

Name:

Mathematics 446 — Diagnostic quiz

This quiz will not count towards your course grade, but it will give you some indication of what you should be able to do efficiently in order to do well in this class. You may not use a calculator. Allow an average of 2 minutes per question, although many should take you only a few seconds. Write neatly. Put your name on each sheet. Use the back of the pages for scrap work.

1. What is the sum of $121/1001$ and $103/999$?

2. What is the standard way of expressing the year MCMLXXVII?

3. What is the greatest common divisor of 4,641 and 1,911?

4. If $|q| < 1$, what is $1 + q + q^2 + q^3 + \dots$?

5. Sketch a proof of your answer to the previous question.

6. What is the cube of 1,001?

7. What is

$$\int \frac{dx}{1+x^2} ?$$

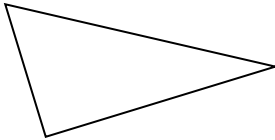
8. What is

$$\int_{-\infty}^{\infty} \frac{dt}{1+t^2} ?$$

9. What is

$$\frac{d \arctan x}{dx} ?$$

10. In the following triangle, label all angles with their exact value.



11. What is $\sqrt{1.001}$ rounded to 6 significant figures?

12. If you borrow \$1,000 at 1% compound annual interest and pay back \$250 at the end of a year, how much do you owe at the end of two years?

13. Fill in the blanks:

$$(a + b)^7 = \square a^7 + \square a^6 b + \square a^5 b^2 + \square a^4 b^3 + \square a^3 b^4 + \square a^2 b^5 + \square a^1 b^6 + \square b^7 .$$

14. What function $y(x) \neq 0$ is equal to its own derivative?

15. Find the quotient and remainder of 100,001 divided by 1,001.

16. What is the next term in the following series?

$$1 + 1 + \frac{1}{2} + \frac{1}{6} + \frac{1}{24} + \dots$$

17. What is the name of the number the series converges to?

18. What is that number correct to 3 decimal places?

19. What is the expression for 13 in base 2?

20. What is the decimal expansion of $1/99$?