Calcul des primitives usuelles.

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

1. $\displaystyle\int t\mathrm{e}^{-t^2}\,\mathrm{d}t =$

Exercice n° 1 : Déterminé les primitives suivantes :

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2. $\displaystyle\int 5t^2\mathrm{e}^{t^3-1}\,\mathrm{d}t =$

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2. $\displaystyle \int 5t^2\mathrm{e}^{t^3-1}\,\mathrm{d}t = \qquad \int \underbrace{3t^2}_{u'(t)} \times \mathrm{e}^{\overbrace{t^3-1}^{u(t)}}\,\mathrm{d}t =$

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3. $$\int \sin^5(t)\cos(t)\,\mathrm{d}t =$$

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6. $\displaystyle\int (t^4+4t^3-1)^5(2t^3+6t^2)\,\mathrm{d}t = \int \underbrace{(4t^3+12t^2)}_{u'(t)}\underbrace{(t^4+4t^3-1)}_{u(t)}{}^5\,\mathrm{d}t$

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6. $$\int (t^4+4t^3-1)^5(2t^3+6t^2)\,\mathrm{d}t = \frac{1}{2} \times \int \underbrace{(4t^3+12t^2)}_{u'(t)}\underbrace{(t^4+4t^3-1)}_{u(t)}{}^5\,\mathrm{d}t$$

$$= \frac{1}{2}\frac{(t^4+4t^3-1)^6}{6} =$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n = \frac{u^{n+1}}{n+1}} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'e^u}$$

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$$= \frac{1}{2}\frac{(t^4+4t^3-1)^6}{6} = \frac{1}{12}(t^4+4t^3-1)^6$$

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7. $$\int \frac{\mathrm{e}^{\sqrt{t}}}{\sqrt{t}}\,\mathrm{d}t =$$

Exercice n° 1 : Détermine les primitives suivantes :

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Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u' u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u' \mathrm{e}^u = \mathrm{e}^u}$$

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Exercice n° 1 : Détermine les primitives suivantes :

$\boxed{\int u'u^n}$ $\boxed{\int \frac{u'}{u^n}}$ $\boxed{\int \frac{u'}{\sqrt{u}}}$ $\boxed{\int \frac{u'}{u}}$ $\boxed{\int u'\mathrm{e}^u = \mathrm{e}^u}$

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Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

8. $\displaystyle\int (t+1)^2(t-3)\,\mathrm{d}t =$

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8. $\displaystyle\int (t+1)^2(t-3)\,\mathrm{d}t = ? \times \int \underbrace{(1)}_{u'(t)}\underbrace{(t+1)}_{u(t)}^2\,\mathrm{d}t$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n = \frac{u^{n+1}}{n+1}} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u' e^u}$$

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On ne reconnaît pas de primitive usuelle, donc on va développer :

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

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On ne reconnaît pas de primitive usuelle, donc on va développer :

$$(t+1)^2(t-3) =$$

Exercice n° 1 : Détermine les primitives suivantes :

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On ne reconnaît pas de primitive usuelle, donc on va développer :

$$(t+1)^2(t-3) = \left(t^2+2t+1\right)(t-3) =$$

Exercice n° 1 : Détermine les primitives suivantes :

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On ne reconnaît pas de primitive usuelle, donc on va développer :

$$(t+1)^2(t-3) = \left(t^2+2t+1\right)(t-3) = t^3 - t^2 - 5t - 3$$

Exercice n° 1 : Détermine les primitives suivantes :

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Il ne reste plus qu'à intégrer le polynôme :

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

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$$\int (t+1)^2(t-3)\,\mathrm{d}t = \int \left(t^3 - t^2 - 5t - 3\right)\mathrm{d}t =$$

Exercice n° 1 : Détermine les primitives suivantes :

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$$(t+1)^2(t-3) = \left(t^2+2t+1\right)(t-3) = t^3 - t^2 - 5t - 3$$

Il ne reste plus qu'à intégrer le polynôme :

$$\int (t+1)^2(t-3)\,\mathrm{d}t = \int \left(t^3 - t^2 - 5t - 3\right)\mathrm{d}t = \frac{t^4}{4} - \frac{t^3}{3} - \frac{5t^2}{2} - 3t$$

Exercice n° 1 : Détermine les primitives suivantes :

