Lab1_151

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0.1 MATH 151 Lab 1

Section Number: 568

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[1]:
```
from sympy import *
from sympy.plotting import (plot,plot_parametric)
```

0.1.1 Question 1

1a

[2]:
```
print((79 * (E ** 1.29 + 11.1 ** 2)) / (2026 - 5.1 ** 3))
```

```
5.29251613828432
```

1b

[3]:
```
def to_rad(deg): return deg * pi / 180

equation = (cos((11 * pi) / 12) * sec(to_rad(75)) + tan((7 * pi) / 12))
print(f"approximate: {equation.simplify()}")
print(f"exact: {equation.evalf()}")
```

```
approximate: -4 - 2*sqrt(3)
exact: -7.46410161513775
```

0.1.2 Question 2

2a

[4]:
```
x = Symbol('x')
equations = (sqrt(x **2 - 4) / (x - 2))
def f(o): return equations.subs(x, o).evalf()

print(f(-10), f(-100), f(-1000000))
```

```
-0.816496580927726 -0.980196058819607 -0.999998000002000
```

2b

[5]:
```
print(f(2.01), f(2.0001), f(2.000001))
```

```
20.0249843945009 200.002499984149 2000.00024988243
```

2c Based on part (a), what happens to the y-values of f when x gets REALLY large in the negative direction?

When x gets REALLY large in the negative direction the y-values of f become close to -1.

2d Based on part (b), what happens to the y-values of f when x gets close to 2 from the right?

When x gets cloes to 2 from the right the y-values of f becomes increasingly larger. It seems for every 0 we put behind the decimal the outputed value gets increased by a power of 10.

0.1.3 Question 3

3a

[6]:
```
a, v, h = symbols('a v h')

equation = (-16 / (v ** 2 * (cos(a) ** 2))) * x ** 2 + tan(a) * x + h
ball_height = equation.subs([(a, to_rad(26)), (v, 130), (h, 3), (x, 409)]).
 ↪evalf()
print(f"ball height: {ball_height}")
```

```
ball height: 6.43593602529508
```

Since the wall is 10ft high and the ball is only 6.4ft high it will hit the wall and not clear it.

3b

[7]:
```
equation = (-16 / (v ** 2 * (cos(a) ** 2))) * x ** 2 + tan(a) * x + h - 10
h = solve(equation.subs([(a, to_rad(54.2)), (v, 24), (x, 15)]), h)[0]
print(f"He released it from {h} feet in the air")
```

```
He released it from 7.46746878686940 feet in the air
```