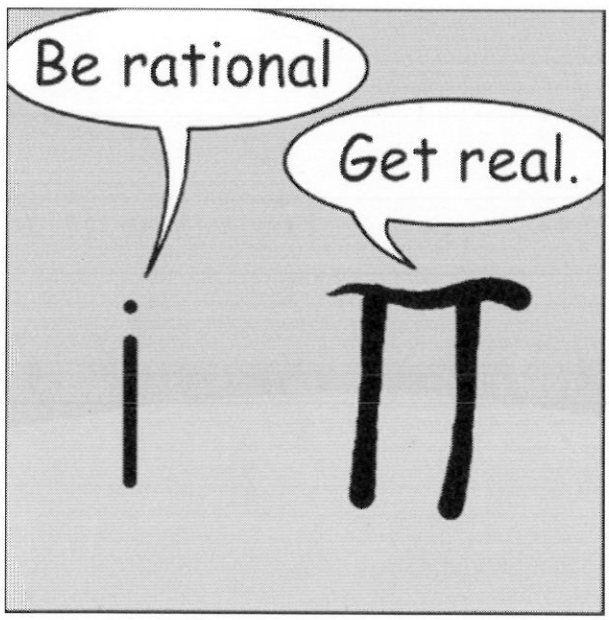
Trenton Central High School's AP Calculus AB 2016 Summer Assignment



Dear future AP Calculus AB students,

To be best prepared for your AP Calculus AB course, you will complete a summer review assignment, which you will **submit on the first day of school**. This assignment will be graded and count as the first quiz of the first marking period.

You have signed up for AP CALC- AB, which by nature must proceed at a very fast pace. The best part of teaching AP CALC is realizing that we are all working together toward the same goal---great AP scores (and hopefully this will mean an excellent foundation in calculus). Therefore, it's not student vs. teacher, it's student and teacher vs. AP test. In order to do well, you must stay on task and not slack off. I'm looking forward to a great year. I have selected a few pertinent problems from the preparation chapter.

Directions:

- Complete ALL problems.
- Show all work for every problem on a separate piece of paper
- Your work should be neatly organized and clearly labeled.

Scoring/Grading: The AP Calc AB Summer Assignment is worth a total of 81 points.

- Each problem (including a, b, c,...) is worth 1 point. Problems #28 – 32 are worth 6 points each.
- Complete all your work on a separate sheet of paper
- Your work should be organized and neatly labeled
- Any problem with no work shown will receive 0 points.
- When asked to explain or justify, you must write in full sentences and try not to use any pronouns ie: instead of saying "it has a zero", say "the function has a zero".
- Your teacher will enter your earned grade for Summer Assignment grade into PowerSchool

Resources:

For additional examples and support you can reference any of the sites listed below and search the skill/concept.

- KhanAcademy.com
- You Tube.com or Teacher Tube.com
- MathIsPower4u.com
- IXL.com

Good luck with the assignment and enjoy your summer!!!!

Sincerely,

Mrs. Deirdre Brown

In problems 1-4, sketch the graph of the equation by point plotting. (no graphing calculators)

1. $y = \frac{3}{2}x + 1$

2. $y = 4 - x^2$

3. $y = |x+2|$

4. $y = \sqrt{x+2}$

In problems 5 – 8, find any intercepts.

5. $y = x^2 + x - 2$

6. $y = x^2\sqrt{25 - x^2}$

7. $y = \frac{3(2-\sqrt{x})}{x}$

8. $x^2y - x^2 + 4y = 0$

9. Find the sales necessary to break even (R=C) if the cost C of producing x units is

$C = 5.5\sqrt{x} + 10{,}000$ (Cost equation)

and the revenue R for selling x units is

$R = 3.29x.$ (Revenue equation)

10. Use a graphing calculator to graph both lines in each viewing window. Compare the graphs. Do the lines appear perpendicular? Are the lines perpendicular? Explain.

$y = x + 6, \quad y = -x + 2$

a) Xmin = -10 Ymin = -10
Xmax = 10 Ymax = 10
Xscl = 1 Yscl = 1

b) Xmin = -15 Ymin = -10
Xmax = 15 Ymax = 10
Xscl = 1 Yscl = 1

11. Write an equation of the line through the point (a) parallel to the given line and (b) perpendicular to the given line.

Pt. (2, 1) Line: $4x - 2y = 3$

12. You are given the dollar value of a product in 2001 and the rate at which the value of the product is expected to change during the next 5 years. Write a linear equation that gives the dollar value V of the product in terms of the year t. (Let t=0 represent 2000).

2001 Value: \$20,400 Rate: \$2000 decrease per year

13. Use a graphing calculator to graph the parabolas and find their points of intersection. Find an equation of the line through the points of intersection and sketch its graph in the same viewing window.

