 84, 4. 3.21, 5. 3.61, 6. b, 7. b, 8. 64, 9. 5.33 mph

Chapter 10

1. $136_7$ is written in base 7. In base ten the number would be written as

2. $104_6$ is written in base six. In base ten the number would be written as

   a. 40  
   b. 20  
   c. 10  
   d. 252  
   e. none of the above

3. If $x$ is an unknown base, and $53_x = 38_{10}$, then $x =$

   a. 5  
   b. 6
c. 7
  d. 8
  e. none of the above.

4. 103 is written in base ten. In base six the number would be written as

5. In base 7, \(4_7 \cdot 5_7 = \)

6. In base six, \(25_6 + 53_6 = \)

7. In base 7, \(35_7 \cdot 24_7 = \)
   a. \(840_7\)
   b. \(1140_7\)
   c. \(1236_7\)
   d. \(1450_7\)
   e. none of the above.

8. In base ten, \(0.2_6 = \)
   a. \(0.2\)
   b. \(0.12\)
   c. \(0.333\ldots\)
   d. \(0.3\)
   e. none of the above

9. In base 5, \(34_5 \cdot 42_5 = \)

10. 83 is written in base ten. In base six the number would be written as

11. In base six, \(43_6 + 15_6 = \)
    a. \(58_6\)
    b. \(62_6\)
    c. \(38_6\)
    d. \(42_6\)
    e. none of the above.

12. If \(x\) is an unknown base, and \(55_x = 45_{10}\), then \(x = \)

13. In base 5, \(0.3\) would be written as: __________

14. Write the number \(0.124\) in base ten:
    a. \(\frac{3}{8}\)
    b. \(1.5\)
c. .5
d. .12
e. none of the above

Answers Ch 10: 1. 76, 2. a, 3. c, 4. 251_6, 5. 26_7, 6. 122_6, 7. c, 8. c, 9. 3133_5, 10. 215_6, 11. e, 12. 8, 13. 0.1222...5, 14. a

Chapter 11

1. As a base 10 number, the common Mayan numeral |.. ; ||| is:
2. In Mayan solar calendar numerals, 575 would be written as
   a. | ; || ; |||s
   b. .; || ; |||s
   c. . ; |... , ||| s
   d. . ; |... ; ...s
   e. none of the above
3. In base 10, the solar calendar Mayan numeral .. ; = would be
4. In common Mayan, | |... ; | | | + | | ; .. =
5. As a common Mayan numeral, the base ten number 231 would be written
   a. .. ; ...
   b. || ; ..
   c. || ; ..
   d. | ; |||
   e. none of the above

Answers Chapter 11: 1. 155, 2. b, 3. 725, 4. ; .. 5. c

Chapter 12

1. A number in base 10 which in base 5 would end in 3 and in base 7 would end in 2 is
2. A number in base 10 which in base 6 would end in 2 and in base 7 would end in 3 is
3. Early Chinese civilizations
   a. made significant mathematical discoveries.
   b. borrowed all their mathematical knowledge from Hindu cultures.
   c. were only proficient in arithmetic calculations.
   d. learned everything they knew about mathematics from Marco Polo.
   e. none of the above
4. A result which was known in China before it was known in the West was
a. quadratic formula  

b. Pythagorean theorem  
c. base 60 arithmetic  
d. volume of a pyramid  
e. none of the above  

Answers Chapter 12: 1. 23, 2. 38, 3. a, 4. b

Chapter 13

1. \[ \frac{11^6}{11^2} = \]

2. The statement below which is FALSE is:
   a. \((7^3)^2 = 7^6\)
   b. \(2^0 = 1\)
   c. \(5^2 \cdot 5 = 5^3\)
   d. \((9 + 6)^3 = 9^3 + 6^3\)
   e. \(6^3 \cdot 6^2 = 6^5\)

3. \(2^{-1}\) is
   a. irrational  
b. -2  
c. \(\frac{1}{2}\)  
d. meaningless  
e. none of the above

