

**Series[Exp[Sin[3 x ^ 2]], {x, 0, 6}]**

$$1 + 3 x^2 + \frac{9 x^4}{2} + O[x]^7$$

**Series[Exp[Sin[4 x ^ 2]], {x, 0, 6}]**

$$1 + 4 x^2 + 8 x^4 + O[x]^7$$

**Series[Exp[Sin[5 x ^ 2]], {x, 0, 6}]**

$$1 + 5 x^2 + \frac{25 x^4}{2} + O[x]^7$$

**Series[Exp[Sin[6 x ^ 2]], {x, 0, 6}]**

$$1 + 6 x^2 + 18 x^4 + O[x]^7$$

**Integrate[(Exp[x] \* Log[1 + Exp[x]]) / (1 + Exp[x]), x]**

$$\frac{1}{2} \text{Log}[1 + e^x]^2$$

**Integrate[(Exp[x] \* Log[1 + Exp[x]]) / (1 + Exp[x]), {x, 0, 2}]**

$$\frac{1}{2} \left( -\text{Log}[2]^2 + \text{Log}[1 + e^2]^2 \right)$$

**Integrate[(Exp[x] \* Log[1 + Exp[x]]) / (1 + Exp[x]), {x, 1, 2}]**

$$\frac{1}{2} \left( -\text{Log}[1 + e]^2 + \text{Log}[1 + e^2]^2 \right)$$

**Integrate[(Exp[x] \* Log[1 + Exp[x]]) / (1 + Exp[x]), {x, 0, 3}]**

$$\frac{1}{2} \left( -\text{Log}[2]^2 + \text{Log}[1 + e^3]^2 \right)$$

**Integrate[(Exp[x] \* Log[1 + Exp[x]]) / (1 + Exp[x]), {x, 1, 3}]**

$$\frac{1}{2} \left( -\text{Log}[1 + e]^2 + \text{Log}[1 + e^3]^2 \right)$$

**Limit[(3 x - 6) / Sin[6 Pi x], x -> 2]**

$$\frac{1}{2 \pi}$$

**Limit[(3 x - 9) / Sin[4 Pi x], x -> 3]**

$$\frac{3}{4 \pi}$$

**Limit[(3 x - 12) / Sin[2 Pi x], x -> 4]**

$$\frac{3}{2 \pi}$$

**Limit[(5 x - 25) / Sin[5 Pi x], x -> 5]**

$$-\frac{1}{\pi}$$

**D[x \* Exp[1 / (x - 1)], x]**

$$e^{-\frac{1}{1+x}} - \frac{e^{-\frac{1}{1+x}} x}{(-1+x)^2}$$

**Simplify[%]**

$$\frac{e^{-\frac{1}{1+x}} (1 - 3x + x^2)}{(-1+x)^2}$$

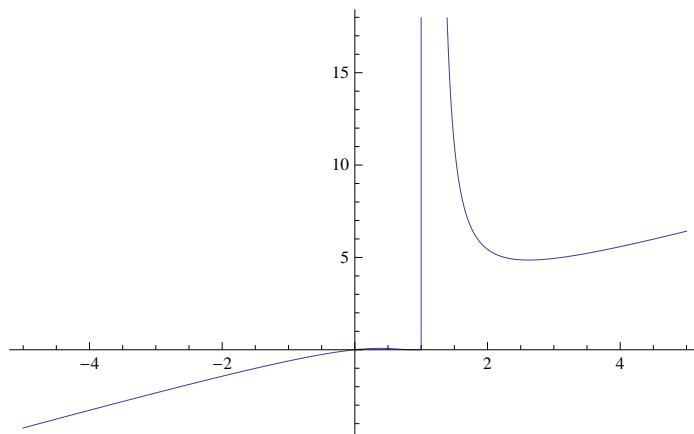
**Simplify[D[D[x \* Exp[1 / (x - 1)], x], x]]**

$$\frac{e^{-\frac{1}{1+x}} (-2 + 3x)}{(-1+x)^4}$$

**Solve[1 - 3x + x^2 == 0, x]**

$$\left\{ \left\{ x \rightarrow \frac{1}{2} (3 - \sqrt{5}) \right\}, \left\{ x \rightarrow \frac{1}{2} (3 + \sqrt{5}) \right\} \right\}$$

**Plot[x \* Exp[1 / (x - 1)], {x, -5, 5}]**



**Limit[Exp[1 / (x - 1)], x → Infinity]**

1

**Limit[x Exp[1 / (x - 1)] - x, x → Infinity]**

1

**Integrate[(4 x^2 + 5 x + 6) / (x^2 + 2 x + 2), x]**

$$4x + \text{ArcTan}[1+x] - \frac{3}{2} \text{Log}[2+2x+x^2]$$

**DSolve[{y''[x] - 4 y'[x] + 4 y[x] == Exp[2 x],  
y'[0] == 1, y[0] == 1}, y[x], x]**

$$\left\{ \left\{ y[x] \rightarrow \frac{1}{2} e^{2x} (2 - 2x + x^2) \right\} \right\}$$

**DSolve[y''[x] - 4 y'[x] + 4 y[x] == Exp[2 x], y[x], x]**

$$\left\{ \left\{ y[x] \rightarrow \frac{1}{2} e^{2x} x^2 + e^{2x} C[1] + e^{2x} x C[2] \right\} \right\}$$