

*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.*

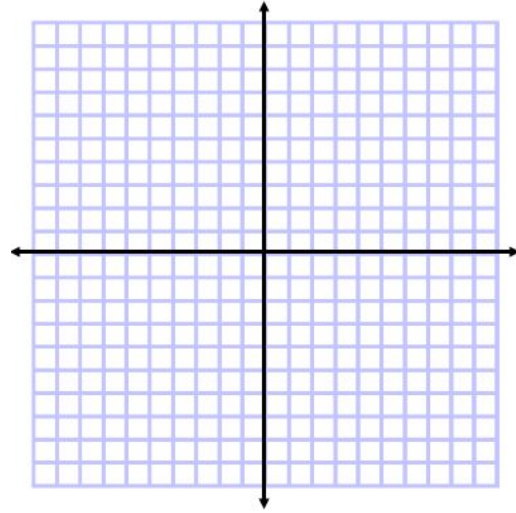
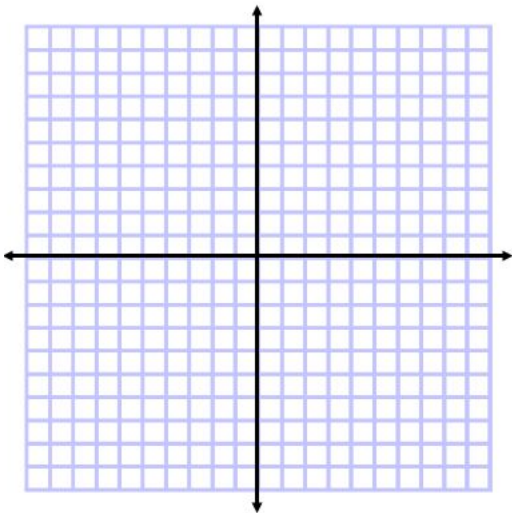
*Complete each of the problems below. They are all a review of topics that you have learned in Algebra 2 or Pre-calculus and will be revisited in Calculus. Your teacher will tell you how this packet will be used as a 1<sup>st</sup> Quarter grade in September. Use pencil and show all of your work!*

**Graph the following piecewise functions. Use the entire graph.**

For a video review of piecewise functions, click [here](#).

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

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



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

For a video review of factoring by grouping, click [here](#).

For a video review of factoring sum/difference of cubes, click [here](#).

For a video review of factoring quartics, click [here](#).

For a video review of factoring when  $a$  is not 1, click [here](#).

**Factor each completely.**

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

4.  $10n^3 + 80n^2 + 15n + 120$

5.  $250 - 128x^3$

6.  $64x^3 + 1$

7.  $6x^4 - 42x^2 + 72$

8.  $12x^4 + 46x^2 + 42$

9.  $b^2 + 8b$

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

11.  $15x^2 + 5x - 10$

12.  $3n^2 + 31n + 70$

**Factor each and find all roots.**

13.  $25x^3 - 10x^2 - 20x + 8 = 0$

14.  $6x^4 - 7x^3 - 5x^2 = 0$

**Divide using polynomial long division.**

For a video review of polynomial long division, click [here](#).

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

16.  $(3x^3 + 2x^2 - 5x + 1) \div (3x + 1)$

**Divide using synthetic division.**

For a video review of synthetic division, click [here](#).

17.  $(5x^4 - 2x^3 - 3x^2 + 5x + 1) \div (x - 1)$

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

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

*For a video review of finding zeros of polynomial functions, click [here](#).*

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

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

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

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.

For a video review of properties of logarithms, click [here](#).

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

22.  $\log 12$

23.  $\log 9$

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

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

For a video review of solving exponential equations, click [here](#).

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

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

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

For a video review of logarithmic equations, click [here](#).

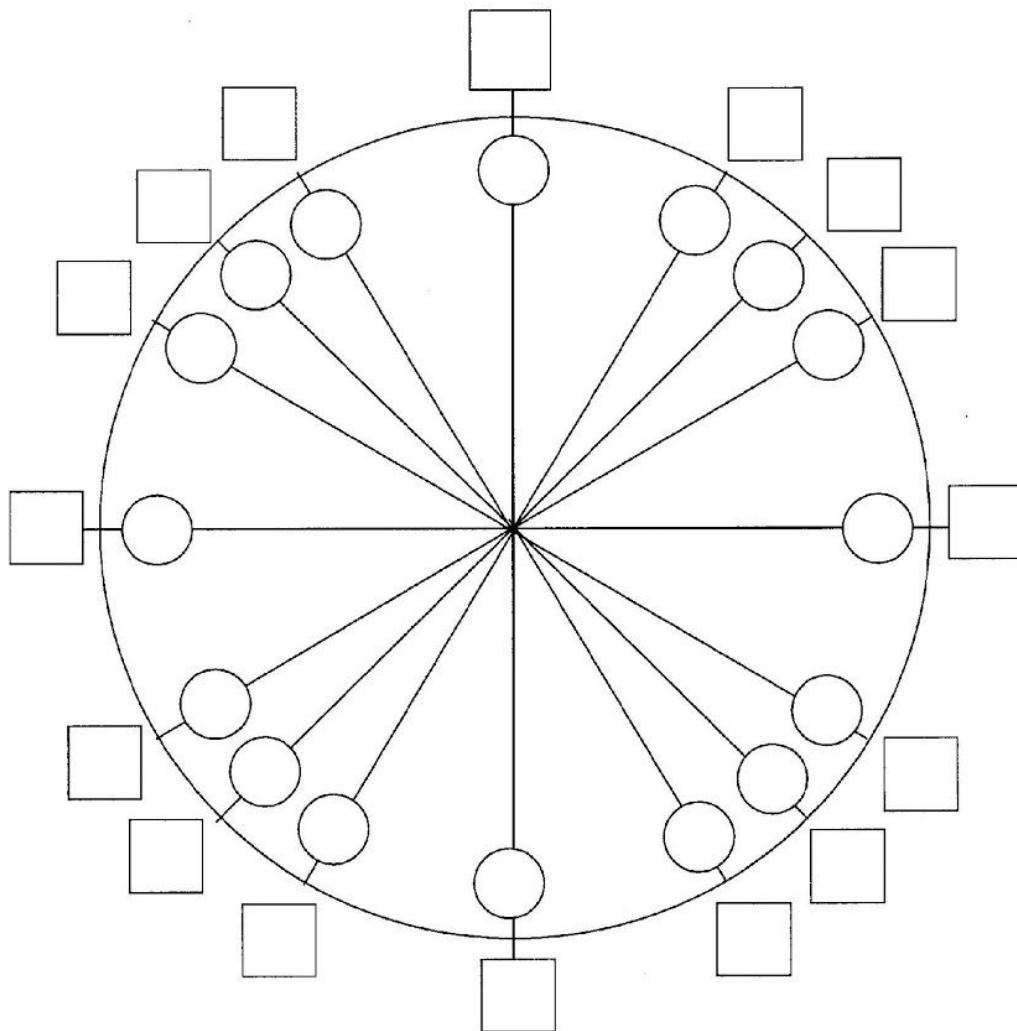
27.  $9\log_{10} x - 4 = 11$

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

## Trigonometry Review

For a video review of the Unit Circle, click [here](#).

29. 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.

$\sec \theta =$  \_\_\_\_\_

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

30.  $\sin 0$

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

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

33.  $\cos \pi$

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

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

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

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

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

Simplify each expression.

For a video review of simplifying complex fractions, click [here](#) or [here](#).

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

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