1) Math Toss up *Multiple Choice*:What is the greatest possible length of the third side in a right triangle with two side lengths 3 and 5?

W) 4

X) 6

Y) √34

Z) √37

Answer: Y

2) Math Bonus short answer:

What do you call a line segment connecting two points on a circle?

Answer: a chord

3) Math Toss up *short answer*: Find the distance between the two points (0,4) and (-3,0)

Answer: 5

4) Math Bonus short answer: Find the sum of the roots of the equation x^2-3x+2943

Answer: 3

5) Math Toss up Multiple Choice: What is the relationship between the tangent and normal lines at a point on a curve? They are

W) parallel

X) perpendicular

Y) The same line

Z) intersecting at the origin

Answer: X

6) Math Bonus short answer: Find the slope of the tangent line to the function y=x^2 at x=0

Answer: 0

7) Math toss up multiple choice: The greatest number used for writing numbers in base 8 is

W) 6

X) 7

Y) 8

Z)9

Answer: X

8) Math bonus short answer: convert the number 2222 in base 3 to base 9

Answer: 88

9) Math toss up multiple choice: What is the probability of rolling a 7 on a pair of dice?

W) 1/36

X) 1/18

Y) 1/12

Z) 1/6

Answer: Y

10) Math bonus short answer: What is the probability of flipping 6 coins and getting 4 heads

Answer: 15/64

11) Math toss up multiple choice find the y intercept of the equation y=2|x|+7

W) 1

X) 2

Y) 7

Z)14

Answer: Y

12) Math Bonus multiple choice: The greatest positive integer n such that there exists a general formula for the roots of n is

W) 4

X) 5

Y) 6

Z) 7

Answer: W

13) Math Toss Up short answer: if 7x+5=17, find 14x+10

Answer: 34

14) Math bonus multiple choice: Find sin(-pi/6)

W) –√3/2

X) -1/2

Y) 1/2

Z) √3/2

Answer: X

15) Math Toss Up multiple choice: If A, B, and C, are positive reals, what is the general formula for an ellipse?

W) y=Ax^2+Bx+C

X) y=Ax+B

Y) Ax^2+By^2=C

Z Ax^2-By^2=C

Answer: Y

16) Math Bonus short answer: What is the area of an ellipse with major axis 4 and minor axis 6?

Answer: 6pi

17) Math toss up multiple choice If x is negative, then -|x|+3 equals

w) –x-3

X) –x+3

Y) x-3

Z) x+3

Answer: Z

18) Math bonus short answer: How many roots does |x-3|^2-2 have?

Answer: 2

19) Math Toss up multiple choice: find the radius of the incircle of a triangle with side lengths 6, 8, and 10

W) 1

X) 2

Y) 3

Z) 4

Answer: X

20) Math Bonus Multiple choice: The distances between the center of the circumcircle of a triangle and its vertices

W) Form an arithmetic sequence

X) Form a geometric sequence  
Y) Sum to the perimeter of the triangle

Z) Are equal

Answer: Y

21) Math toss up multiple choice: Find 1-(1/2+1/4+1/8+1/16)

W) 1

X) 1/4

Y) 1/18

Z) 1/16

Answer: Z

22) Math Bonus short answer: What is the sum 1/3+1/9+1/27+… equal to?

Answer: 1/2

23) Math toss up short answer: How many platonic solids are there?

Answer: 5

24) Math bonus short answer: How many faces are there on an icosahedron?

Answer: 20

25) Math toss up multiple choice the kth number on the nth row of pascal’s triangle equals

W) k

X) n+k

Y) n P k

Z) n choose k

Answer: Z

26 math bonus short answer Find the probability of flipping 99 coins and getting an odd number of heads

Answer: ½

27 math toss up multiple choice: If the hypotenuse of a right triangle is 10, what is the sum of the squares of the two other sides?

W) 10

X) 10√2

Y) 100

Z) 1000

Answer: Y

28) math bonus short answer Find the area of a triangle with side lengths 13, 14, and 15

Answer: 84

29) math toss up multiple choice What is the sum of the two possible values for x such that x^2+26=51

W) 0

X) 5

Y) 10

Z) 15

Answer: W

30) Math bonus multiple choice: The magnitude of vector v is 5 and the magnitude of vector w is 6. If the angle between them is 90 degrees, find the dot product of the two vectors

W) -1

X) 11

Y) 25

Z) 30

Answer: Z

31) Math toss up short answer: Find the mode of the following set {0,1,3,2,1,5}

Answer: 1

32 Math bonus short answer: What is the median of the numbers less than 200 and greater than 98  
answer: 149

33) Math toss up short answer: Find the number of divisors of 2^4\*3^4\*5^4

Answer: 125

34) Math bonus short answer: What is the closest number to 1,000,000/7

Answer: 142857

35) Math toss up multiple choice: the number of bacteria in a container grows at a rate proportional to the amount and doubles every hour. To the nearest 10th, what is the ratio of the number of bacteria after a half hour to the number at the start?

W) 1.1

X) 1.4

Y) 1.7

Z) 2.0

Answer: X

36) Math bonus multiple choice What is the natural log of 32 divided by the natural log of 4

W) 1.5

X) 2

Y) 2.5

Z) 3

Answer: Y

37) Math toss up short answer: what is ½+1/3+1/6

Answer: 1

38) Math bonus short answer: Convert 86 to base 3

Answer: 10012

39) Math toss up multiple choice: What is the product of the roots of the equation x^2-4x+8

W)1

X)2

Y)4

Z)8

40) Math Bonus short answer: Find the discriminant of the quadratic 2x^2-3x+4

W) -23

X)-17

Y) 0

Z) 23

41) Math toss up multiple choice Find (3+2i)(3-2i)

W) 0

X)5

Y)9

Z) 13

42) Math bonus short answer Find the sum of the coefficients in the expression (x+3)^5

Answer: 1024

42) Math toss up short answer What’s the volume of a box with side lengths 3, 4, and 5?

Answer: 60

44) Math bonus short answer What’s the volume of a regular octahedron of side length 1

Answer: √2/3

45) Math toss up multiple choice What’s the probability that a randomly selected point is in the first quadrant?  
W) 1/8

X) ¼

Y)1/2

Z)1

46) Math bonus short answer: Find the length of the hypotenuse of a right triangle which is inscribed in a circle of radius 7

Answer: 14

47) Math toss up multiple choice: Find the slope of the line -2x+3y=4

W) 0

X) 2/3

Y) 1

Z) 2

48) Math bonus short answer: Find the midpoint of the line segment connecting (-5,20) and (15,0).

Answer: (5,10)

49) Math toss up short answer What’s the name of the mathematician who used the Hebrew letter aleph to describe cardinal numbers

Answer: (George) Cantor

50. Math bonus short answer: What famous sequence converges to phi^n

Answer: Fibonacci (sequence)