

AP CALCULUS AB - SUMMER ASSIGNMENT 2018

This packet is designed to help you review and build upon some of the important mathematical concepts and skills that you have learned in your previous mathematics class that you will be using in AP Calculus AB. All answers are expected to be accompanied by corresponding work. **YOU MAY NEED TO LOOK UP INSTRUCTIONAL VIDEOS ONLINE FOR HELP!**

If needed, please reach out to me via email (dhimmler@cvsd.net) if you have questions or concerns during the summer.

Due Date: Wednesday 8-22-2018 (First Day of School)

Points: 50

- THERE WILL BE A GRADED IN-CLASS ASSIGNMENT DURING THE FIRST DAY OF SCHOOL COVERING THIS MATERIAL -

Section A – Linear Equations

For problems 1 – 7, based on the information given, write the linear equations in point-slope form $y - y_1 = m(x - x_1)$ and slope intercept form $y = mx + b$. **NO CALCULATOR.**

1. The line with a slope of 3 passing through the point (4, -2).
2. The line that passes through the points (2, 4) and (4, -5).
3. The line that contains the point (-3, 2) and is parallel to $x + y = 7$.
4. The line perpendicular to $2x - 4y = 8$ containing the point (1, -2).
5. The line with a slope of $-2/3$ and an x-intercept of 5.
6. A horizontal line that passes through the point (-3, 6). Hint: what is the general equation for a horizontal line?
7. The line normal (perpendicular) to $y = 5$ that passes through the point (2, 5). Hint: what is the general equation for a vertical line?

Section B – Factoring, Simplifying, and Solving Equations using Factoring

For problems 1-8, factor completely. **NO CALCULATOR.**

1. $x^2 + 14x + 48$

2. $t^2 - 5t - 150$

3. $x^3 - 144x$

4. $3x^2 - 21x + 30$

5. $16x^2 - 9$

6. $9x^2 - 3x - 2$

7. $6x^3 - 17x^2 + 5x$

8. $2t^5 - 32t$

For problems 9-10, simplify each expression using factoring. **NO CALCULATOR.**

9. $\frac{x^2 - 4x - 5}{x^2 + 2x + 1}$

10. $\frac{x^2 - 2x - 8}{x^3 + x^2 - 2x}$

For problems 11-12, solve the following equations by factoring. **NO CALCULATOR.**

11. $x^3 - 16x = 0$

12. $(x+1)^2(x-2) + (x+1)(x-2)^2 = 0$

Part C – Exponents, Radicals, and Simplifying

For problems 1-4, simplify by writing without fractional or negative exponents. (fractional exponents should be expressed in radical form) **NO CALCULATOR.**

1. $f(x) = 2x^{-3}$

2. $3x^{\frac{1}{3}}y^{-\frac{1}{2}}$

3. $y = 27^{\frac{1}{3}}x^{\frac{3}{4}}$

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

For problems 5-8, write without fractional or negative exponents. Then evaluate the function at the given value. **NO CALCULATOR.**

5. $f(x) = x^{\frac{5}{2}} - x^{-1}$
 $f(4) =$

6. $g(x) = (x+19)^{\frac{2}{3}} - x^{\frac{5}{3}}$
 $g(8) =$

7. $h(x) = 3x^{-\frac{1}{4}} - 16x^{-\frac{3}{2}}$
 $h(16) =$

8. $v(t) = \frac{3t^{\frac{1}{3}}}{2} + \frac{5t^{\frac{1}{2}}}{2}$
 $v(64) =$

Part D – Manipulating Equations and Solving Systems of Equations

In problems 1-6, solve for y in terms of the other variable. You may need to use exponential/logarithmic properties some of them. **NO CALCULATOR.**

1. $\frac{1}{2-y} = x^3 + 4x$

2. $xy - 6x^2 = 7y - 5x + 4$

3. $3\ln y = 6x^2 + 3x - 12$

4. $e^y - 6 = x$

5. $\frac{1}{y^2} = x^2 + 5x - 7$

6. $2\ln(y+3) = 4x^2 - 7$

For problems 7-10, solve the system of equations using substitution or elimination. **NO CALCULATOR.**

