Limits Assignment

Limits Assignment

Question 0

Watch the lecture video here.

Did you watch the video? [Type yes or no.]

Question 1

Consider $\displaystyle \lim_{x \to -2} \frac{x^2 - x - 6}{x^3 - 6x^2 + 32}$.

Part a

Estimate the limit to two decimal places by zooming in on a graph.

```
1   #The limit is approximately:
```

Part b

Estimate the limit numerically **from the left** using at least seven values.

```
2   #The limit is approximately:
```

Part c

Estimate the limit numerically **from the right** using at least seven values.

```
3  #The limit is approximately:
```

Part d

Compute the limit using Sage's limit command. [Convert your answer to a decimal in order to compare it with the results above.]

Question 2

Consider $\displaystyle\lim_{x\to 1} \frac{x^3 - 1}{\sqrt{x} - 1}$.

Part a

Estimate the limit to two decimal places by zooming in on a graph.

```
4  #The limit is approximately:
```

Part b

Estimate the limit numerically **from the left** using at least seven values.

```
5  #The limit is approximately:
```

Part c

Estimate the limit numerically **from the right** using at least seven values.

```
6  #The limit is approximately:
```

Part d

Compute the limit using Sage's limit command.

Question 3

Consider $\displaystyle\lim_{x\to 0} \frac{x}{|x|}$.

Note $|x|$=abs(x) in Sage.

Part a

Estimate the limit to two decimal places by zooming in on a graph.

```
7   #The limit is approximately:
```

Part b

Estimate the limit numerically **from the left** using at least seven values.

```
8   #The limit is approximately:
```

Part c

Estimate the limit numerically **from the right** using at least seven values.

```
9   #The limit is approximately:
```

Part d

Compute the limit using Sage's limit command.

Question 4

Let $f(x) = \dfrac{x^2 - 4}{x^2 - 1}$.

Part a

Use Sage's limit command to compute the right limit $\lim\limits_{x \to 1^+} f(x)$.

Part b

Use Sage's limit command to compute the left limit $\lim\limits_{x \to 1^-} f(x)$.

```
10
```

Question 5

Consider the function $f(x) = \dfrac{12x^4 - 9x^2 + 8}{3x^4 + 2x^3 - 4x}$.

Part a

Compute $\displaystyle\lim_{x \to -\infty} f(x)$.

Part b

Compute $\displaystyle\lim_{x \to \infty} f(x)$.

Part c

Graph $f(x)$ using xmin=-100, xmax=100, ymin=0, ymax=8. Your graph should have a horizontal asymptote that matches the answers from parts a and b.

Question 6

Let $f(x) = \sqrt{2x + 4}$. Compute $\displaystyle\lim_{b \to a} \dfrac{f(b) - f(a)}{b - a}$.