CalcI-Teste3-ExercíciosSAGE

November 9, 2024

1. $f(x) = \cos\left(x^3 + 1\right) - \ln\left(\frac{1}{x}\right)$

[31]:
```
x = var('x')
f1 = cos(x^3 + 1) - log(1/x)

f1_prime = diff(f1, x)
f1_prime2 = diff(f1_prime, x)

print(f1_prime, "\n")
print(f1_prime2, "\n")
```

```
-3*x^2*sin(x^3 + 1) + 1/x

-9*x^4*cos(x^3 + 1) - 6*x*sin(x^3 + 1) - 1/x^2
```

2. $f(x) = \sqrt{\text{sen}(2x + 1)}$

[32]:
```
f2 = sqrt(sin(2*x + 1))

f2_prime = diff(f2, x)
f2_prime2 = diff(f2_prime, x)

print(f2_prime, "\n")
print(f2_prime2, "\n")
```

```
cos(2*x + 1)/sqrt(sin(2*x + 1))

-cos(2*x + 1)^2/sin(2*x + 1)^(3/2) - 2*sqrt(sin(2*x + 1))
```

3. $f(x) = \frac{e^{x+1}}{x+\cos(x)}$

[33]:
```
f3 = exp(x + 1) / (x + cos(x))

f3_prime = diff(f3, x)
f3_prime2 = diff(f3_prime, x)

print(f3_prime, "\n")
print(f3_prime2, "\n")
```

```
e^(x + 1)/(x + cos(x)) + (sin(x) - 1)*e^(x + 1)/(x + cos(x))^2

e^(x + 1)/(x + cos(x)) + 2*(sin(x) - 1)*e^(x + 1)/(x + cos(x))^2 + 2*(sin(x) -
1)^2*e^(x + 1)/(x + cos(x))^3 + cos(x)*e^(x + 1)/(x + cos(x))^2
```

4. $f(x) = \frac{x}{x^3+3x^2+1}$

[34]:
```
f4 = x / (x^3 + 3*x^2 + 1)

f4_prime = diff(f4, x)
f4_prime2 = diff(f4_prime, x)

print(f4_prime, "\n")
print(f4_prime2, "\n")
```

```
-3*(x^2 + 2*x)*x/(x^3 + 3*x^2 + 1)^2 + 1/(x^3 + 3*x^2 + 1)

18*(x^2 + 2*x)^2*x/(x^3 + 3*x^2 + 1)^3 - 6*(x + 1)*x/(x^3 + 3*x^2 + 1)^2 -
6*(x^2 + 2*x)/(x^3 + 3*x^2 + 1)^2
```

5. $f(x) = 2x^{\frac{3}{7}} + \frac{1}{\sqrt[3]{x^4}}$

[35]:
```
f5 = 2*x^(3/7) + 1/(x^4)^(1/3)

f5_prime = diff(f5, x)
f5_prime2 = diff(f5_prime, x)

print(f5_prime, "\n")
print(f5_prime2, "\n")
```

```
-4/3*x^3/(x^4)^(4/3) + 6/7/x^(4/7)

64/9*x^6/(x^4)^(7/3) - 4*x^2/(x^4)^(4/3) - 24/49/x^(11/7)
```

6. $f(x) = \frac{1}{\text{sen}(x)+1}$

[36]:
```
f6 = 1 / (sin(x) + 1)

f6_prime = diff(f6, x)
f6_prime2 = diff(f6_prime, x)

print(f6_prime, "\n")
print(f6_prime2, "\n")
```

```
-cos(x)/(sin(x) + 1)^2

2*cos(x)^2/(sin(x) + 1)^3 + sin(x)/(sin(x) + 1)^2
```