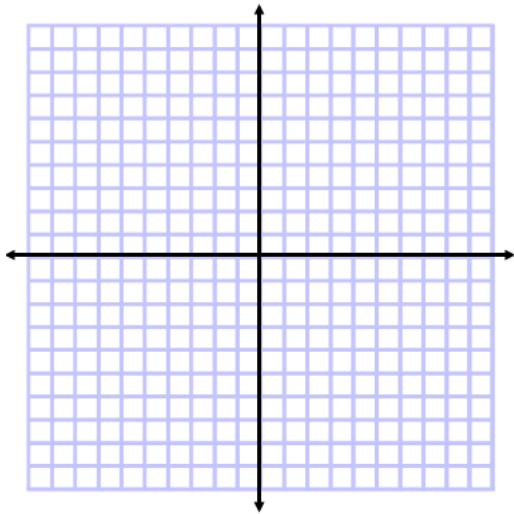


To be successful in Calculus (AV), you need a STRONG Algebra 2 and Pre-Calculus background. It is strongly suggested that a student should have had a minimum average of a B- in both Algebra 2 and Pre-Calculus at the Advanced Level. Students with lower grades may struggle tremendously with the content throughout the year. If this packet is too difficult or requires extensive work with a tutor, you should consult with your guidance counselor about changing classes.

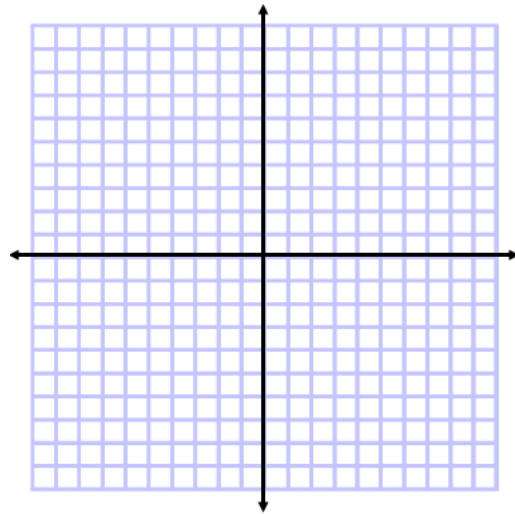
Complete each of the problems below. They are all a review of topics that you have learned in Algebra 2 or Pre-calculus and will be revisited in Calculus. Your teacher will tell you how this packet will be used as a 1st Quarter grade in September. Use pencil and show all of your work!

Graph the following piece-wise functions. Use the entire graph.

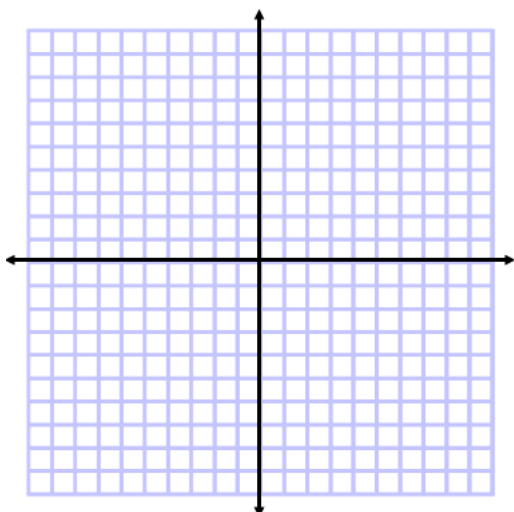
1. $f(x) = \begin{cases} 2x+1, & x < 0 \\ 2x+2, & x \geq 0 \end{cases}$



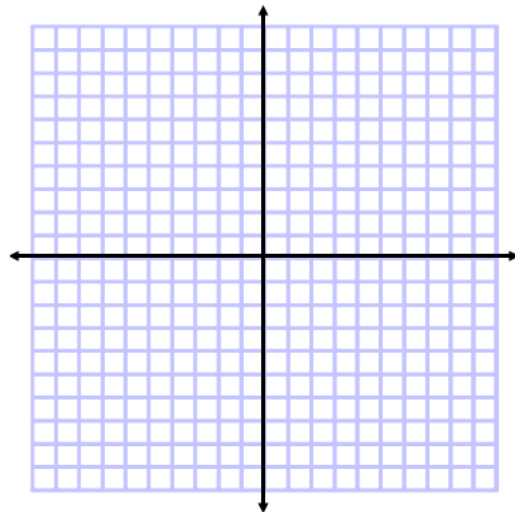
2. $f(x) = \begin{cases} x^2 + 2, & x \leq 1 \\ 2x^2 + 2, & x > 1 \end{cases}$



