



Woodgrove Math Department

June, 2020

Welcome to Calculus AB! We are very excited that you have chosen this course and look forward to working with you over the next year. Calculus is very different than many of the math classes that you have taken in previous years. It requires that you be able to readily access any of the skills and concepts that you have acquired over your previous math courses.

As we embark on this journey, several questions arise:

1) How do I make sure that I am ready for this course?

To help you be as successful as possible, we have put together a packet that will help you refine your pre-requisite skills. There are 8 sections to this packet along with a suggested pacing guide to assist you. These are prerequisite skills that should be **mastered** before beginning the course, as we do not have enough time in the pacing of this course to re-teach Algebra II and Precalculus fundamentals. The packet is *optional* but *recommended* to best prepare yourself for next school year. A formative assessment will be given within the first week of school to evaluate your understanding of these concepts.

2) What do I do if I don't remember a lot of the pre-requisite skills?

You can email us for help on content specific questions or check out some of the great online tutorials such as Khan Academy. Keep practicing 😊 Remember, these are skills that will be used daily in AP Calculus AB.

3) What tools will I need to be successful?

A positive attitude and good study habits are your most powerful tools to ensure success in this course. These include, but are not limited to, having a willingness to come and ask questions when you are confused, taking good notes, actively participating in class, completing your homework on time, studying for tests/quizzes, and correcting incorrect answers on homework and tests/quizzes. A well-organized notebook, paper, pencils, and a graphing calculator (TI-84/TI-89) are required.

4) An AP course is a lot of work. How much should I expect from Calculus AB?

Calculus is a demanding course and will require an average of approximately 60 minutes of homework time for every 90-minute block.

5) What are the requirements at the end of the course?

AP Calculus is intended for serious math students who plan to take higher-level mathematics and/or science courses in college. The curriculum, pace, and rigor of the AP Calculus AB course is determined by College Board guidelines. All enrolled students are required to prepare to take the AP exam, so it is taught as if EVERYONE is planning on taking the exam.

Have a wonderful summer and please be responsible about pacing yourself so you can turn in your assignments on time. We look forward to working with you next year!

Mr. Korn & Mrs. Sowers

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NAME _____
AP Calc AB 2020 Summer Assignment

Section 1: Line Problems

In #1-5, write an equation for the specified line.

Suggested Pacing:

Section 1: complete by July 1

Sections 2 & 3: complete by July 15

Section 4: complete by July 31

Sections 5 & 6: complete by August 14

Section 7 & 8: complete by August 27

_____ 1) the vertical line through (0,-3)

_____ 2) through (-3,6) and (1,-2)
(Use point-slope form.)

_____ 3) the horizontal line through (0,2)
(Use point-slope form.)

_____ 4) through (4,-12) and **parallel** to
 $4x + 3y = 12$ **(Use point-slope form.)**

_____ 5) through (-2,-3) and **perpendicular** to
 $3x - 5y = 1$ **(Use point-slope form.)**

Section 2: Function Problems

You must be able to complete these problems without the aid of a calculator!

_____ 1) Find the zeros and the domain for $h(x) = \frac{x - 3}{|x| - 2}$.

Domain _____

_____ 2) Find the zeros and the domain for $g(x) = \frac{x + 2}{x - 1}$.

Domain _____

3) Using $f(x) = \frac{x^2 - 16}{x^2 + 9}$, find: x-int _____
y-int _____

Domain: _____

Asymptotes: _____

_____ 4) Given $f(x) = 4x^2 - 2$, find $f(-2)$.

_____ 5) Find $f(x+c)$ for $f(x) = \frac{2x - 1}{x^2 + 2}$.

_____ 6) Find $f(x+\Delta x)$ for $f(x) = \frac{x^2 - 9}{2x - 1}$.

_____ 7) Given $h(x) = 10x - 2x^2$, find $h(x+h)$.

_____ 8) Given $f(x) = \begin{cases} 3x + 4, & x \leq 2 \\ x^2 + 1, & x > 2 \end{cases}$ find $f(3)$.

_____ 9) Given $f(x) = \begin{cases} 2x - 1, & x \leq -2 \\ x + 6, & x > -2 \end{cases}$ find $f(-6)$.

_____ 10) Given $f(x) = 2 - x^2$, find $\frac{f(x+h) - f(x)}{h}$.

_____ 11) $f(x) = x^2 + 8x - 5$ and $g(x) = 3x - 1$, find $f(g(2)) - g(f(2))$.

_____ 12) Find $\frac{f(x+h) - f(x)}{h}$ for $f(x) = 9x + 3$

Section 3: Simplifying Expressions

Factor:

