

AP Calculus Summer Work

1. Memorize the value of the six trig functions at $0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}$.

2. Memorize the following trig identity formulas:

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$1 + \tan^2 \theta = \sec^2 \theta$$

$$1 + \cot^2 \theta = \csc^2 \theta$$

3. Find the 6 Trigonometric Functions for $\frac{5\pi}{3}$. State the reference angle and quadrant the angle is located in.

$$\sin \theta =$$

$$\csc \theta =$$

$$\cos \theta =$$

$$\sec \theta =$$

$$\tan \theta =$$

$$\cot \theta =$$

4. Find all solutions for the following equation: $2\sin x + 2 = 1$

Solve using properties of natural and common logs.

5. $5^x = 27$

6. $\log_2(3x + 5) - \log_2 8 = 4$

7. $\ln(2x + 4) - \ln(12) = 3$

8. $3e^{6x-2} = 12$

9. Solve by completing the square: $m^2 + 10m + 14 = -7$

Solve by factoring:

10. $r^2 - 12r + 35 = 0$

11. $3x^2 - 10x + 3 = 0$

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

Find the solution by using division of functions:

13. $(x^3 - 13x^2 + 40x + 18) \div (x - 7)$

Use your graphing calculator to solve.

14. Find the intersection of the functions:

a) $y = \frac{1}{2}x + 3$ and $y = -x^2 + 2x + 6$

b) $y = 2x^2 - 4x - 8$ and $y = \frac{1}{4}x^3 - 2x^2 + 6$

15. Find the zeros to the polynomials using your graphing calculator

a) $3x^2 - 8x + 4 = 0$

b) $y = \frac{1}{4}x^3 - 2x^2 + 6 = 0$

16. Find the max(s)/min(s) of functions

a) $y = x^3 + 2x^2 - 3x + 2$

b) $y = -\frac{1}{4}x^3 - 2x^2 + 6$

Additional Resources:

[Converting radians/degrees](#)

[Hand trick for memorizing trig functions in Q1](#)

[Reference angles](#)

[Working with logs](#)

[Factoring Video](#)

Calculator resources:

[Finding intersection point on two functions](#)

[Max and Mins on a calculator](#)

[Finding zeros of a polynomial](#)