

All work is expected to be neat and labeled on separate paper. No *legible* work = no credit. You should NOT use a calculator unless the problem is labeled with a (*) and bold. A good resource for review is the website www.coolmath.com (choose precalc/calc). You can also go to my website: www.kreganmath.weebly.com

This will be collected on Day 1 with a quiz on this material Day 3. This summer assignment is intended for you to do as REVIEW to prepare for the quiz – your first grade in AP Calculus. If you struggle with any of these concepts, you may need to do additional review *on your own as needed* in order to be prepared for both the quiz AND this course.

Solve the following. Express solutions to inequalities in interval notation. **Only use a calculator on the problems labeled with an ***. Any decimals should be rounded to 3 decimal places.

1. $(x+1)(x+2)(x+3) < 0$ 2. $x^4 < 4x^2$ 3. $x^3 > 1$ **4*. $x^3 - 3x + 1 \leq 0$**

5*. $x^4 - 4x \leq -x^2 + 2x$ 6. $\frac{(x-3)(x+2)}{(x-1)} < 0$ 7. $x + \frac{12}{x} < 7$ 8. $\frac{x-4}{2x+4} \geq 1$

9. $\frac{1}{x+2} > \frac{3}{x+1}$ 10. For what positive numbers will the square of a number exceed twice the number?

11. What is the domain of $y = \sqrt{x^3 - 3x^2}$?

12. What is the domain of $y = \sqrt{\frac{x-1}{x+4}}$?

13*. A ball is thrown vertically upward with an initial velocity of 96 ft/s. The distance s (in feet) of the ball from the ground after t seconds is $s(t) = 96t - 16t^2$.

- For what time interval is the ball more than 112 feet above the ground?
- What is the maximum height of the ball?

14. Find $f(g(x))$ and $g(f(x))$ if $f(x) = \frac{x}{3x+2}$ and $g(x) = \frac{2}{x}$. Write answers in simplest form. Include the domain.

15. Find a composite function form for y (in other words, determine $f(x)$ and $g(x)$ so that $y = f(g(x))$):

a. $y = (x^2 + 3x)^{\frac{1}{3}}$

b. $y = \frac{1}{(x^2 + 3x - 5)^3}$

16. **Describe** in words (be specific) what the following would do to a given graph of $f(x)$:

a. $f(x-2)$

b. $f(x+3) - 6$

c. $|f(x)|$

d. $-3f(x)$

Find $f^{-1}(x)$. Pay attention to the given restrictions for #17 and #18.

17. $f(x) = -(x-2)^2, x \leq 2$

18. $f(x) = x^2 + 2x + 1, x \geq -1$

19. $f(x) = \frac{2x+1}{x+3}$

20. $f(x) = \log_2(x+1)$

Determine the domain. Express in interval notation.

21. $y = \frac{\sqrt{x+6}}{x-3}$

22. $y = \sqrt{x^2 - 7x + 10}$

23. $y = \log(x^2 - 4)$

24. $y = e^{3x+4}$

25. $y = 3x^4 - 2x + 1$

26. $y = \frac{x^2 - 9}{x^2 + x - 12}$

27. Solve for y and simplify where possible: $\ln(y-1) - \ln 2 = x + \ln x$

Solve for x . Leave answers in logarithmic or exponential form if needed but simplified completely:

28. $5^{x-2} = 3$

29. $\ln x + \ln 3 = 6$

30. $\log x + \log(x-6) = \log 16$

31. $e^{2\ln x} = 9$

32. $\ln e^x = 2.34$

33. $32e^{4x} = 16$

34. $x = 3^{\log_3 6 + \log_3 4 - 2\log_3 5}$

Sketch the following on separate paper (NO CALC):

35. $f(x) = 2x$ $x < -1$
 $x^2 + 2$ $-1 \leq x < 1$
 $3 - x$ $x \geq 1$

36. $y = (x-2)^3 + 1$

37. $y = \sqrt{x+3}$

38. $y = \arctan x$

Factor the following **completely**: (Refer to www.coolmath.com "Freaky factoring")

39. $3x^2(x-4)^3 - 2x^3(x-4)^2$

40. $(4x-1)^3(x+3)^2 - (4x-1)^2(x+3)$

Find the **exact solutions** on the interval $[0, 2\pi)$ unless otherwise stated. Only use a calculator for #43.

41. $4 \cos^2 x - 3 = 0$

42. $\sin^2 x = \sin x$ $[0, \pi]$

43*. $2\sin 2x = \sqrt{x}$ $[0, \pi]$

44. $1 - 2\sqrt{2} \sin x \cos x = 0$

45. $\sin 2x = \sin x$ $x \in \mathfrak{R}$

46. $\sin 2x + \cos x = 0$ $x \in \mathfrak{R}$

47. $2\sin^2 x = 3\sin x - 1$

48. $\sin^2 x + 2\cos x = -2$

49. $\cos 2x + \sin^2 x = 0$

50. $2\sin^2(x/2) - 3\sin(x/2) + 1 = 0$

51. $\cos x = \cot x$

52. $\sqrt{3} \csc^2 x + 2\csc x = 0$

53. $2\tan^2 x - 3\sec x = -3$

Simplify the following **completely**:

