Draw a picture which represents $\dfrac{\sqrt{25+h}-5}{h}$ where $h>0$

Estimate $\lim_{h\to 0}\left(\dfrac{\sqrt{25+h}-5}{h}\right)$

Interpret the limit as $f'(a)$ where $f(x)=$
and a=

Use the limit definition of the derivative to determine $f'(a)$

For the function $f(x)=\dfrac{1}{x}$

Use the shortcut to find $f'(x)$ if $f(x) = (2-3x)^2$

Check your answer by sketching the graphs of both and looking to see if it all makes sense

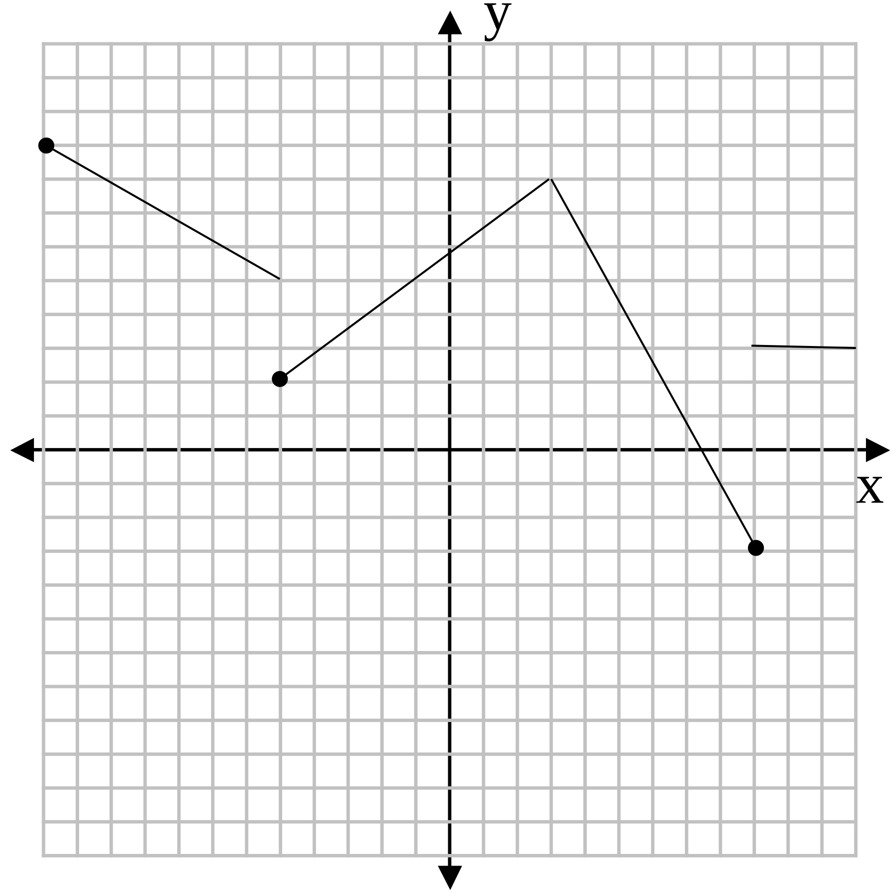
Do likewise for $g(x) = 2^x$

$$\lim_{x\to -12^+} f(x) =$$

$$\lim_{x\to -5^+} f(x) =$$

$$\lim_{x\to -5^-} f(x) =$$