1) $x^3 + 8x^2 - 20x$

6) $x(x+3) - 6(x+3)$

2) $3x^2 + 4x + 1$

7) $(x+2)^2 - 5(x+2)$

3) $x^6 - 2x^3 + 1$

8) $4 - 14x^2 - 8x^4$

4) $4x^2 + 12x + 9$

9) $x^3 - 3x^2 - x + 3$

5) $x^7 - x^5$

10) $x^4 - x^3 + x - 1$

Simplify (no radicals in the denominator):

1) $\frac{12}{x^2 - x} \cdot \frac{x^2 - 1}{4x - 2}$

4) $\frac{(x^2 + 9) \cdot 2 - (2x - 5) \cdot 2x}{(x^2 + 9)^2}$

2) $\frac{x}{x-3} - \frac{x+1}{x^2 + 5x - 24}$

5) $\frac{2 - \sqrt{5}}{2 + 3\sqrt{5}}$

3) $\frac{1}{h} \left(\frac{1}{(x+h)^2} - \frac{1}{x^2} \right)$

6) $\frac{\sqrt{x+h} - \sqrt{x}}{\sqrt{x+h} + \sqrt{x}}$

Section 4: Exponent Problems

#1-9 Simplify the following:

_____ 1) $\left(\frac{x^{-3}y^2}{z}\right)^{-4}$

_____ 4) $\frac{x^2y}{x^3} \div \frac{x^{-3}y^6}{y^4}$

_____ 2) $\left(\frac{3x^2y^3}{xw^{-2}}\right)^3$

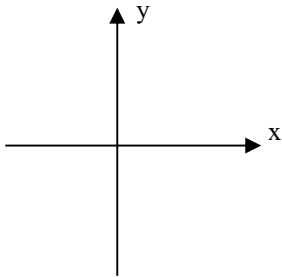
_____ 5) Evaluate $\frac{1}{27^{\frac{-1}{3}}}$.

_____ 3) $(3x^2y^3z)^{-2}(xy^4)$

_____ 6) Evaluate $\left(\frac{1}{64}\right)^{\frac{-3}{2}}$.

Section 5: Trigonometric Problems

1) Determine all six trigonometric functions for the angle whose terminal side occurs at $(-12, -5)$
Draw and label a diagram.



$\sin \theta =$ _____ $\csc \theta =$ _____

$\cos \theta =$ _____ $\sec \theta =$ _____

$\tan \theta =$ _____ $\cot \theta =$ _____

#2- 6 Evaluate the sine, cosine, and tangent of each angle **without** using a calculator. Give **EXACT** answers.

2) $\sin(150^\circ) = \underline{\hspace{2cm}}$ $\cos(315^\circ) = \underline{\hspace{2cm}}$ $\tan(225^\circ) = \underline{\hspace{2cm}}$

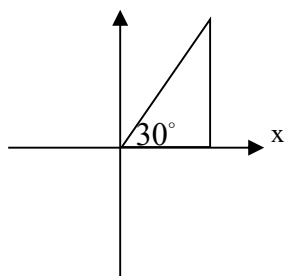
3) $\sin\left(\frac{-\pi}{6}\right) = \underline{\hspace{2cm}}$ $\cos\left(\frac{2\pi}{3}\right) = \underline{\hspace{2cm}}$ $\tan\left(\frac{5\pi}{4}\right) = \underline{\hspace{2cm}}$

4) $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right) = \underline{\hspace{2cm}}$ $\cos^{-1}(-1) = \underline{\hspace{2cm}}$ $\tan^{-1}(\sqrt{3}) = \underline{\hspace{2cm}}$

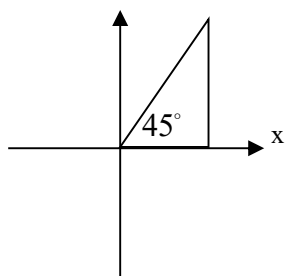
5) $\sin^{-1}\left(\frac{-\sqrt{3}}{2}\right) = \underline{\hspace{2cm}}$ $\cos^{-1}\left(\frac{-\sqrt{3}}{2}\right) = \underline{\hspace{2cm}}$ $\tan^{-1}\left(\frac{\sqrt{3}}{3}\right) = \underline{\hspace{2cm}}$

