MA – 1023: Lab – 1

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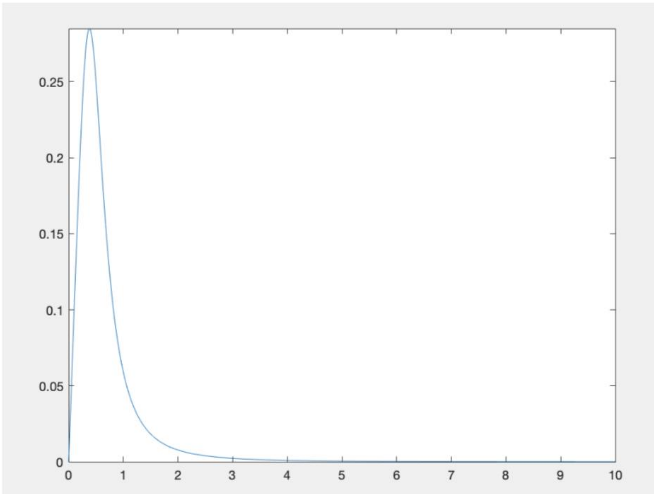
1).

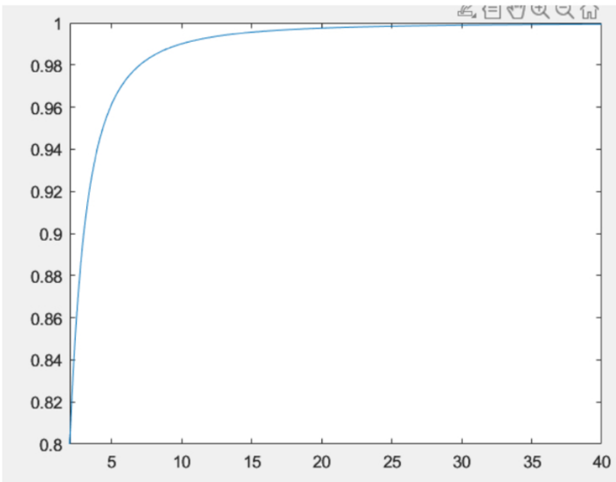
a). Converges to 0.19635

```
clc;
syms f(x) a;
f(x) = x/(1+16*x^4);
a = 0;
fplot(f(x), [a 10])
area = int(f(x),a,Inf)
vpa(area,5)
```



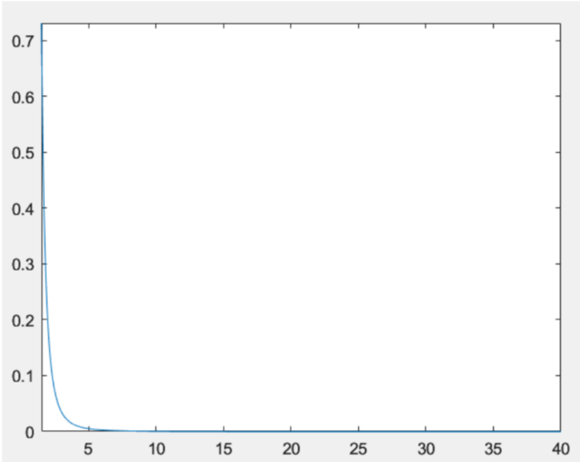
b). Diverges

```
clc;
syms f(x) a;
f(x) = x^2/(1+x^2);
a= 2;
fplot(f(x), [a 40])
area = int(f(x),a,Inf)
vpa(area, 5)
```



