1. What is the coefficient of the $x^2$ term in the product $(x^2 - 3x + 7)(x + 5)$?
   (A) $-3$  (B) $2$  (C) $3$  (D) $5$  (E) $7$

2. Which of the following is a factor of $8x^3 - y^3$? Circle all those that apply.
   (A) $x - y$  (B) $x + y$  (C) $2x - y$  (D) $2x + y$  (E) $4x - y$

3. Which of the following is a root of $x^2 - 2x = 15$?
   (A) $2$  (B) $3$  (C) $5$  (D) $15$  (E) $17$

4. How many roots does the equation below have?
   \[ x^2(x^2 - 3) - 4(x^2 - 3) = 0 \]
   (A) $0$  (B) $1$  (C) $2$  (D) $3$  (E) $4$

5. What is the distance between the point $(-2, 3)$ and the midpoint of the line segment joining $(3, 9)$ and $(5, 13)$?
   (A) $\sqrt{14}$  (B) $9$  (C) $\sqrt{90}$  (D) $10$  (E) $\sqrt{149}$

6. What is the value of $|6\pi - 19| - |16 - 5\pi|$?
   (A) $3 + \pi$  (B) $\pi - 3$  (C) $3 - \pi$  (D) $35 + 11\pi$  (E) $11\pi - 35$
7. If \( b^2 - 4ac = 0 \), then the number of roots of \( ax^2 + bx + c = 0 \) is

(A) 0    (B) 1    (C) 2
(D) 3    (E) cannot be determined from this information

8. Which of the following points belongs to the circle of radius 5 and center at \((4, 7)\)?

(A) \((7, 8)\)    (B) \((7, 9)\)    (C) \((7, 10)\)    (D) \((7, 11)\)    (E) \((7, 12)\)

9. What is the slope of the line passing through \((7, 8)\) that is perpendicular to the line \(3x - 4y = 7\)?

(A) \(3/4\)    (B) \(-3/4\)    (C) \(4/3\)    (D) \(-4/3\)    (E) \(3/7\)

10. What is the slope of the line that includes the points \((-2, 3)\) and \((3, -4)\)?

(A) \(-7/5\)    (B) \(-1/5\)    (C) \(1/5\)    (D) \(7/5\)    (E) 7

11. Which of the following points is not in the domain of the function \( f \) defined by \( f(x) = \sqrt{(x - 1)(x + 1)} \)?

(A) \(-3\)    (B) \(-1\)    (C) 0    (D) 1    (E) 4
On all the following questions, show your work.

12. (12 points) The relationship between the Celsius ($C$) and the Fahrenheit ($F$) temperature scales is linear. Water boils at $212^\circ F$ which is equivalent to $100^\circ C$. Also, water freezes at $32^\circ F$ and at $0^\circ C$. Find $F$ as a function of $C$ and use this equation to find the Fahrenheit temperature in the central square in Seville, Spain, in August, 1997 when the Celsius temperature was $53^\circ$.

13. (20 points) Let $f(x) = \sqrt{2x}$. Use the definition of derivative (ie, the difference quotient) to compute $f'(x)$. 
14. (20 points) Use the definition of derivative (ie, the difference quotient) to compute the derivative of the following function: $f(x) = 1/x$. 
This part of the test is for you to take home. Its due next class meeting. You’re on your honor not to discuss it with anyone. You must sigh a pledge that you have not done so. Sign below: I have not discussed this problem with anyone.

15. (20 points) Let

\[ f(x) = \begin{cases} x - 1 & \text{if } x \leq 2 \\ 3x - 10 & \text{if } x > 2 \end{cases} \]

and let

\[ g(x) = \begin{cases} x^2 - 3 & \text{if } x \leq 0 \\ x + 2 & \text{if } x > 0 \end{cases} \]

(a) (4 points) Compute \( g \circ f(-1), g \circ f(0), g \circ f(1), g \circ f(1.5), g \circ f(2), g \circ f(3), g \circ f(\pi), \) and \( g \circ f(4). \)

(b) (16 points) Find a symbolic representation of \( g \circ f(x) \). Simplify your answer.