

Entering AP Calculus AB you should have the following skills:

1. Recall all unit circle values for sine, cosine, tangent, cosecant, secant, cotangent.
2. Evaluate limits with a graph.
3. Recognize limits that do not exist.
4. Evaluate limits algebraically.
5. Recall and apply properties of logarithms.
6. Recall properties of inverse functions.
7. Recognize key components of graphs (increasing, decreasing, relative extrema, absolute extrema).
8. Understand slope between two points is the average rate of change of the function between those points.
9. Calculate the slope between two points given an equation, table, or graph.
10. Write the equation of a line given the slope and a point.

Sample Questions

Questions related to skill 1:

a. $\sin \frac{\pi}{4}$

b. $\cos \frac{5\pi}{6}$

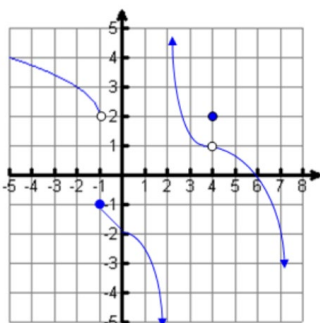
c. $\csc \frac{7\pi}{3}$

d. $\sec -\pi$

e. $\tan -\frac{11\pi}{6}$

f. $\cot \frac{-3\pi}{4}$

Questions related to skills 2 and 3:



a. Find $\lim_{x \rightarrow -1^-} f(x) = \underline{\hspace{2cm}}$

b. Find $\lim_{x \rightarrow 0} f(x) = \underline{\hspace{2cm}}$

c. Find $\lim_{x \rightarrow 2} f(x) = \underline{\hspace{2cm}}$

d. Find $\lim_{x \rightarrow 4} f(x) = \underline{\hspace{2cm}}$

Questions related to skills 3 and 4:

1) $\lim_{x \rightarrow 2^+} -\frac{2x}{x-2}$

$-\infty$

2) $\lim_{x \rightarrow 1^-} -\frac{x-1}{x^2+2x-3}$

$-\frac{1}{4}$

3) $\lim_{x \rightarrow -\infty} (-x^4 + 2x^3 + 2x^2 - 2)$

$-\infty$

4) $\lim_{x \rightarrow -3} -\frac{x^2+7x+12}{x+3}$

-1

5) $\lim_{x \rightarrow -1^+} f(x), f(x) = \begin{cases} 2x+3, & x < -1 \\ \frac{x}{2}+3, & x \geq -1 \end{cases}$

$\frac{5}{2}$

Questions related to skill 5:**Expand each logarithm.**

1) $\log_9 \sqrt[3]{u \cdot v \cdot w}$

$$\frac{\log_9 u}{3} + \frac{\log_9 v}{3} + \frac{\log_9 w}{3}$$

Condense each expression to a single logarithm.

2) $12\log_3 u - 2\log_3 v$

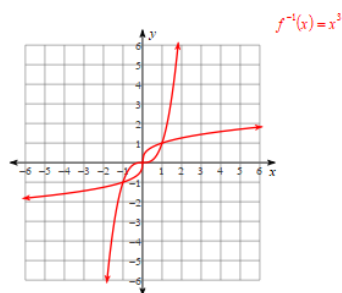
$$\log_3 \frac{u^{12}}{v^2}$$

Solve each equation.

3) $\log 5x + \log 3 = 1 \quad \left(\frac{2}{3} \right)$

Questions related to skill 6:**Find the inverse of each function. Then graph the function and its inverse.**

1) $f(x) = \sqrt[3]{x}$



2. If the point $(3, -7)$ is on the graph of g , what point can we guarantee is on the graph of g^{-1} (the inverse of g)?

Questions related to skill 7:

For each problem, graph the function and find the open intervals where the function is increasing and decreasing. What type of extrema (relative maximum or relative minimum) is occurring at the point where the function changes between increasing and decreasing?

1) $y = -2x^2 - 8x - 8$

Increasing: $(-\infty, -2)$ Decreasing: $(-2, \infty)$

2) $y = \frac{x^2}{2} - 2x$

Increasing: $(2, \infty)$ Decreasing: $(-\infty, 2)$

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

Increasing: $\left(0, \frac{2}{3}\right)$ Decreasing: $(-\infty, 0), \left(\frac{2}{3}, \infty\right)$

Questions related to skill 8:

For each problem, find the average rate of change of the function over the given interval. Graph the function and then represent the average rate of change you calculated on the graph with a line.

1) $y = -2x^2 + 2$; $[-1, 0]$

2

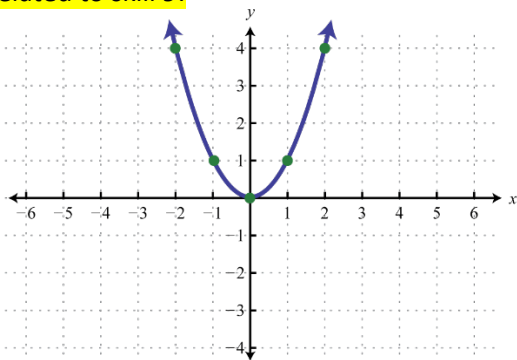
2) $y = -\frac{1}{x-2}$; $[-4, -3]$

$\frac{1}{30}$

Questions related to skill 9:

$f(x) = x^2$

x	$f(x)$
-2	4
-1	1
0	0
1	1
2	4



Calculate the slope for the above function on the following intervals.

- a. $[-2, 0]$
- b. $[-1, 2]$
- c. $[-1, 1]$
- d. $[-2, 1]$

Question related to skill 10:

Write the equation of the line given the following information.

- a. Point: $(-3, 10)$ Slope: -3
- b. Point: $(4, 8)$ Slope: 8