> #` `**Альромхин Джорж, гр.858301, Лаб 3**

> # *Task1 Найдите область сходимости функционального ряда, постройте график его суммы и сравните с полученным результатом.*

> $an := (n, x) \to \frac{(n+5)}{2 \cdot n - 3} \cdot \frac{1}{\left(2x^2 - 4x + 3\right)^n}$

$$an := (n, x) \mapsto \frac{n+5}{(2n-3)\left(2x^2 - 4x + 3\right)^n} \quad \textbf{(1)}$$

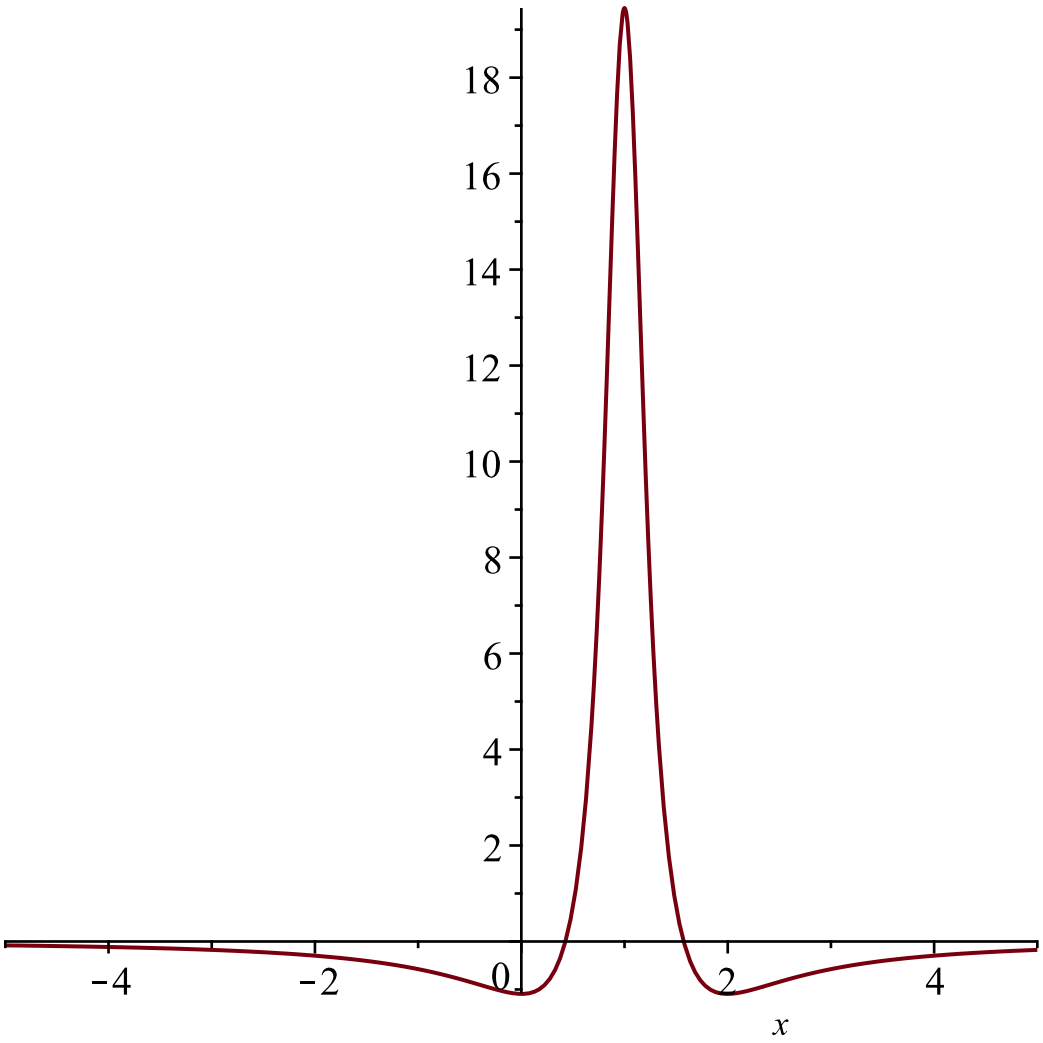
> $l := limit\left(\frac{an(n+1, x)}{an(n, x)}, n = \infty\right)$

$$l := \frac{1}{2x^2 - 4x + 3} \quad \textbf{(2)}$$

> solve$(l < 1)$ # *область сходимости*

$$(-\infty, 1), (1, \infty) \quad \textbf{(3)}$$

> $plot\left(\sum_{n=1}^{20} an(n, x), x = -5..5\right)$




```
> # Task2
```

```
> an2 := (n, x) -> x^n / (6*n - 11)
```