$y = x^2$
$y = 4x - x^2$

For 14-15, evaluate (if possible) the function at the given value(s) of the independent variable. Simplfy the results.

14. $g(x) = 3 - x^2$

(a) $g(0)$

(b) $g(\sqrt{3}$

(c) $g(-2)$

(d) $g(t-1)$

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

$$\frac{f(x+\Delta x) - f(x)}{\Delta x}$$

For 16 – 17, find the domain and range of the function.

16. $h(x) = -\sqrt{x+3}$

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

18. Evaluate the function as indicated. Determine its domain and range.

$$f(x) = \begin{cases} 2x + 1, & x < 0 \\ 2x + 2, & x \geq 0 \end{cases}$$

(a) $f(-1)$ (b) $f(0)$ (c) $f(2)$ (d) $f(t^2 + 1)$

For 19 – 20, sketch a graph of the function and finds its domain and range. Use a graphing utility to verify your graph.

19. $h(x) = \sqrt{x-1}$

20. $g(t) = 2\sin(\pi t)$

21. Determine whether y is a function of x.

$y^2 = x^2 - 1$

For 22 – 25, determine whether the statement is true or false. If it is false, explain why or give an example that shows it is false.

22. If $f(a) = f(b)$, then $a = b$.

23. A vertical line can intersect the graph of a function at most once.

24. If $f(x) = f(-x)$ for all x in the domain of f, then the graph of f is symmetric with respect to the y-axis.

25. If f is a function, then $f(ax) = af(x)$.

26. Given $f(x) = 2x - 3$ and $g(x) = \cos x$, find each composite function.

a) $f \circ g$ b) $g \circ f$

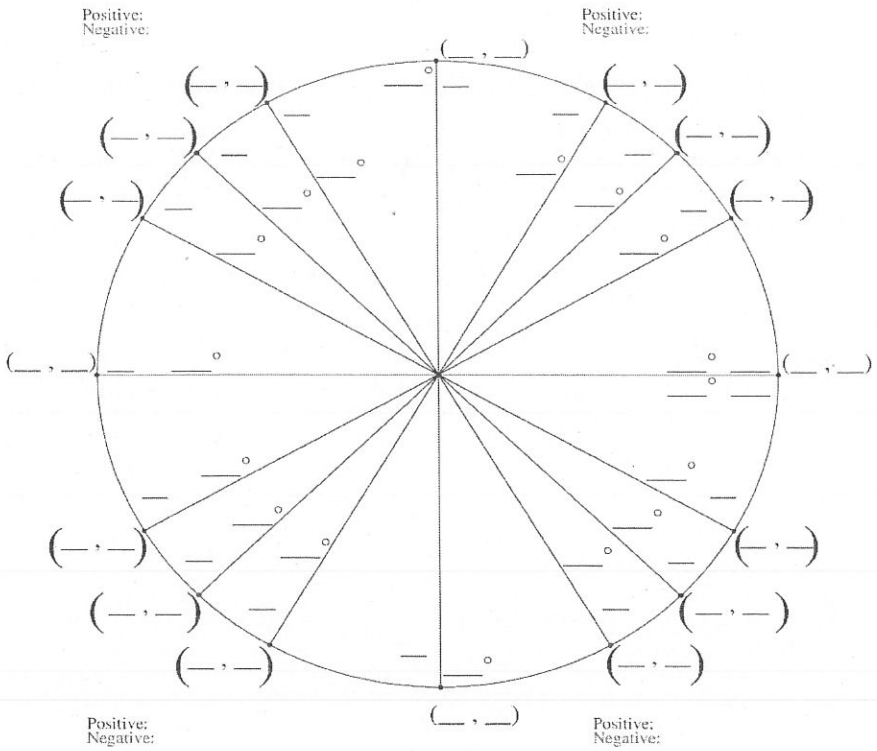
27. Determine whether each function is even, odd, or neither. Then find the zeros of the function.

a) $f(x) = x^3 - x$ b) $1 + \cos x$

28. Identify the relationships for all six trigonometric functions as they relate to x, y, and r.

29. Complete the unit circle below by supplying: the ordered pairs for each point; the radian measures of the angles; and the degree measures of the angles.

