



AP CALCULUS AB
SKILLS REVIEW PACKET

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- This packet contains pre-requisite skills that you must have mastered WITHOUT the use of a calculator (VERY IMPORTANT!) for optimal success in Calculus.
- Please show all work toward your answers.

Enjoy your summer... can't wait to meet you in the fall! 😊

Name: _____

SKILL 1: Rewrite an expression in factored form.

1. $2x^2 + 10x - 12$

2. $3x^2 + 22x + 24$

3. $6x^5 + 54x^3$

4. $3x^3 - 24x^2 + 36x$

5. $x^3 - 25x$

6. $x^4 + 6x^2 - 40$

7. $x^3 + 8$

8. $36x^2 - 49$

9. $27x^3 - 1$

SKILL 2: Simplify a rational expression.

10. $\frac{x^2 - 4x - 32}{x^2 - 16}$

11. $\frac{7 - x}{x^2 - 49}$

12. $\frac{5x^4 - 4x^3 + 6x}{2x}$

13. $\frac{(4 + x)^2 - 16}{x}$

14. $\frac{\frac{3}{x+h} - \frac{3}{x}}{h}$

15. $\frac{\frac{25}{a} - a}{a + 5}$

SKILL 3: Evaluate functions and compositions without a calculator.

Use f , h , k , and g to evaluate each. $f(x) = \{(3, 5), (2, 4), (1, 7)\}$ $k(x) = x^2 + 5$
 $h(x) = \{(3, 2), (4, 3), (1, 6)\}$ $g(x) = \sqrt{x - 6}$

16. $g(k(-2))$

17. $f(h(3))$

18. $k(k(3))$

19. $k(4x)$

20. $k(x + p)$

21. $g(k(x))$

22. $f^{-1}(x)$

23. $g^{-1}(x)$

24. $h^{-1}(3)$

Given $f(x)$, evaluate $\frac{f(x+h) - f(x)}{h}$. Answer in simplest form.

25. $f(x) = 7x + 3$

26. $f(x) = 5 - x^2$

SKILL 4: Evaluate rational exponents without a calculator.

27. $16^{\frac{3}{2}}$

28. $8^{-\frac{4}{3}}$

29. $27^{\frac{1}{3}}$

30. $81^{-3/4}$

SKILL 5: Simplify expressions using properties of exponential & logarithmic functions without a calculator.

31. $e^{\ln 3}$

32. $e^{2+\ln x}$

33. $e^{2\ln x}$

34. $\ln 1$

35. $\ln\left(\frac{1}{2}\right)$

36. $\log_4 \frac{1}{4}$

37. $\log_{\frac{1}{2}} 8$

38. $\ln e^7$

SKILL 6: Write an equation of a line in point-slope and slope-intercept form

39. slope is -2 and contains the point $(3, 4)$

40. slope of 0 and contains the point $(-4, 2)$

41. parallel to the line $y - 4 = \frac{2}{3}(x + 2)$ & passes through $(5, 1)$

42. perpendicular to the line $-3y + 6x - 2 = 0$ & passes through $(-4, -3)$

point slope:

$$y - y_1 = m(x - x_1)$$

slope intercept:

$$y = mx + b$$

SKILL 7: Evaluate trig expressions and inverses involving angles on the unit circle without a calculator.

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

44. $\sin \frac{3\pi}{4}$

45. $\cos 0$

46. $\cos \frac{\pi}{6}$

47. $\sin \left(\frac{\pi}{3}\right)$

48. $\csc \left(\frac{5\pi}{6}\right)$

49. $\tan \frac{7\pi}{4}$

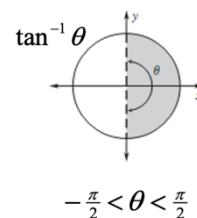
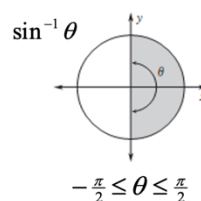
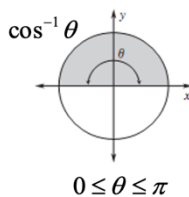
50. $-\tan \frac{2\pi}{3}$

51. $\tan \pi$

52. $\cot \frac{7\pi}{6}$

53. $\sec \left(-\frac{\pi}{6}\right)$

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

• Inverse trig restrictions:*Reminder: Answers will be an angle.*

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

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

57. $\sin^{-1} \left(-\frac{1}{2}\right)$

58. $\tan^{-1}(-1)$

• Simplify a trig expression:59. Show that the expression $\sec \theta \csc \theta - \tan \theta$ can be simplified to $\cot \theta$.

SKILL 8: Solve a polynomial, radical, rational, exponential, log, or abs. value equation without a calculator.

60. $x^2 + 3x = 18$

61. $2x^2 + 5x - 3 = 0$

62. $4t^3 - 12t^2 + 8t = 0$

63. $x^3 = 81x$

64. $\ln(x - 3) = 5$

65. $4e^{2x} = 12$

66. $3\sqrt{x - 2} - 7 = 8$

67. $|x + 1| = 15$

68. $\frac{x+1}{x} = \frac{x}{x+1}$

69. $1 - \frac{8}{k^3} = 0$

SKILL 9: Solve a trigonometric equation using the domain $[0, 2\pi)$ without a calculator.