3. $f(x) = \begin{cases} |x|+1, & x < 1 \\ -x+1, & x \geq 1 \end{cases}$



4. $f(x) = \begin{cases} 4-x, & x \neq 2 \\ 0, & x = 2 \end{cases}$



Factoring You should be able to factor polynomials fluently in this course.

Factor each completely.

5. $32x^3 + 12x^2 + 40x + 15$

6. $10n^3 + 80n^2 + 15n + 120$

7. $35m^3 + 20m^2 - 14m - 8$

8. $112v^3 + 48v^2 - 42v - 18$

9. $x^3 - 8$

10. $648m^3 - 375$

11. $250 - 128x^3$

12. $64x^3 + 1$

13. $6x^4 - 42x^2 + 72$

14. $12x^4 + 46x^2 + 42$

15. $b^2 + 8b$

16. $v^2 + 9v - 10$

17. $15x^2 + 5x - 10$

18. $3n^2 + 31n + 70$

19. $18a^2 + 30a - 100$

20. $6n^2 + 61n + 63$

Factor each and find all roots.

21. $25x^3 - 10x^2 - 20x + 8 = 0$

22. $6x^4 - 7x^3 - 5x^2 = 0$

23. $15x^2 + x - 2 = 0$

24. $8x^3 - 125 = 0$

Divide using polynomial long division.

25. $(x^3 - x^2 - x - 2) \div (x - 3)$

26. $(3x^3 + 2x^2 - 5x + 1) \div (3x + 1)$

Divide using synthetic division.

27. $(5x^4 - 2x^3 - 3x^2 + 5x + 1) \div (x - 1)$

28. $(x^3 - 2) \div (x + 1)$

Given one zero of the polynomial function, find the other zeros.

29. $f(x) = x^3 + 3x^2 - 34x + 48$; 3

Use the rational zero (root) theorem and synthetic division to find all rational zeros of the function.

30. $f(x) = 3x^4 + 10x^3 - 11x^2 - 10x + 8$

Use the properties of logarithms to rewrite the expression in terms of $\log 3$ and $\log 4$. Then use $\log 3 \approx 0.477$ and $\log 4 \approx 0.602$ to approximate the expression.

31. $\log\left(\frac{3}{4}\right)$

32. $\log 12$

33. $\log 9$

34. $\log 16$

35. $\log \frac{1}{4}$

36. $\log\left(\frac{4}{27}\right)$

Solve the exponential equation. Round the result to three decimal places if necessary.

37. $e^{3x} + 6 = 10$

38. $\frac{3}{8}(2^{3x}) + 1 = 10$

Solve the logarithmic equation. Round the result to three decimal places if necessary.