Fill in The Unit Circle



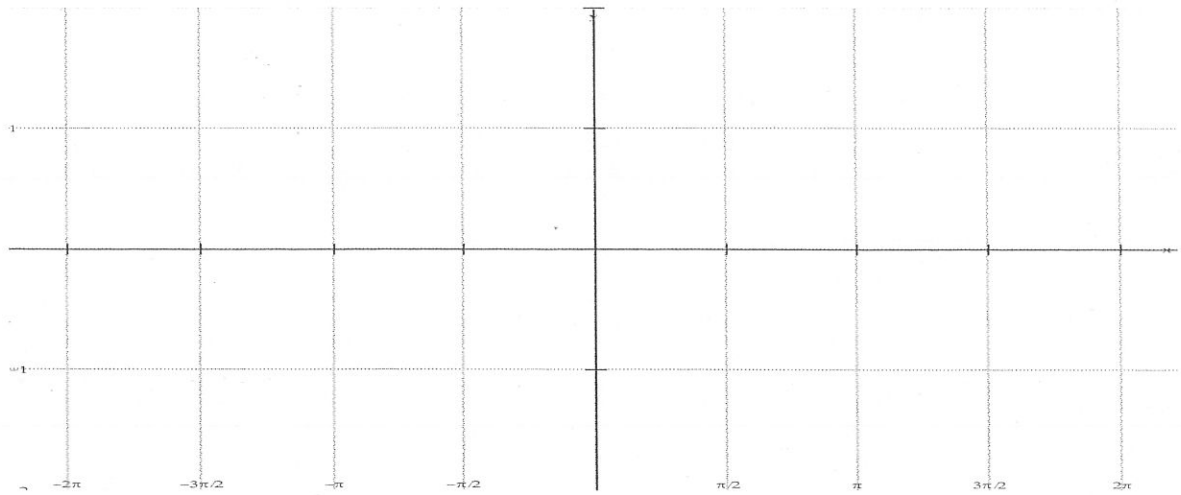
EmbeddedMath.com

30. Identify the three trigonometric reciprocal identities.

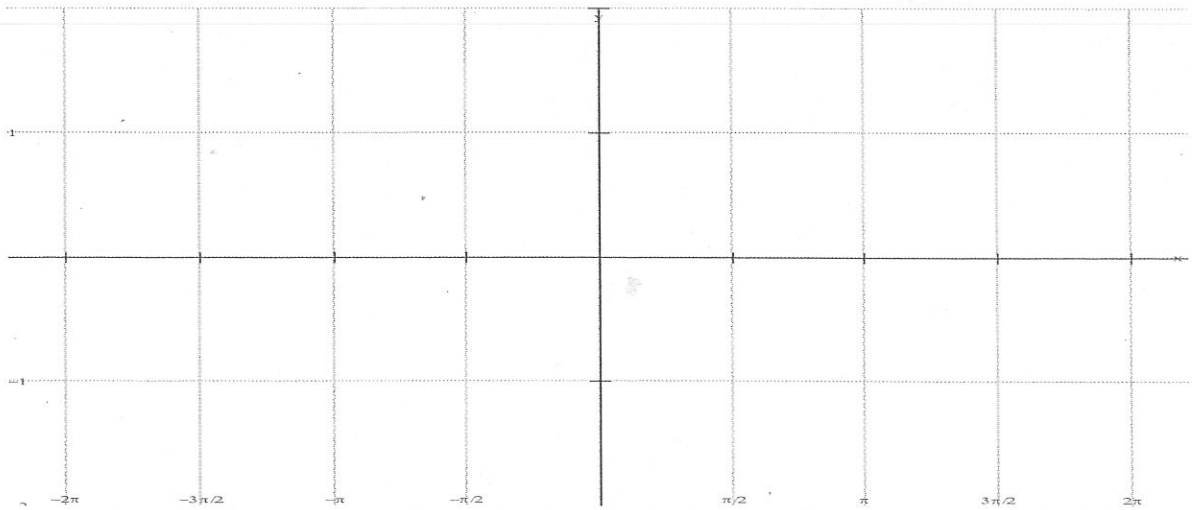
31. Identify the two trigonometric quotient identities.

