

Physics 341
Physics of Music
Math Status Test

Name:

The following questions are to give me an idea of what the mathematical and musical sophistication is of the people in this class. The level of mathematics tested here is very roughly the level expected of you during this course. This test is primarily so that I will know the level to use in teaching the class. I neither want to bore you with elaborate explanations of concepts which are well known to you, nor snow you with math that you have long forgotten. This test does not count for anything and is for my information only. Please answer as many questions as you can (guess if you have some feeling that you know what the question means).

1. $8^2 = 8 \times 8 = 64$
2. $\sqrt{36}$ is that number which when multiplied by itself is 36, which is 6.
3. $(16)^{1/2}$ The exponent $1/2$ means the same thing as the square root, so this answer is just 4.
4. Write out in full decimal notation
 - (a) $6.3 \times 10^4 = 6.3 \times 10000 = 63000$
 - (b) $5.7 \times 10^{-2} = 5.7/100 = .057$
5. Solve for x in each of the following equations:

a)

$$5x - 8 = 7$$

We can add 8 to both sides of the equation to give $5x = 8 + 7 = 15$
. Dividing both sides by 5 gives $x = 15/5 = 3$

b)

$$ax + b = 6$$

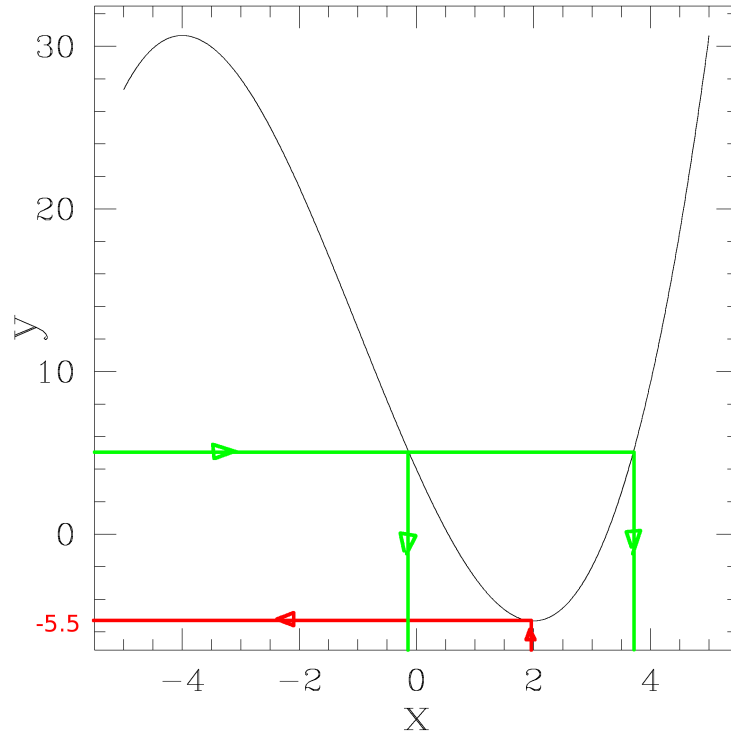
subtracting b from both sides gives $ax = 6 - b$ and then dividing
both sides by a gives $x = (6 - b)/a$

6. $\sqrt{\frac{a^4}{b^2}} = \frac{\sqrt{a^4}}{\sqrt{b^2}} = \frac{a^2}{b}$

7. What is the meaning of π ? What is the approximate value of π .

π is the ratio the length of the circumference of a circle to its diameter
(or is also the ratio of the area of the circle to the area of a square
with side length equal to the radius of the circle). It's approximate
value is 3.14 (or some learn $22/7$) Both are approximations. There is
no finite fraction which equals π , and the decimal expansion goes on
forever. (3.1415926.....)

8. In the following graph, a function $y(x)$ is plotted against x . Answer
the following questions about this graph.



(a) If x has value 2 what are the possible values of y ?

There is only one possible value for y which is approximately -5 (each minor tick on the y axis is 2). Following the red line, you go up vertically from the point on the lower x axis representing the value 5 until you hit the curve, then go horizontally to the vertical y axis on the left to read off the value. (It is below zero. Since each minor tick on the y axis is 2, and one is just a bit over 2 and a half minor ticks below 0, that gives us a value slightly more negative than -5)

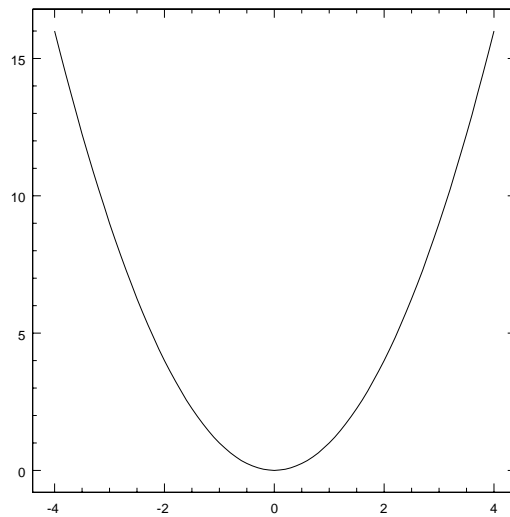
(b) If y has the value 5, what are the possible values of x ?

There are two possible values for x , approximately 0 and 4 (more closely -0.2 and 3.7)

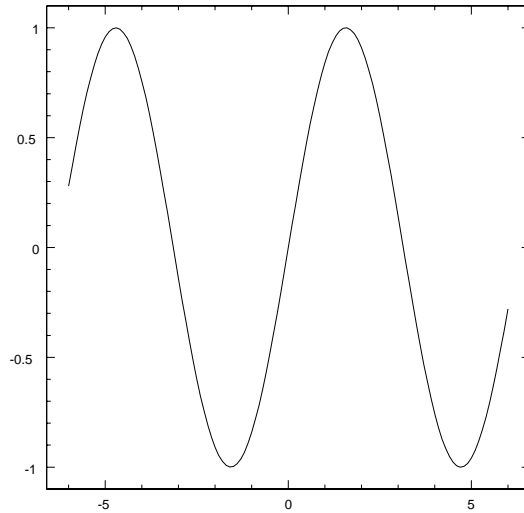
Again, you can now follow the green line, and start at the value on the vertical y axis representing the value 5 (2 and a half ticks above 0) Go

horizontally until you hit the curve, and then down to the x axis to read off the value. There are two places where the horizontal line hits the curve, and both would be a possible value of x.)

9. Sketch the graph for the function $y = x^2$.



10. Sketch the graph for the function $y = \sin(x)$.



11. What is the name of the note an octave above middle C?
 The answer is C. Two notes separated by an octave have the same letter name. Some namings differentiate between the various octave. The one often used calls middle C C_4 . An octave higher would be C_5 .

12. What is the name of the note a perfect fifth above A? A perfect fifth below A?
 Above= E
 Below= D

13. What is the name of the note a major sixth above G? A minor sixth below G?
 Above=E
 Below=B

14. Do/did you play a musical instrument? If so which and how long have you played?

15. Why did you decide to take this course? What do you hope to get out of this course?

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