4. \(3^5 + 3^5 = \)
   a. \(3^{10}\)  
b. \(325\)  
c. \(6^5\)  
d. \(610\)  
e. none of the above

5. \(4^5 \cdot 4^3 = \)

6. \(5^0 = \)

7. \(3^{-2} = \)

8. \((4^5)^3 = \)
   a. \(4^8\)  
b. \(4^{15}\)  
c. \(12^5\)  
d. \(4^{125}\)  
e. none of the above
9. \(100^{1.5} =\)
   a. 150
   b. 1,000
   c. 1,500
   d. 10,000
   e. none of the above

Answers Chapter 13: 1. 1, 11, 4, 2. d, 3. c, 4. e, 5. 4 8, 6. 1, 7. \(\frac{1}{9}\), 8. b, 9. b

Chapter 14

1. \((x + 1)(x - 3) =\)

2. If \(\frac{x}{2} + \frac{1}{3} = \frac{1}{2}\), then \(x =\)

3. A student has grades of 91, 79 and 77 on three exams. The remaining exam is the final exam, and it is worth two exams. What grade must the student earn on the final exam to attain an average of exactly 85?

4. Sales tax is 5%. If you purchase an item and the total charge (price plus tax) is $13.44, what was the price of the item?

5. You have 4 quarts of punch which is 50% fruit juice and 50% Seven-Up. How much fruit juice must you add to the punch to have a punch which is 80% fruit juice?

6. \((x - 2)(x + 1) =\)
   a. \(x^2 - x - 2\)
   b. \(x - 2\)
   c. \(x^2 - 3x\)
   d. \(x^2 - 2x - 2\)
   e. none of the above

7. Solve the equation \(3x + 5 = 9\)

8. A student has grades of 74 and 90 on two tests. What grade must she earn on a third test to have an average of 85?

9. Nancy has 36 coins. Some are quarters ($0.25) and some are nickels ($0.05). All together they are worth $6.60. How many nickels does Nancy have?
   a. 5
   b. 8
   c. 10
   d. 12
   e. none of the above
10. When Judy goes bowling, she rents shoes for $2.25 and pays $1.75 per game. How many games can Judy bowl for $11.00?

   a. 4
   b. 5
   c. 6
   d. 7
   e. none of the above

11. In a certain course, there are two exams worth 30% each, a major paper worth 20% and homework worth 20%. If a student got a score of 82 on the first exam, a score of 91 on the paper and homework grade of 76, what is the lowest score the student can get on the second test to have a semester grade of 85?

12. Solve the equation \[ \frac{5}{3} = \frac{20}{x} \]

13. Solve the equation \[ x + 0.20x = 5.40 \]

   a. \( x = 4.32 \)
   b. \( x = 4.50 \)
   c. \( x = 6.48 \)
   d. \( x = 5.29 \)
   e. none of the above

Answers Chapter 14: 
1. \( x^2 - 2x - 3 \), 2. \( 89 \), 3. \( 89 \), 4. $12.80$, 5. 6 quarts, 6. a, 7. \( x = \frac{4}{3} \), 8. 91, 9. d, 10. b, 11. 90, 12. \( x = 12 \), 13. b

Chapter 15

1. Euclid's **Elements** was written about

   a. 1000 B.C.
   b. 600 B.C.
   c. 300 B.C.
   d. 200 A.D.
   e. 400 A.D.