$$an2 := (n, x) \mapsto \frac{x^n}{6\,n - 11} \tag{4}$$

```
> f2 := x -> sum((-1)^n * an2(n, x), n = 1 .. infinity)
```

$$f2 := x \mapsto \sum_{n=1}^{\infty} (-1)^n\, an2(n, x) \tag{5}$$

```
> l2 := limit(an2(n + 1, x) / an2(n, x), n = infinity)
```

$$l2 := x \tag{6}$$

```
> Limit(an2(n, 1), n = infinity) = limit(an2(n, 1), n = infinity)
```

$$\lim_{n \to \infty} \frac{1}{6\,n - 11} = 0 \tag{7}$$

```
> solve({n >= 1, abs(an2(n, 1)) < 0.01})
```

$$\{18.50000000 < n\} \tag{8}$$

> $n\_min := 19$

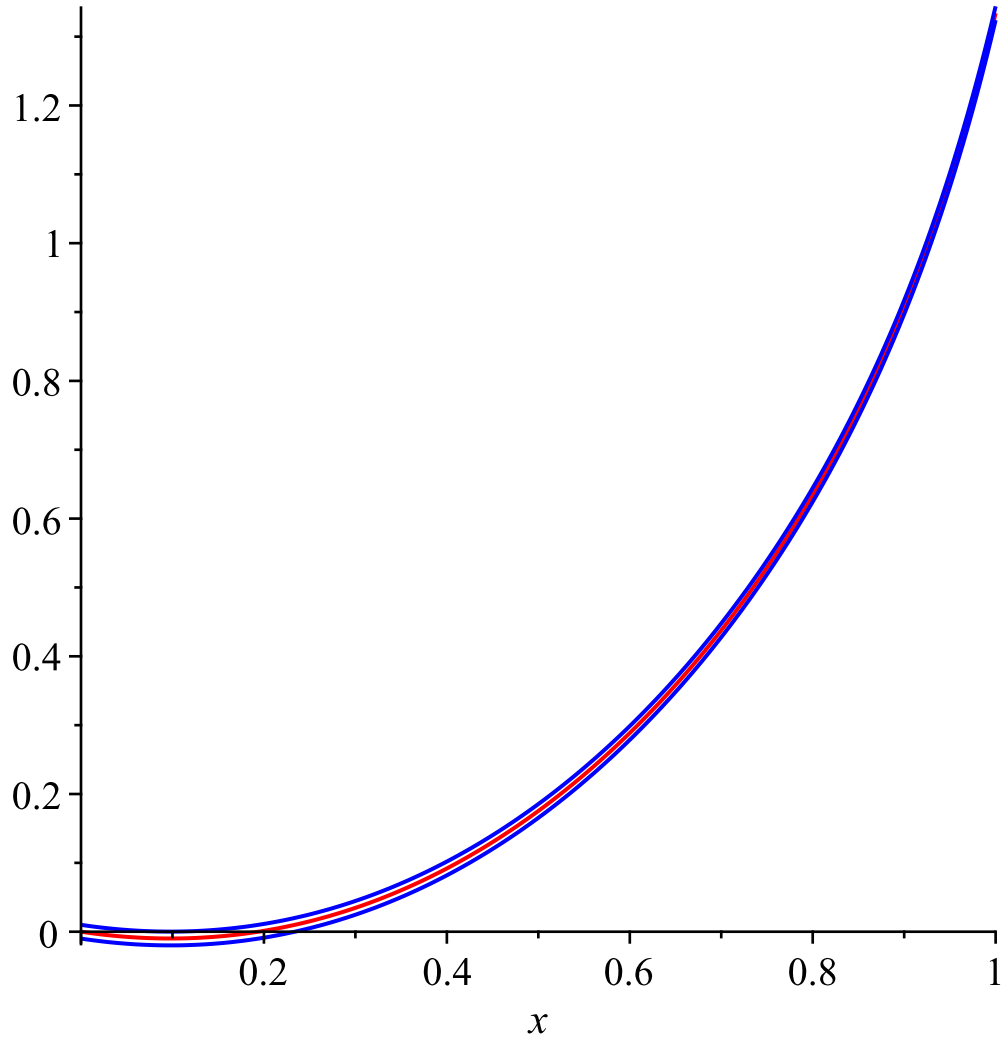
$$n\_min := 19 \quad \textbf{(9)}$$

> $sum\_p := plot\left(\sum_{n=1}^{n\_min} an2(n,x), x = 0..1, color = red\right):$