70. $\sin x = \cos x$

71. $4\sin^2 x - 1 = 0$

72. $\cos^2 x = \cos x$

SKILL 10: Give the equation(s) of the vertical & horizontal asymptotes, if any, without graphing.

73. $F(x) = \frac{x}{x-3}$

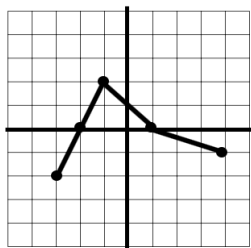
74. $f(x) = \frac{5x+20}{x^2-16}$

75. $h(x) = \frac{2x^2}{4x^2+1}$

76. $p(x) = \frac{x+1}{x^2+x-2}$

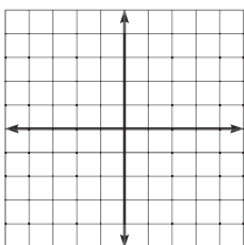
SKILL 11: Sketch transformations of functions & basic parent graphs.

Use the graph of f below to sketch each.

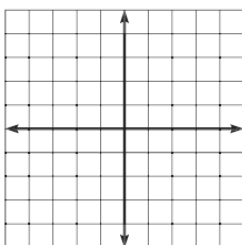


$y = f(x)$

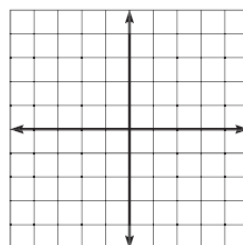
77. $y = 2f(x)$



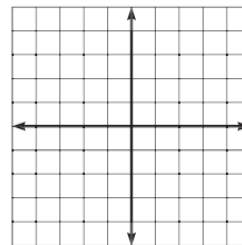
78. $y = -f(x)$



79. $y = f(x+2) - 3$

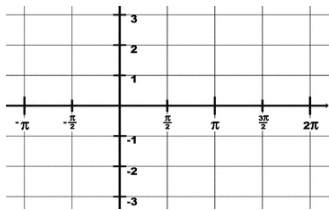


80. $y = |f(x)|$

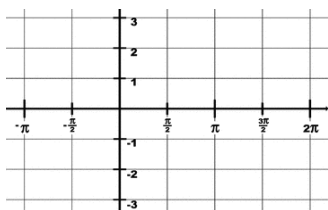


Sketch each. Include any asymptote line(s).

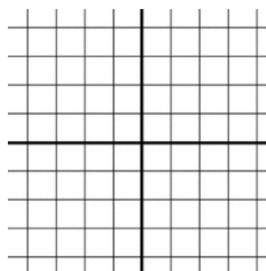
81. $f(x) = \sin x$



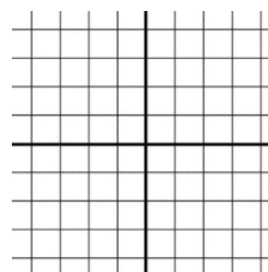
82. $f(x) = \cos x$



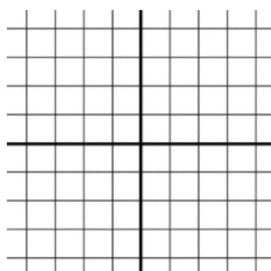
83. $f(x) = e^x$



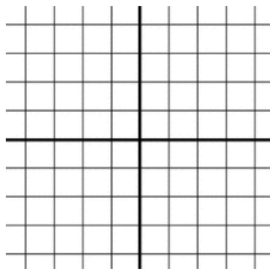
84. $f(x) = \ln x$



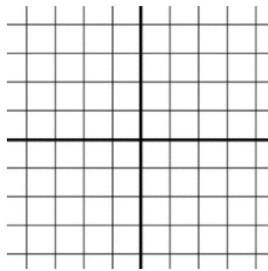
85. $f(x) = x$



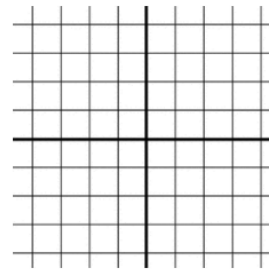
86. $f(x) = x^2$



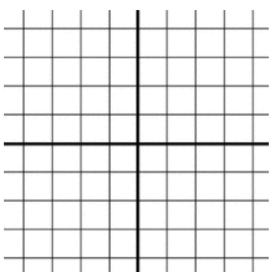
87. $f(x) = x^3$



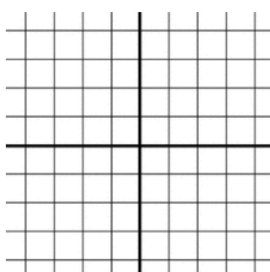
88. $f(x) = |x|$



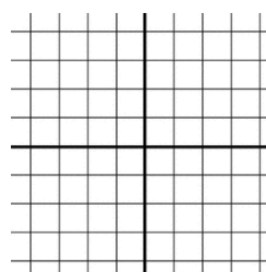
89. $f(x) = \sqrt{x}$



90. $f(x) = \sqrt[3]{x}$



91. $f(x) = \frac{1}{x}$



92. $f(x) = \frac{1}{x^2}$