2. Euclid proved all his theorems on geometry by starting with geometric and general axioms. The number of only the geometric axioms was:

   a. 4
   b. 5
   c. 10
   d. 21
   e. none of the above

3. Two geometric figures that have the same shape but not necessarily the same size are called

   a. congruent
   b. symmetric
   c. similar
   d. parallel
   e. none of the above
4. The statement "The sum of the angles of a triangle is 180°," is an example of:
   a. an axiom  
   b. a definition  
   c. a theorem  
   d. a proof  
   e. none of the above

5. The statement below which is true in Euclidean Geometry is:
   a. all rectangles with the same perimeter have the same area  
   b. all rectangles are similar  
   c. all rectangles with the same area have the same perimeter  
   d. all right triangles are congruent  
   e. none of the above

6. If you have 80 feet of fence, the largest rectangular area you could fence would be

7. A rancher wants to enclose a rectangular area of 900 square meters. What’s the smallest amount of fence he could use?

8. The two rectangles below are similar. Find x.

9. According to Plato, geometry aims at knowledge of:
   a. the ever-changing physical world  
   b. triangles and circles as drawn on paper  
   c. "the eternal"  
   d. the science of surveying  
   e. ballistics

Answers Chapter 15: 1. c, 2. b, 3. c, 4. c, 5. e, 6. 400 square feet, 7. 120 meters, 8. x=9, 9. c

Chapter 17

1. To measure the width of a river, a person standing on one bank of a river spots a tall tree directly across the river. She then walks to another point 30 feet downstream. From that point, the angle between the river bank and the line of sight to the tall tree is 40°. The width of the river is (round off to the nearest foot)

2. At some point on the ground, located at a distance from the base of a building, an observer finds that the angle between the horizontal and the line of sight to the top is 75°. The building is 400 feet high. How far away is the observer from the base of the building? (round off to the nearest foot)

   a. 107 feet  
   b. 1493 feet  
   c. 104 feet
d. 1546 feet
e. none of the above

3. Find x:

4. At a point on the ground, located at a distance of 205 feet from the base of a building, an observer finds that the angle between the horizontal and the line of sight to the top is 75°. How tall is the building? (round off to the nearest foot)

   a. 55 feet
d. 792 feet
   b. 198 feet
e. none of the above
   c. 765 feet

5. Find x:

   (Answers are rounded to whole numbers.)
   a. 36
d. 91
   b. 30
e. none of the above
   c. 43

6. Find x:

   (Answers are rounded to whole numbers.)

7. An 18 foot ladder leans against a building. The angle the ladder makes with the ground is 62°. The ladder will reach up the building to a height of  (answers are rounded to the nearest foot)

   a. 18 feet
da. 20 feet
   b. 16 feet
e. none of the above
c. 8 feet
Chapter 18

1. Kepler’s Law is \( T = 0.0005465 \ D^{1.5} \). The average distance from the sun to the planet Venus is 108.2 million meters. The number of earth years in one revolution of Venus around the sun is

a. 1  
d. 0.13
b. 0.01  
e. 0.48
c. 0.62

2. Galileo's methodology for science included all of the following except:

a. basic principles come from the human mind  
b. use of deductive reasoning  
c. use of mathematics  
d. physical objects are real  
e. goal is description by use of formulas

3. For free fall, \( d = 16t^2 \). When \( t = 2 \) seconds, \( d = \)

4. If an object is dropped and falls for 2 seconds, its average speed during the 2 seconds is:

5. If you travel 400 miles in 8 hours, your average velocity was:

a. 50 miles / hr  
b. 45 miles / hr  
c. 60 miles / hr  
d. 55 miles / hr  
e. none of the above

6. For free fall, \( v = 32t \). How long will it take a falling object to reach a speed of 96 feet/sec?

a. 1/3 sec.  
b. 1 sec.  
c. 3 sec.  
d. 32 sec.  
e. none of the above

Answers Chapter 18: 1. c, 2. a, 3. 64 feet, 4. 32 feet / sec, 5. a, 6. c

Chapter 19

1. “All horizontal lines which are perpendicular to the screen must be drawn so as to go through the principal vanishing point” is a theorem of

a. Gauss’s non-Euclidean geometry.  
b. Euclidean geometry.  
c. perspective drawing.  
d. pre-Renaissance painting.  
e. none of the above.
2. "No human inquiry can be called true science unless it proceeds through mathematical
demonstrations," and "Let no one who is not a mathematician read my works (about art)," are quotes
from
a. Leonardo da Vinci
b. Euclid
c. Plato
d. Pascal
e. Descartes