54. $y = \frac{x-4}{\sqrt{x}-2}$

55. $y = \frac{x^5-32}{x-2}$

56. $y = \frac{x^3+8}{x^4-16}$

57. $y = \frac{x+3}{\frac{1}{x} + \frac{1}{3}}$

58. $y = \frac{h}{4 - \sqrt{16+h}}$

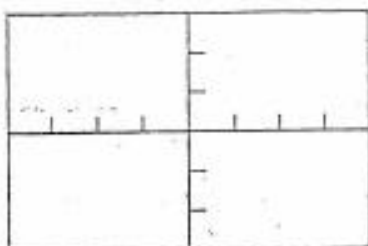
****Must have memorized: Parent graphs and their domain/range – see next page, UNIT CIRCLE IN RADIANS, graphs of all 6 trig functions and $y = \arctan x$, trig identities (all basic identities, Pythagorean, and double angle (sine and cosine)). These will be included on the quiz day 3.**

****You will have a quiz on these review topics on Day 3. Be prepared!!****

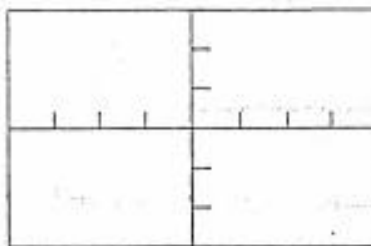
Parent Function Graphs:

1. Graph each function. Clearly indicate units on the axes provided.

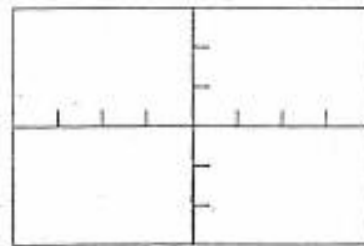
(a) $f(x) = x^2$



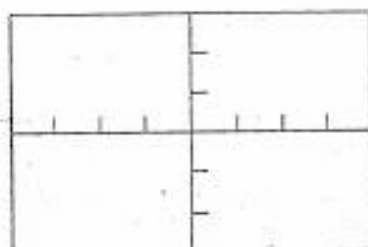
(b) $f(x) = x^3$



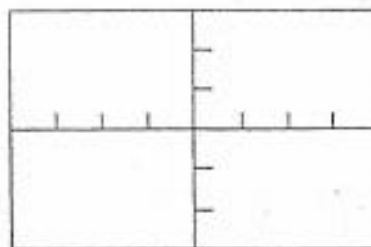
(c) $f(x) = |x|$



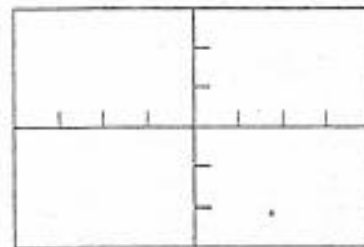
(d) $f(x) = \sin x$



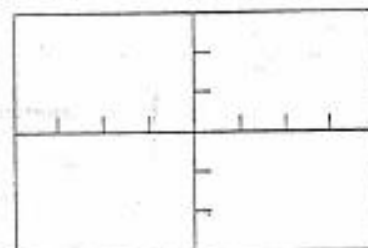
(e) $f(x) = \cos x$



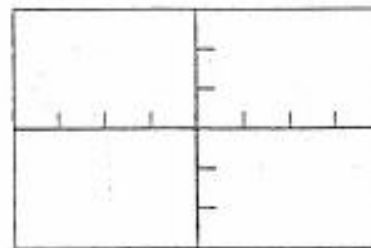
(f) $f(x) = \tan x$



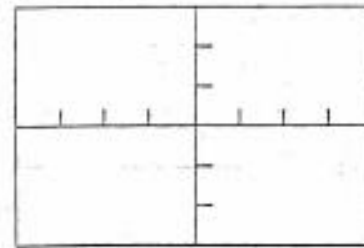
(g) $f(x) = \arctan x$



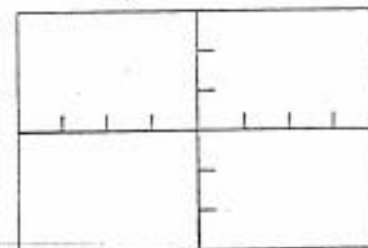
(h) $f(x) = 2^x$



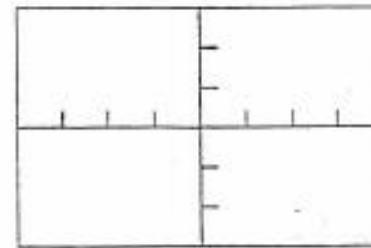
(i) $f(x) = \log_2 x$



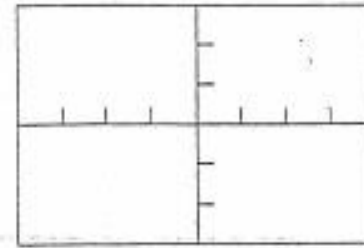
(j) $f(x) = \frac{1}{x}$



(k) $f(x) = \sqrt{x}$



(l) $f(x) = \sqrt{a^2 - x^2}$



Function	Domain	Range $y = f(x)$	Zeros (Find x when $f(x) = 0$)	Symmetry with respect to y -axis or origin	Even or Odd Function— $f(-x) = f(x)$ or $f(-x) = -f(x)$	Is the function periodic? If so, state the period.	Is $f(x)$ a one-to-one function? (For each $f(x)$ only one x exists)
(a) $f(x) = x^2$							
(b) $f(x) = x^3$							
(c) $f(x) = x $							
(d) $f(x) = \sin x$							
(e) $f(x) = \cos x$							
(f) $f(x) = \tan x$							
(g) $f(x) = \arctan x$							
(h) $f(x) = 2^x$							
(i) $f(x) = \log_2 x$							
(j) $f(x) = \frac{1}{x}$							
(k) $f(x) = \sqrt{x}$							
(l) $f(x) = \sqrt{a^2 - x^2}$							