$$\lim_{x\to -5} f(x) =$$

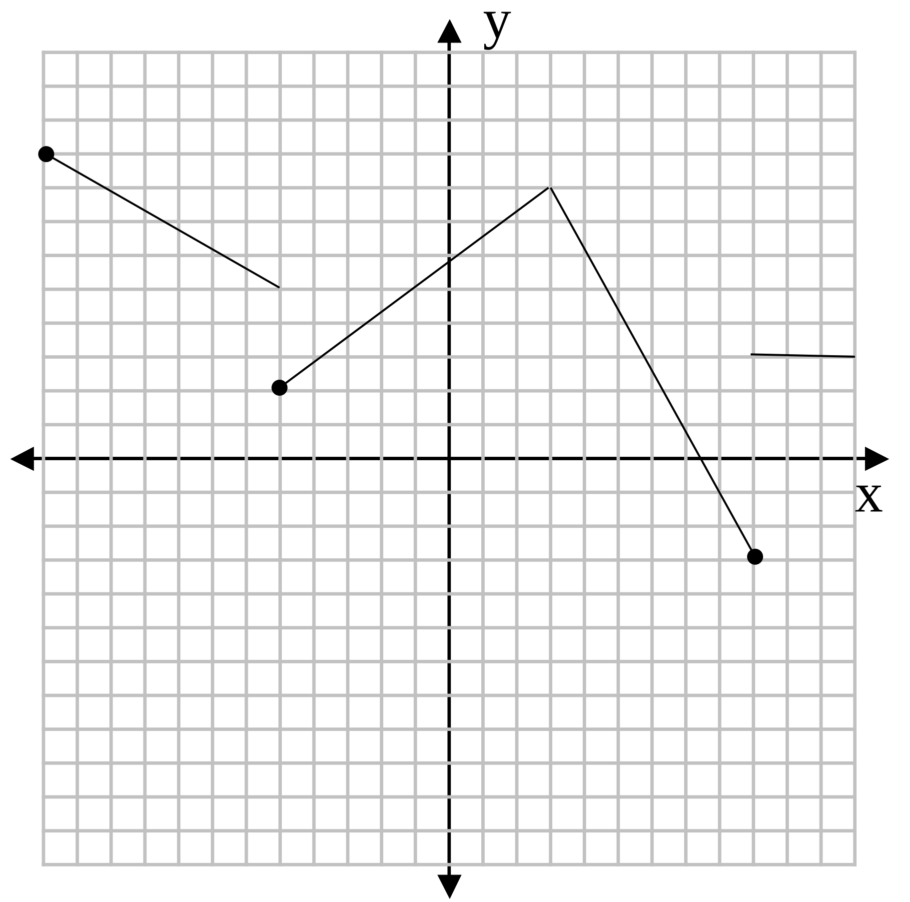


$$\lim_{x \to 3^+} f(x) =$$

$$\lim_{x \to 3^-} f(x) =$$

$$\lim_{x \to 3} f(x) =$$

$$\lim_{x \to 12^-} f(x) =$$

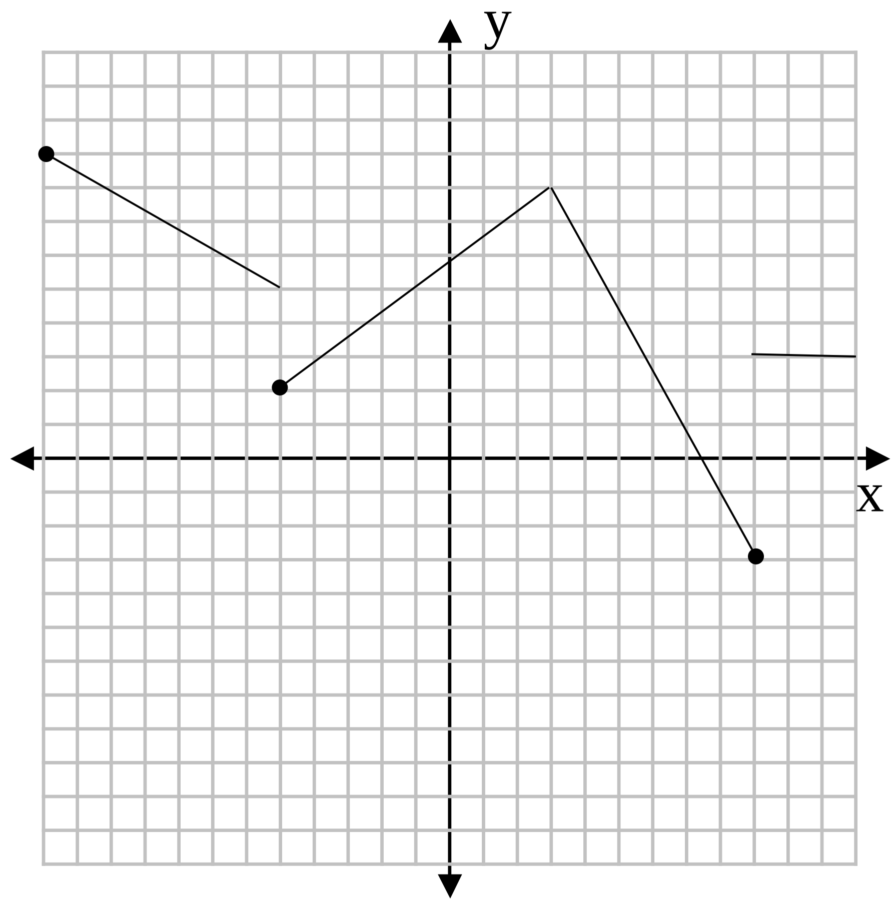


$$\lim_{x\to 9^+} f(x) =$$

$$\lim_{x\to 9^-} f(x) =$$

$$\lim_{x\to 9} f(x) =$$

$$\lim_{x\to 12} f(x) =$$



$$g(x) = 3(2-3x)^2 - \frac{1}{\sqrt{x}}$$

Determine $$\lim_{x \to 4} \frac{g(x) - g(4)}{x-4}$$

$$f(x) = x^3 - 6x^2 - 36x + 9$$

Without using technology, determine all relative maximum points, relative minimum points and all inflection points of f.