6) Simplify: $\sin\frac{5\pi}{4} + \tan\frac{\pi}{4} = \underline{\hspace{4cm}}$

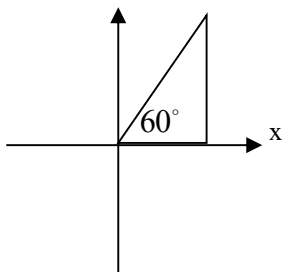
7) For each diagram, label the 6 trig ratios:



$\sin \theta =$	$\csc \theta =$
$\cos \theta =$	$\sec \theta =$
$\tan \theta =$	$\cot \theta =$



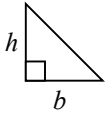
$\sin \theta =$	$\csc \theta =$
$\cos \theta =$	$\sec \theta =$
$\tan \theta =$	$\cot \theta =$



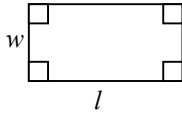
$\sin \theta =$	$\csc \theta =$
$\cos \theta =$	$\sec \theta =$
$\tan \theta =$	$\cot \theta =$

Section 6: Area and Volume

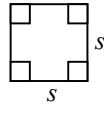
Area Formulas:



$$A = \frac{1}{2}bh$$



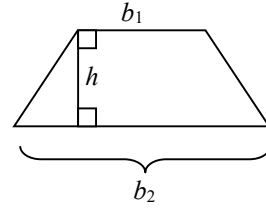
$$A = lw$$



$$A = s^2$$

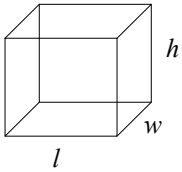


$$A = \pi r^2$$

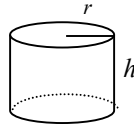


$$A = \frac{1}{2}h(b_1 + b_2)$$

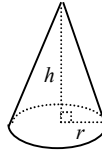
Volume Formulas:



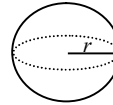
$$V = lwh$$



$$V = \pi r^2 h$$

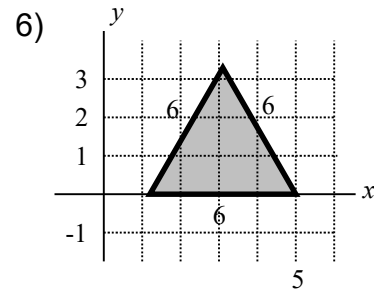
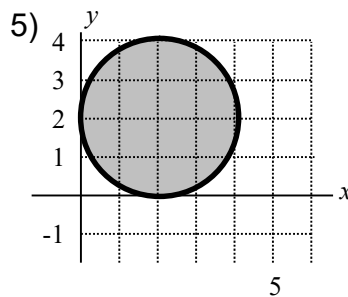
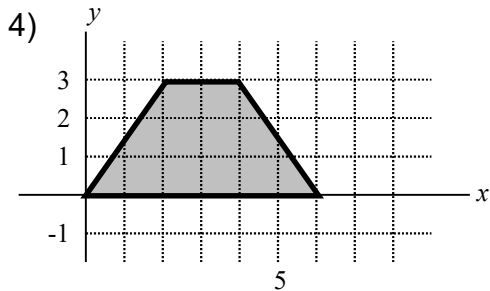
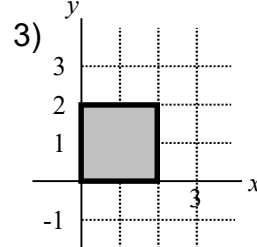
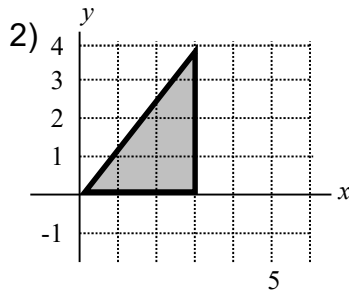
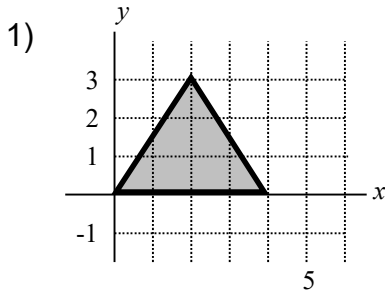


$$V = \frac{1}{3}\pi r^2 h$$

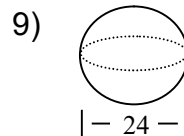
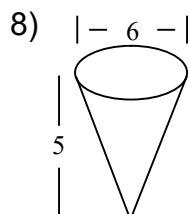
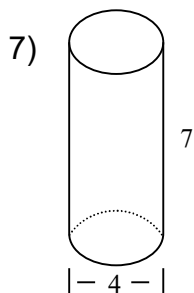


$$V = \frac{4}{3}\pi r^3$$

#1-6 Find the EXACT area of each of the following shaded figures. Show formulas and work for each on the answer sheet.



