

Engineering-Focused Math 2250 Diagnostic Exam

The self-test below covers the sort of precalculus material that you'll need to know on a day-to-day basis in order to succeed in this section of Math 2250. This "exam" is assigned for homework; your assignment is to sit and complete the questions to the best of your ability without studying and then to grade yourself. You should turn in the graded exam along with a few sentences explaining your plan of action based on your score.

A score of at least 17 correct indicates that you're prepared for success in this section. A score from 12-17 means that you should consider a different section of Math 2250. A score below 12 means that you may not be ready for any Math 2250 course and should consider Math 2200 or taking a precalculus course first.

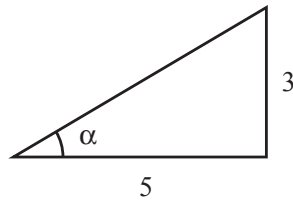
Do not worry about correcting your exam work: this is purely to help you decide which section to be in! Completing and turning in the assignment will count for 10 points of homework credit regardless of your score.

1. ALGEBRA PROBLEMS

1. What is the distance between the points $A = (5, 1)$ and $B = (7, 2)$?
2. What is the slope of the straight line through the points $P = (3, 5)$ and $Q = (6, 9)$?
3. What is the equation of this line?
4. What is the equation of the line through $(2, 4)$ with slope 3? (Point-slope form is fine.)
5. Solve the equation $x^2 + 3x - 7 = 0$ for x .
6. Solve the equation $P(V - b) = nRT$ for V .
7. Factor the polynomial $x^2 - 5x + 6$.
8. Solve the inequality $x^2 - 5x + 6 > 0$.
9. Simplify the expression $(3a - b)^2 a^3 - (a^3 + 7b)(b^2 - 2a^2)$.
10. Simplify the expression
$$\frac{\frac{1}{A} - \frac{1}{B}}{C}$$
11. Simplify the expression
$$\frac{3x + 2}{x^2 - x} - \frac{x + 1}{x^2}$$
12. Solve the equation $\sqrt{x^2 - 5} = \sqrt{x + 1}$.
13. Without a calculator, find the numerical value of $27^{2/3}$.
14. Simplify the expression
$$\frac{y^4(x^3y^{-2})}{2(2x)^{-1}}$$
15. Complete the square in the expression $x^2 + 4x + 17$.

2. TRIGONOMETRY, LOGARITHMS AND EXPONENTS

1. Without a calculator, find the numerical value of $\ln e^3$.
2. Simplify the expression $e^{\ln 3t}$.
3. Combine $2 \ln x + 5 \ln y - \ln z$ into a single expression.
4. Convert 45 degrees to radians.
5. Convert $7\pi/4$ to degrees.
6. In the triangle below, what is $\sin \alpha$?



7. Without a calculator, find all solutions to $\sin 3x = 1$.
8. Simplify the expression $3 \cos^2 5x + 3 \sin^2 5x$.