$f(x) = ax^2 + bx + c$ is tangent to $y = 3x + 4$

at $x = 2$ f has a relative minimum value when

$x = -1$ Determine $f(x)$

Given $f(2)=4$ and $\mathrm{f}''(\mathrm{x})>0$ on $(-2,6)$ and

$$g(x)=\frac{f(x)-4}{x-2}$$

arrange the following in order, smallest to largest

$$f'(0),\ f'(2),\ f'(4),\ g(0),\ g(2),\ g(4)$$

Guess the value of $\lim_{x\to\infty}\left(\sqrt{\left(x^2 - x\right)} - x\right)$

Verify that your answer seems reasonable

Prove that your answer is correct.

$$f(x) = x^3 - (x+5)^2 + \frac{1}{\sqrt{x^3}}$$

Find an antiderivative of f

A piece of string is divided into two parts and made into a circle and a square. The string is 100 meters long. Find the maximum possible area that can be enclosed and the minimum possible area that can be enclosed.

The counter culture club is taking a field trip to a downtown Chicago lunch counter. If 200 or fewer people attend, the cost will be $8 per person. For each person over 200, the cost will be lowered by $.01 per person. How many people should go so that the club collects the greatest amount of money?

Waldemar can row a boat 2 miles per hour. He can run 4 miles per hour. He is 3 miles due east of the shore, in a rowboat, on the water. He wishes to go to a point 5 miles up (north) the shore. Describe the path that will get him there in the shortest amount of time

Write differential equations for each of the following situations:

1) The amount of money invested is compounded continuously at a rate of 3% per year.

2) The population is growing at a rate of 10% per year.

3) The temperature of a liquid is cooling at a rate proportional to the difference between the room temperature and its current temperature.

A object moves along a straight line in such a way that it is slowing down with an acceleration of –8 meters per second (some may say it is decelerating at a rate of 8 meters per second). It has an initial velocity of 14 meters per second. Find the distance the object travels until it comes to rest. (Write some differential equations and solve them along the way to your solution.)

The population of Smallville is growing at a rate of 10% per year. If there were 100,000 people on January 1,2000, how many are there now? (This is day 270 of year 2005). Do this by writing and solving a differential equation.
When will there be a million people?

$$y = \ln\left(\frac{x^3}{x-3}\right)$$

$$\frac{dy}{dx} =$$

Find the derivative of *f* with respect to x

$$f(x) = \ln(5x) + \frac{3}{x^2} - e^{(x+4)} + \pi^e - 4^{3x} + \cos(2x)$$

Antidifferentiate

$$g(x)=\frac{3}{x^4}+\frac{2}{x}+5^x+\sin(x-1)+\cos(\pi)$$

$$f(x) = \cos(x)$$

$$L(x) = A + Bx$$

$$Q(x) = A + Bx + Cx^2$$

$$T(x) = A + Bx + Cx^2 + Dx^3$$

Find A,B,C and D so that

$$f(0) = L(0)$$

$$f'(0) = L'(0)$$

$$f''(0) = Q''(0)$$

$$f'''(0) = T'''(0)$$

$f(x) = 3\sin(x) - 2\cos(x)$ has domain $[0, 2\pi]$

Determine all critical points, relative maxima and minima, inflections points, intervals where f is increasing and where it is decreasing, where it is concave up and where it is concave down. Determine the absolute maximum and minimum values of the function. Justify all work with calculus.

$$\lim_{h\to 0}\frac{2^{3h}-1}{h}$$

Identify the limit as a derivative

Evaluate it by taking the derivative at the appropriate point

$$f(x) = \frac{1}{x} + \ln(x)$$

The domain of f is $\frac{1}{4} \le x \le 4$

Determine all critical points and inflection points

Identify the x-coordinates of all maxima and minima

Identify absolute maxima and minima

Justify your work