Calculus AB Summer Prep Packet

Calculus AB Summer Prep Worksheet

* 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?

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ANSWER KEY

1. $\dfrac{\sqrt{3}}{2}$
2. $-\sqrt{3}$
3. $\sqrt{2}$
4. $\dfrac{\sqrt{3}}{2}$
5. 1
6. $\varnothing$
7. $-\frac{\pi}{3}$
8. $\frac{3\pi}{4}$
9. $\frac{\pi}{6}, \frac{5\pi}{6}$
10. $0, \frac{\pi}{3}, \frac{5\pi}{3}$
11. -.7854, 1.2490
12. 64
13. 6346
14. $2x + \Delta x$
15. 116/15
16. (-.5987, -2.4442) is the solution of the two equations when set equal to each other
17. no – cubic rises faster than quadratic
18. (.4514, 1.6311)
19-24. (sketches by hand)
25. 2,2,2i,-2i
26. 2.4656
27. (4, 2)
28. (2, -3, -2)
29. flipped across x-axis, moved 2 right
30. moved left 3, down 1
31. flipped across y-axis
32. 3/2
33. 5/2, the curve gets steeper
34. $(x-1)^{\frac{1}{3}}(2x+1)^{-2}$
35. $\sin^{-\frac{3}{2}}\left[x^2(x+4)^{-1}\right]$
36. ½
37. $\ln x - \frac{1}{2}\ln\left(x^2+1\right)$
38. ~2.463

39. ∞

40. 6