1. Evaluate: \( \log_4 9 \).
   A) 1.58  
   B) 0.95  
   C) 1.69  
   D) 5.42

2. An angle lies on the coordinate plane with its vertex on the origin and one side along the positive x-axis. If the other side of the angle passes thru the point (15, 8), what is the sine of the angle?
   A) 8/15  
   B) 8/17  
   C) 15/17  
   D) 15/8

3. Find the surface area of a cylinder with radius 8 cm and a height of 10 cm.
   A) 80\pi \text{ cm}^2  
   B) 640\pi \text{ cm}^3  
   C) 224\pi \text{ cm}^2  
   D) 288\pi \text{ cm}^2

4. Find the volume of a cone with radius x and height 3x
   A) \pi x^3  
   B) 192\pi x^3  
   C) 3\pi x^3  
   D) \pi x^2

5. Solve for x: \( 2 \ln e^{5x} = 7.2 \) (to the nearest hundredth)
   A) 0.72  
   B) 3.60  
   C) 2.88  
   D) 1.66

6. Find the length of the longer leg of a 30°-60°-90° triangle with a hypotenuse of length x.
   A) x\sqrt{3}  
   B) \frac{x}{\sqrt{3}}  
   C) \frac{x}{2}  
   D) \frac{x\sqrt{3}}{2}

7. Find the inverse of the following matrix: \( \begin{bmatrix} 3 & 2 \\ 9 & 6 \end{bmatrix} \)
   A) \( \begin{bmatrix} 1/3 & 1/2 \\ 1/4 & 1/6 \end{bmatrix} \)  
   B) \( \begin{bmatrix} 3 & 2 \\ 9 & 6 \end{bmatrix} \)  
   C) \( \begin{bmatrix} 6 & -2 \\ -9 & 3 \end{bmatrix} \)  
   D) Does not exist

8. Which value is not equal to \( \sqrt[6]{64} \)?
   A) \( \sqrt[6]{64} \)  
   B) 10.6  
   C) \( \sqrt[6]{4096} \)  
   D) 2

9. If \( \sin \Theta = \frac{3}{4} \) and \( \Theta \) terminates in the first quadrant, find the exact value of \( \sin 2\Theta \).
   A) 6/8  
   B) 3/2  
   C) \( \frac{3\sqrt{7}}{8} \)  
   D) \( \frac{6\sqrt{2}}{7} \)

10. What is the maximum number of x-intercepts of a seventh degree polynomial?
    A) 0  
    B) 1  
    C) 7  
    D) 10

11. What is the minimum number of x-intercepts of a seventh degree polynomial?
    A) 0  
    B) 1  
    C) 7  
    D) 10
12. What is the area of a 45°-45°-90° triangle with a hypotenuse of length 8?
   A) 8  B) 16  C) 32  D) 64

13. Approximate the area of a triangle with side lengths of 6 cm, 7 cm and 8 cm.
   A) 20.3 cm²  B) 21.0 cm²  C) 42.0 cm²  D) 239.4 cm²

14. Solve the system of equations using matrices:
   \[ \begin{align*}
   x - y + z &= 3 \\
   2y - z &= 1 \\
   2y - x + 1 &= 0
   \end{align*} \]
   A) (1, 0, -1)  B) (2, 2, 3)  C) (1, 3, 1)  D) (3, 1, 1)

Use this set of data for questions 15-17
\{42, 56, 39, 87, 56, 41, 89, 65, 39, 12\}

15. Find the 5-number summary (minimum, Q1, med., Q3, maximum).
   A) (42, 39, 48.5, 65, 12)  B) (39, 40, 56, 76, 89)  C) (12, 39, 49, 65, 89)  D) (12, 39, 52.6, 65, 89)

16. What are the outliers?
   A) 12  B) 89  C) 12 and 89  D) none

17. Find the mean and standard deviation.
   A) 52.6, 22.2  B) 52.6, 23.5  C) 49, 22.2  D) 49, 23.5

18. Solve for x:
   \[ \frac{1}{8} = 4^{6x+2} \]
   A) \(-\frac{5}{6}\)  B) \(-\frac{7}{12}\)  C) \(-\frac{1}{12}\)  D) \(-\frac{3}{4}\)

19. Suppose \( z \) varies directly as the square of \( x \) and inversely as \( y \). If \( z = 8 \), when \( x = 4 \) and \( y = 6 \), find \( z \) when \( x = 6 \) and \( y = 12 \).
   A) \( \frac{3}{2} \)  B) 6  C) \( \frac{64}{9} \)  D) 9

20. Find the area of an equilateral triangle with a perimeter of 21.3.
   A) 700.2 square units  B) 247.0 square units  C) 6.1 square units  D) 21.8 square units

21. In \( \triangle ABC \), \( m\angle B = 73^\circ \), the side opposite \( \angle B \) is 40 cm and the side opposite \( \angle A \) is 23 cm. What is \( m\angle A \)?
   A) 33.4°  B) 32.4°  C) 34.4°  D) 35.4°

22. Bob has $2200 he put in the bank and earns 3.8% compounded quarterly. What will his balance be after 5 years?
   A) $11,423.99  B) $2,657.96  C) $2,875.35  D) $2618.00

23. What is the domain of \( f(x) = e^{\sqrt{x}} \)
   A) All Real Numbers  B) \( x > 0 \)  C) \( x \geq 0 \)  D) \( x \geq 1 \)
Advanced Math 2012: Answer Key

1. A
2. B
3. D
4. A
5. A
6. D
7. D
8. B
9. C
10. C
11. B
12. B
13. A
14. D
15. C
16. D
17. B
18. B
19. D
20. D
21. A
22. B
23. C