Diagnostic

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29 August 2012

This test totals 0 points and you get 20 minutes to do it. If you are brave or don’t care, you can put down your name. Good luck!

1. What is the area of a circle?
2. What is the volume of a cylinder?
3. Are the above two questions related?
4. $\pi$ radians is how many degrees?
5. 60 degrees is how many radians?
6. Write down a number
7. Is it an integer? If so, give me something which is not an integer
8. Do you know any numbers which are not fractions? Is so, give an example.
9. What is $0.9 + 0.99 + 0.999 + 0.9999 + \ldots$? Make an intelligent guess if you are not sure.
10. Expand $\cos(a + b)$
11. Multiply out $(x + a)(x - a)$
12. Factor $(x^4 - a^4)$
13. Have you heard of Pascal’s triangle?
14. Multiply out $(x + a)^3$. 

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15. Give an example of a quadratic equation. How many roots does yours have?

16. Do you remember the quadratic formula? Write it down, if you do.

17. Simplify the expression

\[
\frac{y}{x} - \frac{x}{y} - \frac{1}{y} - \frac{1}{x}
\]

18. Are you generally jittery about simplifying algebraic expressions?

19. \(2^3 = 8\). In the language of logarithms, this translates to?

20. What is \(25^{\frac{1}{2}}\). Hint: 5 times 5 is 25

21. Do you remember how sin and cos behave in different quadrants

22. What is \((\frac{2}{3})^{-2}\)? Leave the answer as a fraction

23. Is \(\frac{1}{x-y} = \frac{1}{x} - \frac{1}{y}\)?

24. If \(\sin 3 = 0.1\) and \(\sin 9 = 0.4\),
   (a) What is \(\sin^2 3\) ?
   (b) What is \(\sin(3^2)\) ?
   (c) What is \((\sin 3)^2\) ?
   (d) Do you see why brackets are important?

25. Look at \(2 + 3 \times 5 - 4\)
   (a) Does this drive you mad? Why or why not?
   (b) Bracket this expression in two different ways, to give two different answers

**Choco-question** You get a chocolate bar if you can calculate \(1+2+3+4\ldots+1000\) by hand (without a calculator) and tell me the answer in this class