Question: 1

For a quadratic equation, which of the following is FALSE?

A. If the discriminant is negative, there are no real solutions
B. If the discriminant is zero, there is only one solution
C. If the discriminant is negative there are two different real solutions
D. If the discriminant is positive there are two different real solutions

Answer: C

Question: 2

The natural logarithm of x is:

A. the inverse function of exp(x)
B. log(e)
C. always greater than x, for x>0
D. 46

Answer: A

Question: 3

When a number is written with a fraction as an exponent, such as , which of the following is the correct computation?

A. Take the square-root of 75 and raise it to the 5th power
B. Divide 75 by 2, then raise it to the 5th power
C. Multiply 75 by 2.5
D. Square 75, then take the fifth root of it

Answer: A

Question: 4

You invest $2m in a bank savings account with a constant interest rate of 5% p.a. What is the value of the investment in 2 years time if interest is compounded quarterly?

A. $2,208,972
B. $2,210,342
C. $2.205,000
D. None of them

Answer: A

Question: 5

Solve the simultaneous linear equations: x + 2y - 2 = 0 and y - 3x = 8

A. x = 1, y = 0.5
B. x = -2, y = 2
C. x = 2, y = 0
D. None of the above

Answer: B

Question: 6

Find the roots, if they exist in the real numbers, of the quadratic equation

A. 4 and -2
B. -4 and 2
C. 1 and 0
D. No real roots

Answer: D

Question: 7

The sum of the infinite series 1+1/2+1/3+1/4+1/5+.... equals:

A. 12
B. Infinity
C. 128
D. 20

Answer: B

Question: 8

Which of the following properties is exhibited by multiplication, but not by addition?

A. associativity
B. commutativity
C. distributivity
D. invertibility

Answer: C

Question: 9

Identify the type and common element (that is, common ratio or common difference) of the following sequence: 6, 12, 24

A. arithmetic sequence, common difference 2
B. arithmetic sequence, common ratio 2
C. geometric sequence, common ratio 2
D. geometric sequence, common ratio 3

Answer: C

Question: 10

What is the sum of the first 20 terms of this sequence: 3, 5, 9, 17, 33, 65,…?

A. 1 048 574
B. 1 048 595
C. 2 097 170
D. 2 097 172

Answer: C

Question: 11

What is the simplest form of this expression: log2(165/2)

A. 10
B. 32
C. 5/2 + log2(16)
D. log2 (5/2) + log2(16)

Answer: A

Question: 12

For each of the following functions, indicate whether its graph is concave or convex:
Y = 7x2 + 3x + 9
Y = 6 ln(3x)
Y = exp(-4x)

A. concave, concave, concave

B. concave, convex, convex
C. convex, concave, concave
D. convex, convex, concave

Answer: C