39. $9 \log_{10} x - 4 = 11$

40. $\ln(2x + 3) = \ln(2x - 1)$

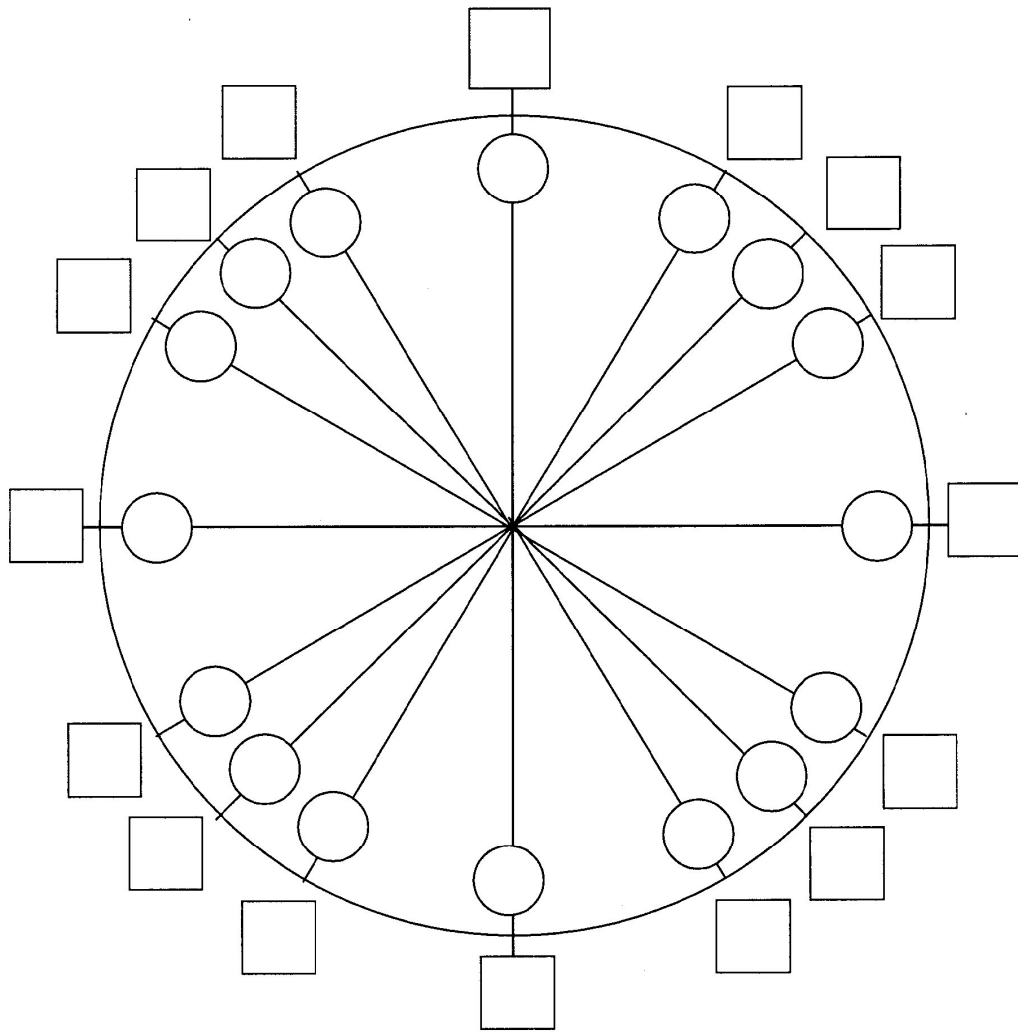
Evaluate.

41. If $f(x) = 5x + 8$ and $g(x) = 4x - 1$, find $f(g(x))$.

42. If $f(x) = -2x + 1$ and $g(x) = -4x^2 - 7x - 8$, find $g(f(5))$.

Trigonometry Review

43. Complete and know the unit circle



Place degree measures in the circles.

Place radian measure in the squares.

Place $(\cos \theta, \sin \theta)$ in parenthesis outside the square.

Place $\tan \theta$ outside the parenthesis.

Without a calculator, determine the exact value of each expression.

44. $\sin 0$

45. $\sin \frac{\pi}{2}$

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

47. $\cos \pi$

48. $\cos \frac{3\pi}{4}$

49. $\cos \frac{\pi}{3}$

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

51. $\tan \frac{\pi}{6}$

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

Simplify each expression.

53. $\frac{5}{2m} - \frac{6}{5m-5}$

54. $\frac{n-2}{2} - \frac{3n+1}{2n^2+2n}$

55. $\frac{6}{2} - \frac{6a}{a+1}$

56. $\frac{3}{a-3} - \frac{5}{a+5}$

$$57. \frac{\frac{3}{x} - \frac{9}{5}}{3x}$$

$$58. \frac{\frac{3}{u} - \frac{u^2}{3}}{\frac{3}{u}}$$

$$59. \frac{\frac{3}{x} - \frac{x}{9}}{9}$$

$$60. \frac{\frac{u^2}{2} - \frac{9}{2u}}{2u}$$

$$61. \frac{\frac{\frac{25}{16} + \frac{12u-4}{5}}{u^2}}{3u-1} - \frac{u^2}{12u-4}$$

$$62. \frac{\frac{4}{x} - \frac{x}{9}}{\frac{3}{4} + \frac{8}{3}}$$