IF YOU HAVE PLACED YOURSELF IN MATH 157 CALCULUS AND ANALYTIC GEOMETRY I (or a higher MATH course), please complete the following Quick Exam to confirm the accuracy of that placement. The Mathematics and Computer Science Department at Gonzaga University constructed this Exam and strongly recommends that you honestly work through these problems without the aid of a calculator or computer.

The following Exam contains 25 questions pertaining to Pre-Calculus skills. Answers may be found on the back of this Exam. **If you correctly answer 15 or more questions, it is appropriate for you to register for MATH 157 Calculus and Analytic Geometry I.** Such a score does not guarantee your success in this course, but it does indicate that you possess the appropriate skills to begin mathematics coursework at this level.

A score below 15 indicates that a choice of MATH 147 Pre-Calculus will be more appropriate for your skill level at this point. **Even if you have studied Calculus in high school, a score of below 15 is not unusual.** It is the STRONG opinion of the Department of Mathematics and Computer Science that your academic career, especially in mathematics, will be better served by reviewing Pre-Calculus prior to commencing study of Calculus and Analytic Geometry I.
1. Solve for $x$: $3x + 7 = 12$.

2. Solve for $x$: $3(x - 3) + 4 = 7(x + 1)$.

3. Find an equation of the line passing through the points $(3, 4)$ and $(6, 2)$.

4. Find an equation of the circle which has center at $(7, -1)$ and has radius 4.

5. Solve for $x$: $x^2 - 6x - 7 = 0$.

6. Solve for $x$: $x^2 + x - 1 = 0$.

7. Solve for $x$: $x(x + 1) = 3(x + 1)$.

8. Solve for $x$: \( \frac{3}{x + 1} = \frac{4}{x + 2} \).

9. Solve for $x$: $\sqrt{x} + 7 = 12$.

10. Find all $x$ satisfying the inequality $3x + 7 \leq 5x + 1$.

11. Find all $x$ satisfying the inequality $x^2 - 5 \leq 4x$.

12. Find all $x$ satisfying the inequality $\frac{x^2 - 4}{x + 1} < 0$.

13. If $f(x) = x^2 + 1$ and $g(x) = 3x + 1$, find and simplify $f(g(x))$.

14. If $f(x) = x^2 - 3x$, find and simplify $f(6 + h)$.

15. If $f(x) = 2x^2 + 1$, find and simplify $\frac{f(x + h) - f(x)}{h}$. 
16. What is the domain of the function \( f(x) = \frac{x}{(x - 3)(x + 4)} \)?

17. Find all \( x - \) intercepts and all \( y - \) intercepts on the graph of \( f(x) = \frac{(x + 3)(x - 1)}{(x + 2)(x - 3)} \).

18. Sketch a graph of the function \( f(x) = 3\sin2x \) for \( 0 \leq x \leq 2\pi \).

19. Find all \( x \) between 0 and \( 2\pi \) for which \( 2 + 4\cos x = 0 \).

20. Suppose that \( \sin \theta = 0.3 \) and that \( \theta \) is an angle in the second quadrant. What is the value of \( \cos \theta \)?

21. If \( \theta \) is an angle for which \( \sin \theta = \frac{1}{3} \) and \( \cos \theta = \frac{2\sqrt{2}}{3} \), what is the value of \( \sin(\theta + \pi) \)?

22. If \( \log x = 3 \) and \( \log y = 5 \), what is the value of \( \log (xy^2) \)?

23. Express the solution to \( 3^x - 4 = 9 \) in terms of logarithms.

24. Factor the polynomial \( x^3 - 3x^2 - 10x \) into linear factors.

25. Find the coordinates for the vertex of the parabola \( y^2 - 4y + 4 = 3x \).
1. \( \frac{5}{3} \)

2. \( x = -3 \)

3. \( y = -\frac{2}{3}x + 6 \)

4. \( (x - 7)^2 + (y + 1)^2 = 16 \)

5. \( x = 7, \ x = -1 \)

6. \( x = \frac{-1 + \sqrt{5}}{2}, \ x = \frac{-1 - \sqrt{5}}{2} \)

7. \( x = 3, \ x = -1 \)

8. \( x = 2 \)

9. \( x = 25 \)

10. \( x \geq 3 \)

11. \( -1 \leq x \leq 5 \)

12. \( x < -2 \) or \( -1 < x < 2 \)

13. \( 9x^2 + 6x + 2 \)

14. \( h^2 + 9h + 18 \)

15. \( 4x + 2h \)

16. \( \{x| x \neq 3, \ x \neq -4\} \)

17. \( x = -3, \ x = 1, \ y = \frac{1}{2} \)

18. (Graph of a function)

19. \( x = \frac{2\pi}{3} \) and \( x = \frac{4\pi}{3} \)

20. \( x = -\frac{\sqrt{91}}{10} = -\sqrt{.91} \)

21. \( -\frac{1}{3} \)

22. 13

23. \( x = \log_3{13} = \frac{\log{13}}{\log{3}} = \frac{\ln{13}}{\ln{3}} \)

24. \( x(x - 5)(x + 2) \)

25. \( (0, 2) \)