3. Renaissance painters believed mathematics was necessary to achieve painting characterized by:

a. abstraction
b. cubism
c. realism
d. romanticism
e. none of the above

Answers Chapter 19: 1. c, 2 a, 3. c

Chapter 20

1. The father of modern mathematics and philosophy whose quest for certainty led him to follow the
pattern of mathematics by building on self-evident truths, such as “I think therefore I am”, was

a. Pascal
d. Riemann
b. Gauss
e. none of the above
c. Descartes

2. The point (2, –1) is located

a. above the X axis
d. on the Y axis
b. on the X axis
e. none of the above
c. below the X axis

3. The equation of the line which has a slope of + 4 and passes through the point (2,5) is

4. The slope of the line containing the points (2,–3) and (3, – 1) is m =

5. Find the equation of the line parallel to y = 2x + 5 and through the point (2, 1), and draw a graph
with both lines.
6. The graph on the right looks like the graph of:

   a.  $y = 2x$
   b.  $y = 2x - 1$
   c.  $y = -2x$
   d.  $y = -2x + 1$
   e.  $y = x + 1$

7. A certain church has 1500 members and plans to grow by 125 members per year. How many members does the church plan to have in 8 years?

   a.  1000  
   b.  2000  
   c.  2500  
   d.  3000  
   e.  none of the above

8. The equation of the line which passes through the origin and has slope $-2$ is

9. The line whose equation is $y = 3x - 2$ contains all of the following points except:

   a.  $(0, -2)$
   b.  $(-2, -8)$
   c.  $(3, 7)$
   d.  $(2, 4)$
   e.  $(-1, -9)$

10. The line perpendicular to $y = 2x + 5$ has a slope of $m = \text{ }$

11. Regular gasoline costs $3.29 per gallon. How much will 8 gallons cost?

Answers Chapter 20: 1. c, 2. c, 3. $y = 4x - 3$, 4. 2, 5. $y = 2x - 3$, 6. b, 7. c, 8. $y = -2x$, 9. e, 10. $-1/2$, 11. $26.32$

Chapter 21

1. Non-Euclidean geometries were first developed shortly after the year

   a.  300 BC  
   b.  150 A.D.  
   c.  1200 A.D.  
   d.  1500 A.D.  
   e.  1800 A.D.

2. To obtain non-Euclidean geometries, changes are made in Euclid’s axiom concerning ______

3. In relation to the real world in which we live, the idea of non-Euclidean geometry:

   a.  is interesting but not useful.
   b.  was always regarded as nonsense.
c. was used by Einstein in relativity theory.
d. implies relativism in ethics.
e. none of the above.

4. In the non-Euclidean geometry in which the parallel axiom states that two parallel lines go through the point not on a given line, the sum of the angles of a triangle is

a. equal to 180°
b. less than 180°
c. greater than 180°
d. equal to 270°
e. none of the above

5. The statement "If two triangles are similar, then they are congruent" is

a. true in non-Euclidean geometries.
b. true in Euclidean geometry.
c. true in all Euclidean and non-Euclidean geometries.
d. true in no geometry.
e. logical nonsense.

Answers Chapter 21: 1. e, 2. parallel lines, 3. c, 4. b, 5. a

Chapter 22
1. The median of the numbers 3, 2, 7, 8, 2, 1, 9 is _____
2. The mean of the numbers 4, 0, 5, -2, 3, 3, 1 is _____
3. Suppose a class of 35 students is given a 6-point quiz, with the results being summarized in the table below. Then the mode is

<table>
<thead>
<tr>
<th>Grade on quiz</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of students</td>
<td>6</td>
<td>10</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

a. 5  b. 4  c. 3.66  d. 3  e. none of the above

4. Suppose a class of 35 students is given a 6-point quiz, with the results being summarized in the table below. Then the mean is