#7-9 Find the EXACT volume of each solid.



Do NOT make π a decimal!

Section 7: Exponents and Logs

#1-8 Simplify or solve. Show all work.

_____ 1) $2^{\log_2 7}$

_____ 2) $\ln e^{-4}$

_____ 3) $e^{\ln 16}$

_____ 4) Condense: $\ln\left(\frac{x}{x-1}\right) + \ln\left(\frac{x+1}{x}\right) - \ln(x^2 - 1)$

_____ 5) $\ln(x+1) - \ln x = 2$ _____ 6) $e^{\ln(w^2+1)} = 5$

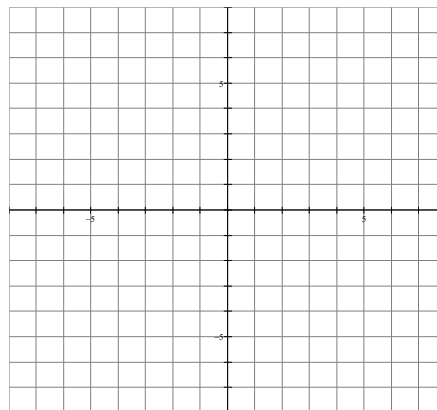
_____ 7) $e^{x^2+4x-5} = 1$

Section 8: Function Families

Graph each parent function and clearly state the domain, range, asymptotes, and end behavior.

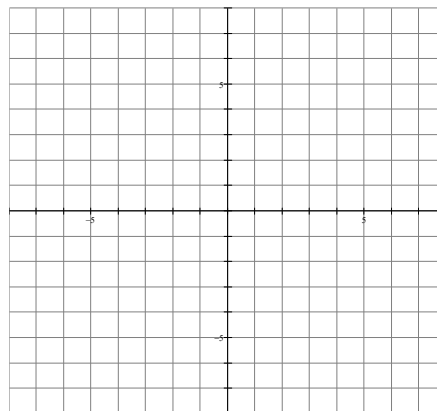
1) $y = x$

Domain: _____
Range: _____
Asymptotes: _____
End Behavior:
$x \rightarrow \infty, f(x) \rightarrow$
$x \rightarrow -\infty, f(x) \rightarrow$



2) $y = x^2$

Domain: _____
Range: _____
Asymptotes: _____
End Behavior:
$x \rightarrow \infty, f(x) \rightarrow$
$x \rightarrow -\infty, f(x) \rightarrow$



3) $y = x^3$

Domain: _____

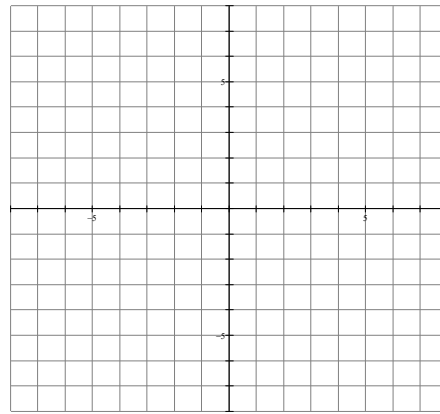
Range: _____

Asymptotes: _____

End Behavior:

$x \rightarrow \infty, f(x) \rightarrow$

$x \rightarrow -\infty, f(x) \rightarrow$



4) $y = x^4$

Domain: _____

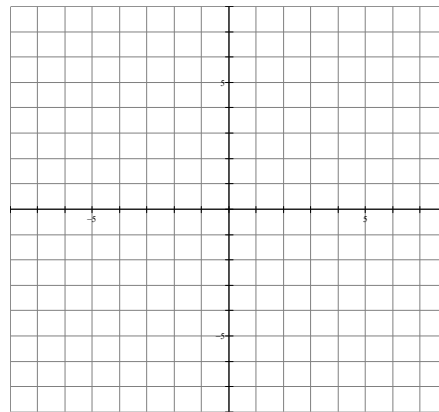
Range: _____

Asymptotes: _____

End Behavior:

