# pem34

(problemas evaluables de matemáticas 3 y 4)

## Evaluables 3:

### Problemas 1.

```
> an:=x->(n+5)*x^(3*n)/(n^2+14)/8^n:
  [sum(an(-x),n=1..4),sum(an(-1),n=1..1)];
  evalf([%[2],sum(an(-1),n=1..infinity)]);
```

$$\left[-\frac{1}{20}x^3+\frac{7}{1152}x^6-\frac{1}{1472}x^9+\frac{3}{40960}x^{12},\ -\frac{1}{20}\right]$$

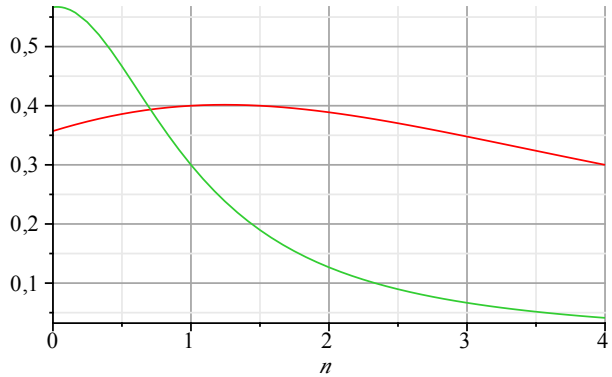
$$[-0.05000000000,\ -0.0445367843+0.\,I] \quad (1)$$

```
> bn:=x->(n+17)*x^(3*n)/(n^2+1)/27^n:
  [sum(bn(-x),n=1..4),sum(bn(-1),n=1..1)];
  evalf([%[2],sum(bn(-1),n=1..infinity)]);
```

$$\left[-\frac{1}{3}x^3+\frac{19}{3645}x^6-\frac{2}{19683}x^9+\frac{7}{3011499}x^{12},\ -\frac{1}{3}\right]$$

$$[-0.3333333333,\ -0.3282200568+0.\,I] \quad (2)$$

```
> plot([(n+5)/(n^2+14),(n+17)/(n^2+1)/30],n=0..4);
```




### Problemas 2.

```
> [taylor(exp(x)*arctan(x),x,5),taylor((1+3*x)^(1/3),x,5)];
  f:=exp(x)*arctan(x)-x*(1+3*x)^(1/3):
  [taylor(f,x),limit(f/x^3,x=0),limit(f/x^3,x=infinity),
  limit(diff(f,x$3),x=0)];
```

$$\left[x+x^2+\frac{1}{6}x^3-\frac{1}{6}x^4+O(x^5),\ 1+x-x^2+\frac{5}{3}x^3-\frac{10}{3}x^4+O(x^5)\right]$$

$$\left[\frac{7}{6}x^3-\frac{11}{6}x^4+\frac{409}{120}x^5+O(x^6),\ \frac{7}{6},\ \infty,\ 7\right] \quad (3)$$

```
> [taylor(exp(-x)*arctan(x),x,5),taylor((1-2*x)^(1/2),x,5)];
  f:=exp(-x)*arctan(x)-x*(1-2*x)^(1/2):
  [taylor(f,x),limit(f/x^3,x=0),limit(f/x^3,x=infinity),
  limit(diff(f,x$3),x=0)];
```

$$\left[x-x^2+\frac{1}{6}x^3+\frac{1}{6}x^4+O(x^5),\ 1-x-\frac{1}{2}x^2-\frac{1}{2}x^3-\frac{5}{8}x^4+O(x^5)\right]$$

$$\left[\frac{2}{3}x^3+\frac{2}{3}x^4+\frac{7}{10}x^5+O(x^6),\ \frac{2}{3},\ 0,\ 4\right] \quad (4)$$

## Evaluables 4:

### Problemas 1.

```
> f:=sin(x)^3/cos(x):[int(f,x),int(f,x=Pi/4..Pi/3)];
  g:=log(x)/(x-2)^2:[int(g,x),int(g,x=3..4)];
```

$$\left[-\frac{1}{2}\sin(x)^2-\ln(\cos(x)),\ -\frac{1}{8}+\frac{1}{2}\ln(2)\right]$$

$$\left[\frac{1}{2}\ln(x-2)-\frac{1}{2}\frac{\ln(x)\,x}{x-2},\ \frac{3}{2}\ln(3)-\frac{3}{2}\ln(2)\right] \quad (5)$$

```
> f:=cos(x)^3/sin(x):[int(f,x),int(f,x=Pi/6..Pi/4)];
  g:=log(x+2)/x^2:[int(g,x),int(g,x=1..2)];
```

$$\left[\frac{1}{2}\cos(x)^2+\ln(\sin(x)),\ -\frac{1}{8}+\frac{1}{2}\ln(2)\right]$$

$$\left[\frac{1}{2}\ln(x)-\frac{1}{2}\frac{\ln(x+2)\,(x+2)}{x},\ \frac{3}{2}\ln(3)-\frac{3}{2}\ln(2)\right] \quad (6)$$

### Problemas 2.

```
> Ha:=int(exp(-t^4),t=5-2*x..1):Hb:=int(exp(-t^6),t=2*x-1..1):
  [subs(x=2,diff(Ha,x)),subs(x=1,diff(Hb,x))];
```

$$\left[2\,e^{-1},\ -2\,e^{-1}\right] \quad (7)$$

```
> plot([Ha,Hb],x=0..3,thickness=2,gridlines=true);
```


### Problemas 3.

```
> k:=1/sqrt(x-a)/(x+4-a):
  [limit(sqrt(x-a)*k,x=a,right),limit(x^(3/2)*k,x=infinity)];
  [int(k,x=a..infinity),
  int(2/(4+t^2),t=0..infinity),int(2/(4+t^2),t)];
```

$$\left[\frac{1}{4},\ 1\right]$$

$$\left[\frac{1}{2}\pi,\ \frac{1}{2}\pi,\ \arctan\left(\frac{1}{2}\,I\right)\right] \quad (8)$$