7. $2x + 3y = -2$
 $5x + 2y = -27$

8. $2b + 5 = a$
 $2b + 3a = 13$

9. $y = x^2 - 4x - 9$
 $y = 6x + 15$

10. $5a + 3b = 9$
 $2a - 4b = 14$

Section E – Intercepts and Functions

For problems 1-2, find the x and y intercept(s), if they exist. **NO CALCULATOR.**

1. $2y = 6x + 4$

2. $y = \frac{x-1}{x-2}$

For problems 3-5, use the given functions to answer the following questions. **NO CALCULATOR.**

3. Given the function: $f(x) = -2x(x+3)^4(x-2)^3$

a. What are the zeros of the function? This means the x – intercepts.

b. Find $f(-1)$.

4. Given $f(x) = 2x + 1$ and $g(x) = 1 - x^2$, find each of the following:

a. $f(g(0))$

b. $g(g(2))$

c. $g(f(x))$

d. $f(g(x))$

5. If $f(x) = 5x + 3$ and $g(x) = 2x^2 - 3x + 4$, find the following:

a. $g(f(-1))$

b. $g(\ln x)$

c. $f(\cos x)$

d. $f(g(\ln x))$

Section F – Trigonometry

For problems 1-16, determine the exact value of each expression. Try to envision the Unit Circle. **NO CALCULATOR.**

1. $\cos(0)$

2. $\sin\left(\frac{\pi}{2}\right)$

3. $\csc\left(\frac{3\pi}{4}\right)$

4. $\cos(\pi)$

5. $\cos\left(\frac{7\pi}{6}\right)$

6. $\cos\left(-\frac{\pi}{3}\right)$

7. $\tan\left(\frac{7\pi}{4}\right)$

8. $\tan\left(\frac{\pi}{6}\right)$

9. $\sin(\pi)$

10. $\sin\left(\frac{3\pi}{2}\right)$

11. $\cot\left(\frac{5\pi}{4}\right)$

12. $\cos\left(-\frac{2\pi}{3}\right)$

13. $\cos\left(\frac{7\pi}{4}\right)$

14. $\sin\left(\frac{2\pi}{3}\right)$

15. $\tan\left(\frac{5\pi}{6}\right)$

16. $\sin\left(\frac{11\pi}{6}\right)$

For problems 17-20, find all solutions to each equation for $0 \leq x \leq 2\pi$. For some of these problems, you may need to factor before you can solve it. **NO CALCULATOR.**

17. $2\sin^2 x - \sin x = 0$

18. $\sin x - \cos x = 0$

19. $2\cos 2x + \sqrt{3} = 0$

20. $\tan^2 x - 1 = 0$

Section G – Exponentials and Logarithms

For problems 1-4, evaluate each expression. **NO CALCULATOR**

1. $\log_2 64$

2. $\log_5 \frac{1}{5}$

3. $\log_4 4^6$

4. $\log_{81} 9$

For problems 5-8, use properties of logarithms to expand each logarithmic expression. When possible, simplify if you can evaluate the logarithm. **NO CALCULATOR.**

5. $\log(1000x)$

6. $\log_5 \left(\frac{25}{y} \right)$

7. $\ln \left(\frac{x^2}{y} \right)$

8. $\log \sqrt{100x}$

For problems 9-12, use properties of logarithms to condense each logarithmic expression. Write the expression as a single logarithm whose coefficient is 1. When possible, simplify if you can evaluate the logarithm. **NO CALCULATOR.**

9. $\ln x + \ln 3$

10. $\log(2x + 5) - \log x$

11. $4 \ln x + 7 \ln y - 3 \ln z$

12. $\frac{1}{3}(\log x - \log y)$

For problems 13-16, solve the exponential or logarithmic equation. **ONLY USE A CALCULATOR TO FIND THE DECIMAL APPROXIMATION TO THREE DECIMAL PLACES.**

13. $4^x = 15$

14. $5^{x-2} = 4^{2x+3}$

15. $\log_4(x + 3) = 2$

16. $\ln(x + 2) - \ln(4x + 3) = \ln \left(\frac{1}{x} \right)$