<table>
<thead>
<tr>
<th>Grade on quiz</th>
<th>6</th>
<th>5</th>
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<th>3</th>
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<td>6</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

a. 5  b. 4  c. 3.74  d. 3  e. none of the above

Answers Chapter 22: 1. 3, 2. 2, 3. a, 4. e (it's 3.66)

Chapter 23
1. When you roll a die, what is the probability of getting a one or a two or a three?

a. \(\frac{5}{6}\)  b. \(\frac{4}{6}\)  c. \(\frac{3}{6}\)  d. \(\frac{2}{6}\)  e. none of the above
2. If a box contains 3 red pencils and 7 green pencils, the probability of randomly selecting a red pencil from the box (without looking in the box) is 

3. When you toss 2 coins, the probability that they both land on “heads” is 

4. A game consists of tossing 2 coins and receiving $2 for exactly 1 "heads" and $5 for 2 "heads". Find the expected value.

a. $2.25  
b. $2.33  
c. $3.00  
d. $3.50  
e. none of the above 

Answers Chapter 23:  1. c, 2. \( \frac{3}{10} \), 3. \( \frac{1}{4} \), 4. a 

Chapter 24

1. Zeno’s paradox concerned 
   a. movement subdivided into stages or parts.  
   b. the motion of planets.  
   c. the trinity.  
   d. rational numbers that are not-terminating non-repeating decimals.  
   e. none of the above 

2. The repeating decimal 1.373737..... written as a fraction would be equal to: ______ 

3. The repeating decimal 0.222222..... written as a fraction would be equal to 

4. The sum of the infinite series \( .75 + .0075 + .000075 + \ldots \) is 
   a. infinity  
   b. .757575  
   c. \( \frac{75}{100} \)  
   d. \( \frac{75}{99} \)  
   e. none of the above 

5. The sum of the infinite series \( 1 + 0.25 + 0.25^2 + 0.25^3 + \ldots \) is 

6. The sum of the infinite series \( 1 + 0.9 + 0.9^2 + 0.9^3 + \ldots \) is 

7. The sum of the infinite series \( 0.9 + 0.09 + .009 + \ldots \) is ______
Chapter 25

1. The set \{1, 2\} is a proper subset of
   a. \{1\}  d. \{1, 2, 3\}
   b. \{3\}  e. none of the above
   c. \{3, 4, 5\}

2. There is a one-to-one correspondence between \{1, 3, 5\} and
   a. \{3\}
   b. \{5, 7, 9\}
   c. \{1, 3, 5, 7, 9\}
   d. \{1, 3, 5, 7, 9, .....\}
   e. none of the above

3. The idea of a formal treatment of infinite sets in mathematics was first developed around _____ by Cantor.

4. There is a one-to-one correspondence between \{2, 4, 6, 8, \ldots \} and
   a. \{2, 4, 6, 8\}
   b. \{1, 3, 5, 7, \ldots \}
   c. infinity
   d. the descendants of Abraham
   e. none of the above

5. What is \{3, 8, 9, 17\} U \{1, 2\}?

6. What is \{3, 8, 9, 17\} \cap \{1, 2, 3, 16, 17, 18\}

Answers Chapter 25: 1. d, 2. b, 3. 1900 A.D, 4. b, 5. \{1,2,3,8,9,17\}, 6. \{3,17\}

Chapter 26

1. For the sequence \(a_n = \frac{2n^2 + 3n + 1}{3n^2}\), find the value of an as \(n \to \infty\).

2. Evaluate \(\int_0^2 x^3 \, dx\)

3. Find the area of the region between vertical lines \(x = 1\) and \(x = 2\), the x-axis and the graph of \(y = x^2\)

Answers Chapter 26: 1. \(\frac{2}{3}\), 2. 4, 3. \(\frac{7}{3}\)