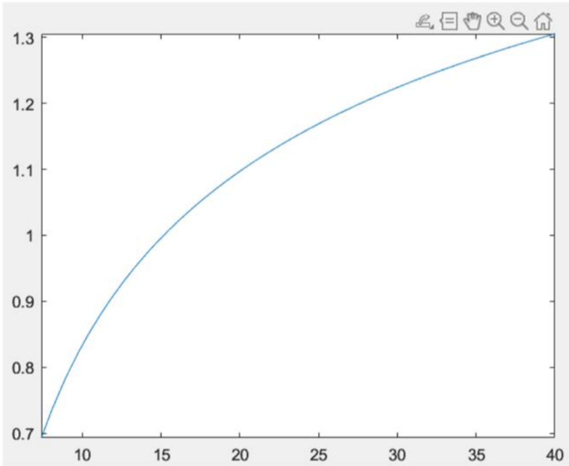
c). Converges to 0.30453

```
clc;
syms f(x) a;
f(x) = 1/(x^3*log(x));
a= 3/2;
fplot(f(x), [a 40])
area = int(f(x),a,Inf)
vpa(area, 5)
```



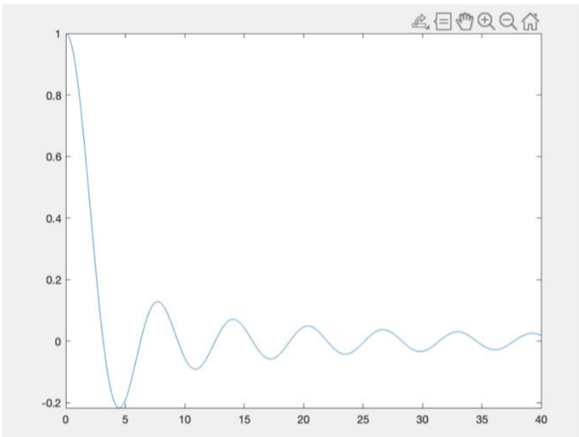
d). Diverges

```
clc;
syms f(x) a;
f(x) = log(log(x));
a= exp(2);
fplot(f(x), [a 40])
area = int(f(x),a,Inf)
vpa(area, 5)
```



e). Converges to 1.5708

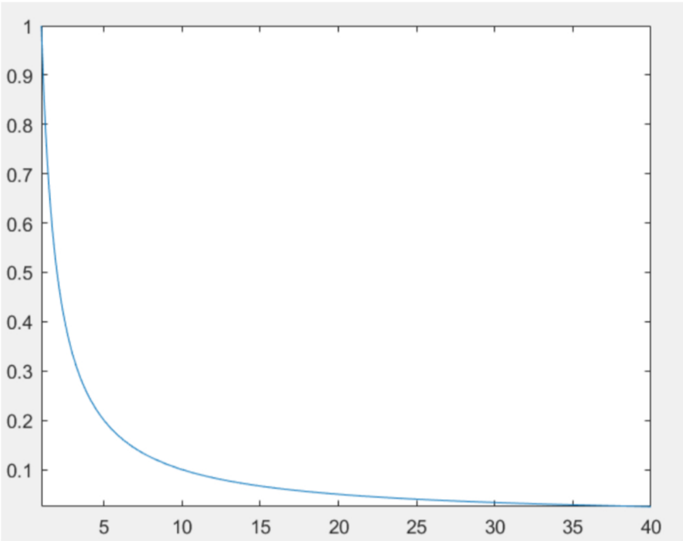
```
clc;
syms f(x) a;
f(x) = sin(x)/x;
a = 0;
fplot(f(x), [a 40])
area = int(f(x),a,Inf)
vpa(area,5)
```



f). As the function gets closer to infinity in the x axis, the values in the y axis gets closer to 0.

2). Diverges

```
clc;
syms f(x) a;
f(x) = 1/x;
a= 1;
fplot(f(x), [a 40])
area = int(f(x),a,Inf)
vpa(area, 5)
```



$$= \lim_{a \to \infty} \int_{1}^{a} \frac{1}{x}\, dx$$

$$= \lim_{a \to \infty} [\ln|x|]_1^a$$

$$= \lim_{a \to \infty} \ln|a| - 0$$

$$= \ln|\infty|$$

$$= \infty$$