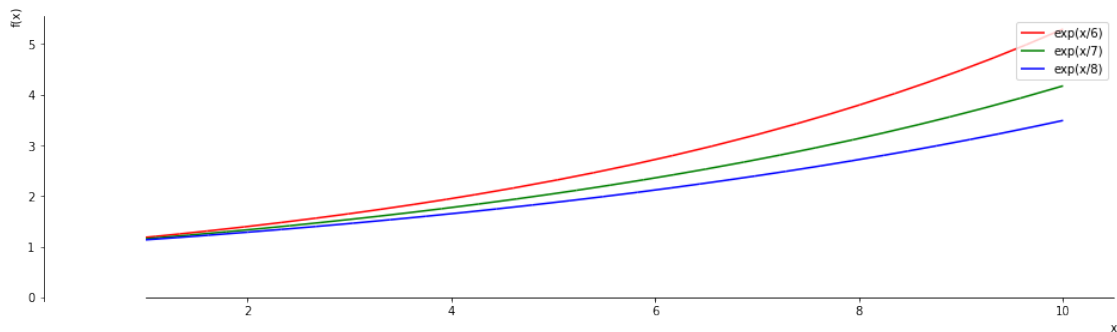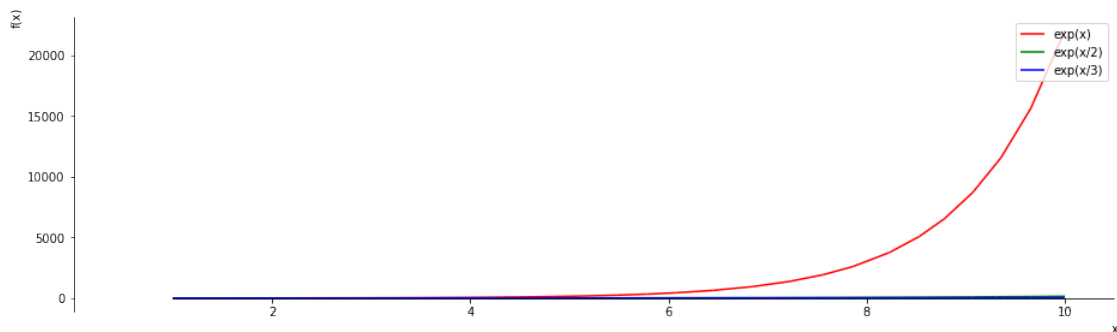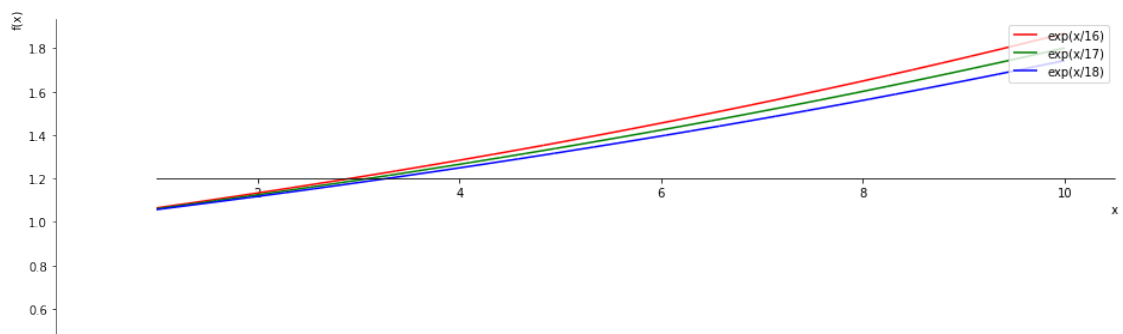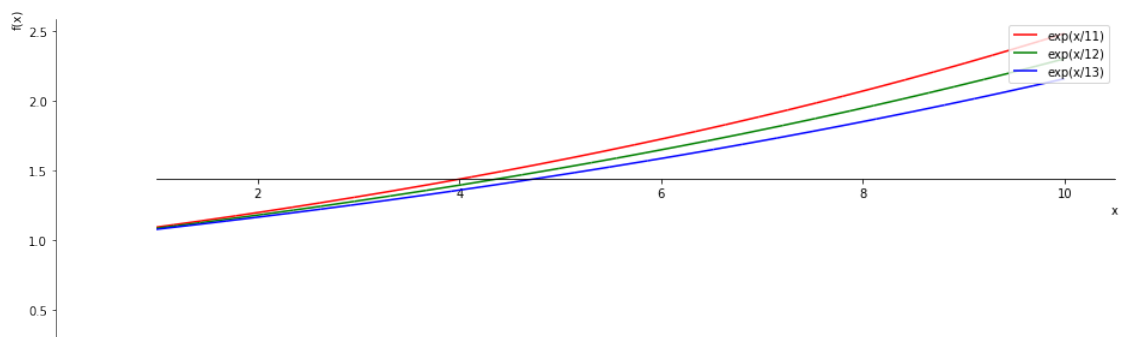# Limit of The Denominator When Euler's Number Is Raised To A Fraction

January 15, 2022

```python
[19]: from sympy import *; x,h,t,y,z,n    = symbols("x h t y z n", real=True)
      f, g, h = symbols('f g h', cls=Function)

      for n in range(1,21,5):
          f = E**(x/n)
          g = E**(x/(n+1))
          h = E**(x/(n+2))
          p0 = plot(f,g,h,show = False,xlim = (1,10.5),size = (13,4),legend = True)
          p0[0].line_color = 'r'
          p0[1].line_color = 'g'
          p0[2].line_color = 'b'
          p0.show()
```

f(x)

2.5

2.0

1.5

1.0

0.5

exp(x/11)
exp(x/12)
exp(x/13)

2   4   6   8   10   x

f(x)

1.8

1.6

1.4

1.2

1.0

0.8

0.6

exp(x/16)
exp(x/17)
exp(x/18)

2   4   6   8   10   x

[13]:
```python
n = symbols('n')
Eq(Limit(E**(x/n),n,oo),Limit(E**(x/n),n,oo).doit())
```

[13]: $\lim_{n\to\infty} e^{\frac{x}{n}} = 1$