$x \rightarrow \infty, f(x) \rightarrow$

$x \rightarrow -\infty, f(x) \rightarrow$



5) $y = e^x$

Domain: _____

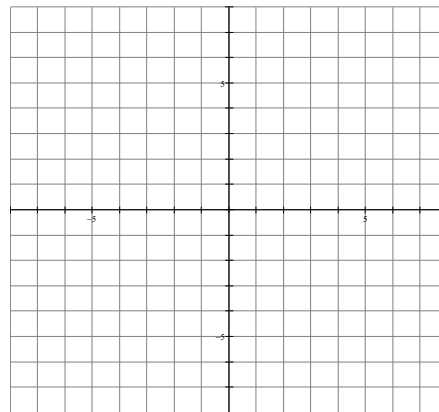
Range: _____

Asymptotes: _____

End Behavior:

$x \rightarrow \infty, f(x) \rightarrow$

$x \rightarrow -\infty, f(x) \rightarrow$



6) $y = \ln x$

Domain: _____

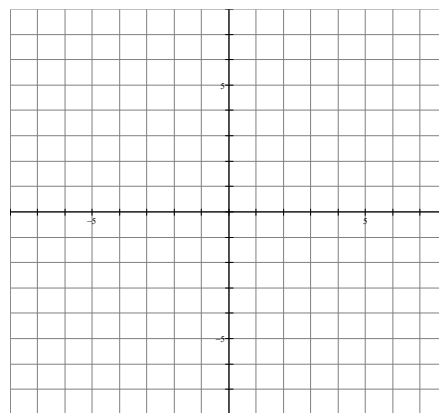
Range: _____

Asymptotes: _____

End Behavior:

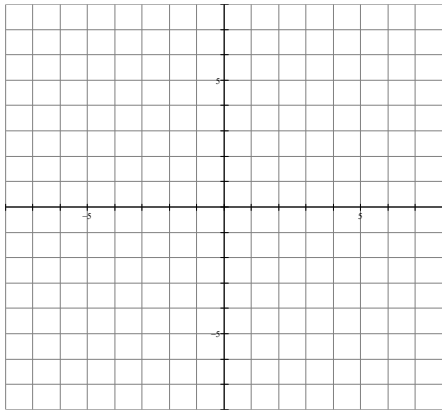
$x \rightarrow \infty, f(x) \rightarrow$

$x \rightarrow -\infty, f(x) \rightarrow$



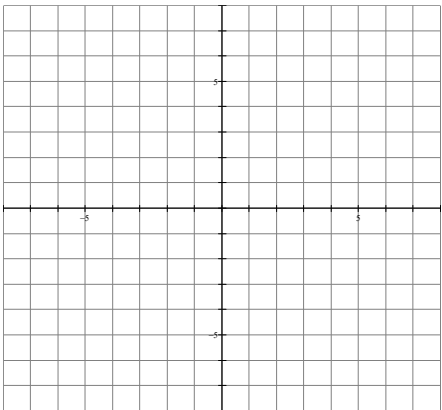
7) $y = \sqrt{x}$

Domain: _____
 Range: _____
 Asymptotes: _____
 End Behavior:
 $x \rightarrow \infty, f(x) \rightarrow$
 $x \rightarrow -\infty, f(x) \rightarrow$



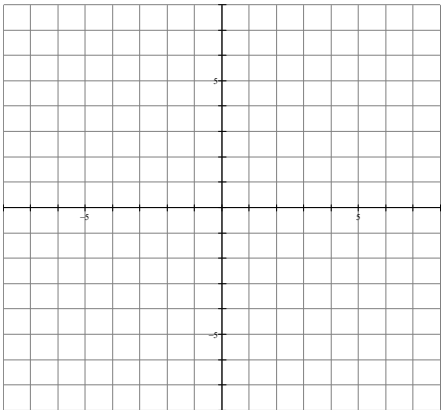
8) $y = |x|$

Domain: _____
 Range: _____
 Asymptotes: _____
 End Behavior:
 $x \rightarrow \infty, f(x) \rightarrow$
 $x \rightarrow -\infty, f(x) \rightarrow$



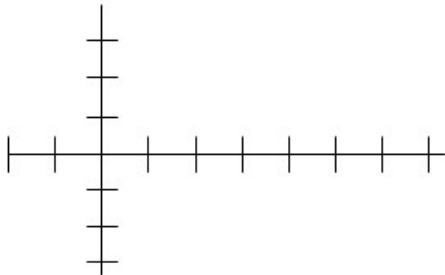
9) $y = \frac{1}{x}$

Domain: _____
 Range: _____
 Asymptotes: _____
 End Behavior:
 $x \rightarrow \infty, f(x) \rightarrow$
 $x \rightarrow -\infty, f(x) \rightarrow$



10) $y = \sin x$

Domain: _____
 Range: _____



11) $y = \cos x$

Domain: _____
 Range: _____

