Calculus AB Summer Prep Worksheet   Expect a quiz on this material on the 3rd day of class. Your ability to learn calculus depends to a great extent on your mastery, or at least proficiency, of all the concepts tested below as well as others. This will give you some indication as to whether you are truly prepared.

* indicates that you should use a calculator; otherwise don't use one.

1. $\sin \frac{\pi}{3} = ?$

2. $\tan(-240°) = ?$

3. $\sec \frac{7\pi}{4} = ?$

4. $\cos \frac{11\pi}{6} = ?$

5. $\csc(450°) = ?$

6. $\cot \pi = ?$

7. $\sin^{-1}\left(\frac{-\sqrt{3}}{2}\right) = ?$

8. $\arccos\left(\frac{-\sqrt{2}}{2}\right) = ?$

9.Solve for x: $2\sin x - 1 = 0$; $[0, 2\pi)$

10. Solve for x: $2\sin^2 x + 3\cos x - 3 = 0$; $[0, 2\pi)$

11.* Solve for θ: $\sec^2 \theta - 2\tan \theta = 4$, $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

Given $f(x) = x^2, g(x) = 3x - 2, h(x) = \frac{2}{5}x^{\frac{5}{2}} - \frac{2}{3}x^{\frac{3}{2}}$,

12. f(g(-2)) = ?

13. * g(f(g(f(g(2))))) = ?

14. $\dfrac{f(x + \Delta x) - f(x)}{\Delta x} = ?$

15. h(4) – h(1) = ?

Given $p(x) = x^3 - 4x^2 + 3x + 1, q(x) = x^2 - 2x - 4$

16. * Find the coordinates of the intersection point of the two curves in QIII. What does this point represent with respect to the equations?

17. * Do you think the graphs intersect in QI? Why or why not?

18. * Find the coordinates of the local maximum of p(x).

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19. Sketch, by hand, the graph of $y = -(x + 1)(x - 3)$.

20. Sketch, by hand, the graph of $y = x^2(x^2 - 4)$.

21. Sketch, by hand, the graph of $y = \dfrac{2x - 1}{x + 1}$.

22. Sketch, by hand, the graph of $y = \dfrac{x^2 - 3}{x + 2}$.

23. Sketch, by hand, the graph of $y = -3\sin(\pi x)$.

24. Sketch, by hand, the graph of $y = \sec(x) - 2$.

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25. Solve for x (real and imaginary answers): $x^4 - 4x^3 + 8x^2 - 16x + 16 = 0$.

26. * Solve for x (only real answers): $h(x) = x^3 - 4x^2 + 5x - 3$.

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27. Solve for x and y: $\begin{array}{l} 2x - y = 6 \\ x + 3y = 10 \end{array}$.

28. * Solve for x, y, and z: $\begin{array}{l} 4x + y - 3z = 11 \\ 2x - 3y + 2z = 9 \\ x + y + z = -3 \end{array}$.

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29. * How does the graph of $f(x) = -(x-2)^2$ differ from the graph of $f(x) = x^2$?

30. How does the graph of $f(x) = |x+3| - 1$ differ from the graph of $f(x) = |x|$?

31. How does the graph of $f(x) = \sqrt{-x}$ differ from the graph of $f(x) = \sqrt{x}$?

Given $k(x) = \frac{1}{2}x^2$,

32. Find $\dfrac{k(2) - k(1)}{2 - 1}$, which is the slope of the secant line connecting (1, ½) and (2, 2).

33. Find $\dfrac{k(3) - k(2)}{3 - 2}$. Why is your slope greater than the slope of the previous problem?

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34. Rewrite $\dfrac{\sqrt[3]{x-1}}{(2x+1)^2}$ using rational exponents and no fractions.

35. Rewrite $\sqrt{\csc^3\left(\dfrac{x^2}{x+4}\right)}$ in terms of sine and/or cosine and using rational exponents and no fractions.

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36. $\log_{16} 4 = ?$

37. Expand $\ln\left(\dfrac{x}{\sqrt{x^2+1}}\right)$ using laws of logarithms.

38. * Solve for x: $2\ln(3x) = 4$

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39. As n approaches ∞, what does $\dfrac{e^n}{n^5}$ approach?

40. As n approaches ∞, what does $\dfrac{2n^2 - 3n + 1}{\frac{1}{3}n^2 + 4}$ approach?