32. Identify the three trigonometric Pythagorean identities.

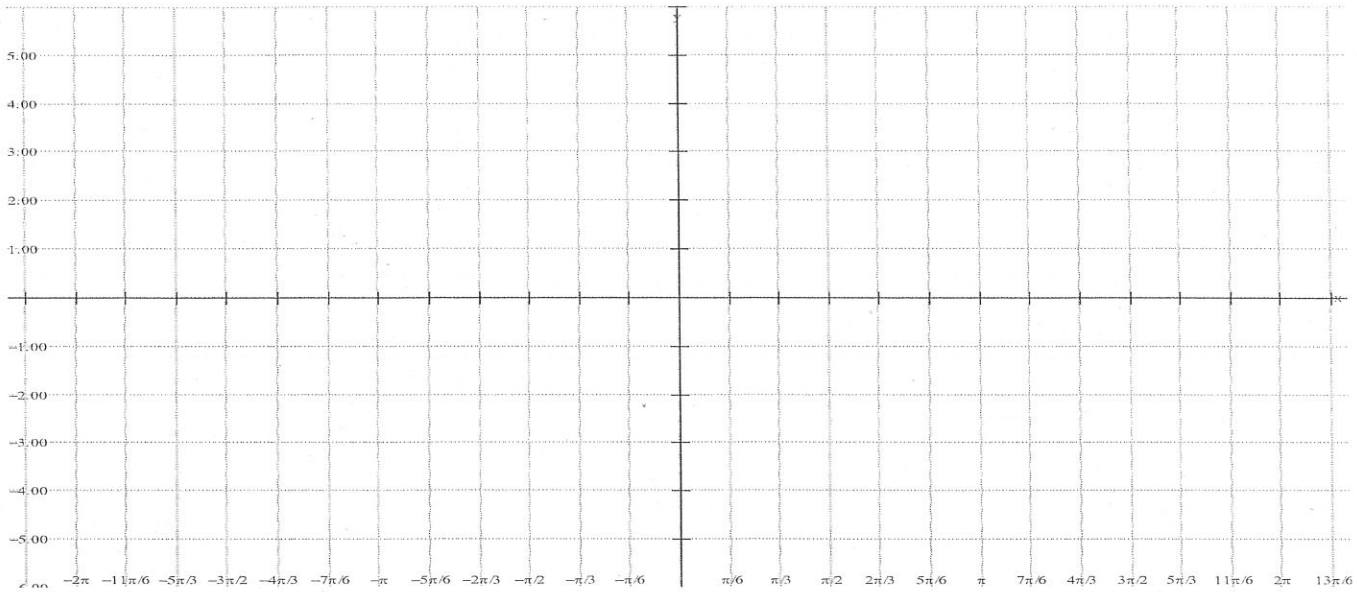
33. Graph y = sin x, for ($-2\pi \leq x \leq 2\pi$)



34. Graph y = cos x, for ($-2\pi \leq x \leq 2\pi$)



35. Graph y = tan, for ($-2\pi \leq x \leq 2\pi$)



Establish the identities below (i.e. make the left side look like the right side without using right side!)

36. $\csc\theta \cdot \tan\theta = \sec\theta$

37. $\dfrac{\sin^2(-\theta) - \cos^2(-\theta)}{\sin(-\theta) - \cos(-\theta)} = \cos\theta - \sin\theta$

38. $\dfrac{1+\tan x}{1+\cot x} = \tan x$

39. $\dfrac{\tan x + \cot x}{\sec x \csc x} = 1$

DOUBLE-ANGLE FORMULAS

If $\sin\theta = \frac{3}{5}$, $\frac{\pi}{2} \le \theta \le \pi$, find the exact value of:

40. $\cos(2\theta)$

41. $\sin(2\theta)$

42. $\tan(2\theta)$

Solve the following equations for $0 \le \theta \le 2\pi$.

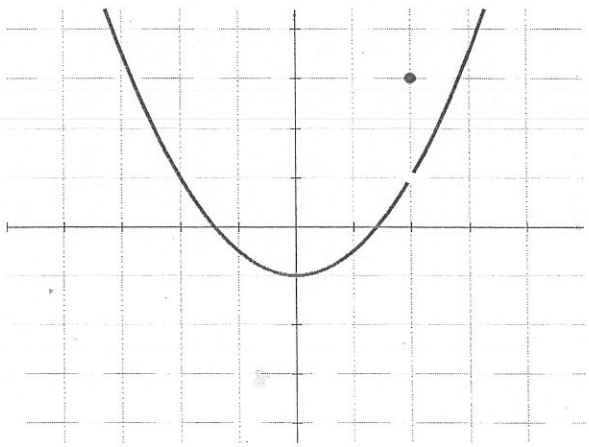
43. $2\sin\theta + \sqrt{3} = 0$

44. $2\sin^2\theta - 3\sin\theta + 1 = 0$

45. $\cos(2\theta) + 3 = 5\cos\theta$

46. Evaluate the following limits.

a. f(-2) = _____ b. f(2) = _____ c. $\lim_{x \to 0} f(x)$ = _____ d. $\lim_{x \to 2} f(x)$ = _____



Evaluate the following limits algebraically. You must show your work for full credit.

47.

$$\lim_{\Delta x \to 0} \frac{(x+\Delta x)^2 - 3(x+\Delta x) - 2 - (x^2 - 3x - 2)}{\Delta x}$$

47. _____

48. $\lim_{x \to 3} \left(\frac{x^2 - 8x + 15}{x - 3} \right)$

48 . _____

49. $\lim_{x \to 11} \left(\frac{\sqrt{x+5} - 4}{x - 11} \right)$

49 . _____

50. $\lim_{x \to 2} \frac{(x-3)^3 (x+2)}{x - 2}$

50. _____

Solving Equations Using Common and Natural Logarithms Practice

Solve each equation using common logarithms.

51) $8^x = 10$

52) $2.4^x = 20$

53) $1.8^{x-5} = 19.8$

Solve each equation using natural logarithms,

54) $6^x = 42$

55) $7^x = 4^{x+3}$

56) $1249 = 175e^{-0.04t}$