

AP Calculus AB Summer Assignment

Find the x - and y -intercepts and the domain and range, and sketch the graph. No calculator.

1. $y = \sqrt{x-1}$

2. $y = \sqrt{9-x^2}$

3. $y = \frac{|x|}{x}$

4. $y = \sin x, -2\pi \leq x \leq 2\pi$

5. $y = \cos x, -2\pi \leq x \leq 2\pi$

6. $y = \tan x, -2\pi \leq x \leq 2\pi$

7. $y = \cot x, -2\pi \leq x \leq 2\pi$

8. $y = \sec x, -2\pi \leq x \leq 2\pi$

9. $y = \csc x, -2\pi \leq x \leq 2\pi$

10. $y = e^x$

11. $y = \ln x$

$$12. y = \begin{cases} -1, & \text{if } x \leq -1 \\ 3x+2, & \text{if } |x| < 1 \\ 7-2x, & \text{if } x \geq 1 \end{cases}$$

$$13. y = \begin{cases} x^2+1, & \text{if } x > 0 \\ -2x+2, & \text{if } x \leq 0 \end{cases}$$

Find the asymptotes (horizontal, vertical, and slant), symmetry, and intercepts, and sketch the graph. No calculator.

14. $y = \frac{1}{x-1}$

15. $y = \frac{1}{(x+2)^2}$

16. $y = \frac{2(x^2-9)}{x^2-4}$

17. $y = \frac{x^2-2x+4}{x-1}$

Solve. No calculator.

18. $x^2 - x - 12 > 0$

19. $(x-2)^2(x+1)^3(x-5) \leq 0$

20. $\frac{3x-2}{x+4} \leq 0$

21. $\frac{(2x+5)(x-1)^2}{(x+2)^3} \geq 0$

Evaluate. No calculator.

22. $\cos \frac{5\pi}{6}$

23. $\sin \frac{3\pi}{2}$

24. $\tan \frac{5\pi}{4}$

25. $\sin \frac{7\pi}{4}$

26. $\cos \pi$

27. $\tan \frac{2\pi}{3}$

28. $\sec \frac{4\pi}{3}$

29. $\csc \frac{\pi}{4}$

30. $\cot \frac{2\pi}{3}$

Evaluate. No calculator.

31. $\tan \left(\cos^{-1} \left(-\frac{\sqrt{3}}{2} \right) \right)$

32. $\sec \left(\arcsin \left(-\frac{\sqrt{2}}{2} \right) \right)$

33. $\cos \left(\sin^{-1} (2x) \right)$

34. $\sec \left(\arctan (4x) \right)$

Solve. Give exact answers in radians, $0 \leq x \leq 2\pi$. No calculator.

35. $2 \cos^2 x + 3 \cos x - 2 = 0$

36. $2 \sin^2 x - \cos x = 1$

37. $\sin(2x) = \cos x$

38. $2 \cos(2x) + 1 = 0$

39. $2 \csc^2 x + 3 \csc x - 2 = 0$

40. $\tan^2 x - \sec x = 1$

41. $2 \cos\left(\frac{x}{3}\right) - \sqrt{3} = 0$

42. $\tan(2x) = -\sqrt{3}$

43. $2 \sin(3x) - \sqrt{3} = 0$

Solve. Show all steps. Use your calculator, and give decimal answers correct to **three** decimal places.

44. $e^{2x+3} = 37$

45. $e^{2x} - 5e^x + 6 = 0$

46. $e^x - 12e^{-x} - 1 = 0$

47. $\frac{50}{4 + e^{2x}} = 11$

48. $\ln(5x - 1) = 3$

49. The number of students in a school infected with the flu t days after exposure is modeled by the

$$\text{function } P(t) = \frac{300}{1 + e^{4-t}}.$$

- (a) How many students were infected after three days?
(b) When will 100 students be infected?

50. Exponential growth is modeled by the function $n = n_0 e^{kt}$. A culture contains 500 bacteria when $t = 0$.

After an hour, the number of bacteria is 1200.

- (a) How many bacteria are there after four hours?
(b) After how many hours will there be 8000 bacteria?