> $ep\_p\_p := plot\left(\sum_{n=1}^{n\_min} an2(n,x) + 0.01, x = 0..1, color = blue\right):$

> $ep\_m\_p := plot\left(\sum_{n=1}^{n\_min} an2(n,x) - 0.01, x = 0..1, color = blue\right):$

> $plots[display](\{sum\_p, ep\_p\_p, ep\_m\_p\})$



> # Task3

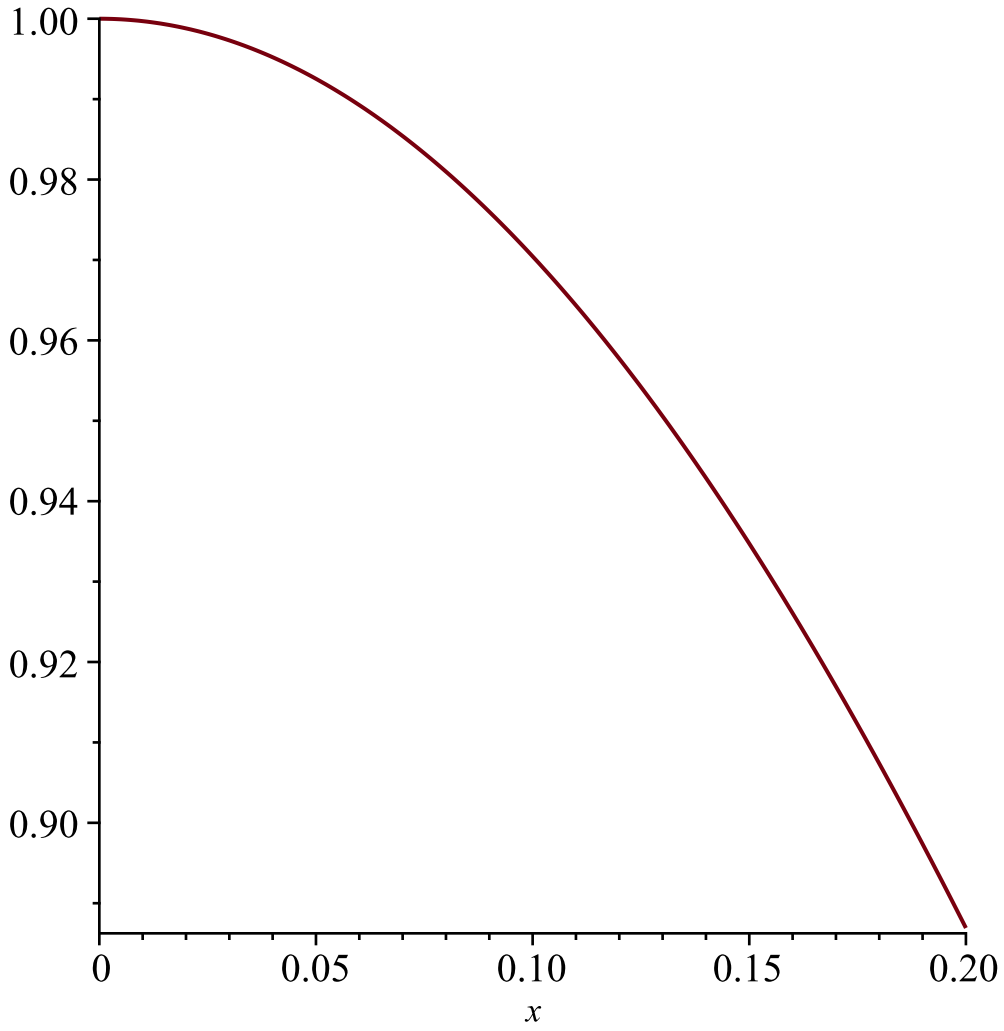
> $f3 := e^{-3x^2}$

$$f3 := e^{-3x^2} \quad \textbf{(10)}$$

> $\int_0^{0.2} f3 \, dx$

$$0.1922799597 \quad \textbf{(11)}$$

```
> plot( f3, x = 0 ..0.2 )
```




```
> s := series( f3,  x , 3 )
```

$$s := 1 - 3\,x^2 + O\left(x^4\right) \tag{12}$$

```
> evalf ( int( convert( s, polynom ), x = 0 ..0.2 ), 3 )
```

$$0.192 \tag{13}$$

```
>
```