$\boxed{\int u'u^n}$ $\boxed{\int \frac{u'}{u^n}}$ $\boxed{\int \frac{u'}{\sqrt{u}}}$ $\boxed{\int \frac{u'}{u}}$ $\boxed{\int u'\mathrm{e}^u}$

9. $\displaystyle\int \frac{t^2}{\sqrt{5+t^3}}\,\mathrm{d}t =$

Exercice n° 1 : Détermine les primitives suivantes :

$\boxed{\int u' u^n}$ $\boxed{\int \frac{u'}{u^n}}$ $\boxed{\int \frac{u'}{\sqrt{u}} = 2\sqrt{u}}$ $\boxed{\int \frac{u'}{u}}$ $\boxed{\int u' \mathrm{e}^u}$

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9. $\displaystyle\int \frac{t^2}{\sqrt{5+t^3}}\,\mathrm{d}t = \qquad \int \frac{\overbrace{}^{u'(t)}}{\sqrt{\underbrace{5+t^3}_{u(t)}}}\,\mathrm{d}t =$

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9. $\displaystyle\int \frac{t^2}{\sqrt{5+t^3}}\,dt = \qquad \int \frac{\overbrace{3t^2}^{u'(t)}}{\sqrt{\underbrace{5+t^3}_{u(t)}}}\,dt =$

Exercice n° 1 : Détermine les primitives suivantes :

$\boxed{\int u'u^n}$ $\boxed{\int \frac{u'}{u^n}}$ $\boxed{\int \frac{u'}{\sqrt{u}} = 2\sqrt{u}}$ $\boxed{\int \frac{u'}{u}}$ $\boxed{\int u'\mathrm{e}^u}$

9. $\displaystyle \int \frac{t^2}{\sqrt{5+t^3}}\,\mathrm{d}t = \frac{1}{3} \times \int \frac{\overbrace{3t^2}^{u'(t)}}{\sqrt{\underbrace{5+t^3}_{u(t)}}}\,\mathrm{d}t =$

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$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}} = 2\sqrt{u}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

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10. $$\int \frac{4t}{(t^2-1)^3}\,\mathrm{d}t =$$

Exercice n° 1 : Détermine les primitives suivantes :

$\boxed{\int u'u^n}$ $\boxed{\int \frac{u'}{u^n} = \frac{-1}{(n-1)u^{n-1}}}$ $\boxed{\int \frac{u'}{\sqrt{u}}}$ $\boxed{\int \frac{u'}{u}}$ $\boxed{\int u'\mathrm{e}^u}$

9. $\displaystyle \int \frac{t^2}{\sqrt{5+t^3}}\,\mathrm{d}t = \frac{1}{3} \times \int \frac{\overbrace{3t^2}^{u'(t)}}{\sqrt{\underbrace{5+t^3}_{u(t)}}}\,\mathrm{d}t = \frac{1}{3}\times 2\sqrt{5+t^3} = \frac{2}{3}\sqrt{5+t^3}$

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$\boxed{\int u'u^n}$ $\boxed{\int \frac{u'}{u^n} = \frac{-1}{(n-1)u^{n-1}}}$ $\boxed{\int \frac{u'}{\sqrt{u}}}$ $\boxed{\int \frac{u'}{u}}$ $\boxed{\int u'\mathrm{e}^u}$

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10. $$\int \frac{4t}{(t^2-1)^3}\,\mathrm{d}t = 2 \times \int \frac{\overbrace{2t}^{u'(t)}}{\underbrace{(t^2-1)^3}_{u(t)^3}}\,\mathrm{d}t =$$

Exercice n° 1 : Détermine les primitives suivantes :

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10. $$\int \frac{4t}{(t^2-1)^3}\,\mathrm{d}t = 2 \times \int \frac{\overbrace{2t}^{u'(t)}}{\underbrace{(t^2-1)^3}_{u(t)^3}}\,\mathrm{d}t = 2 \times \frac{-1}{(3-1)(t^2-1)^{3-1}} =$$

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10. $$\int \frac{4t}{(t^2-1)^3}\,\mathrm{d}t = 2 \times \int \frac{\overbrace{2t}^{u'(t)}}{\underbrace{(t^2-1)^3}_{u(t)^3}}\,\mathrm{d}t = 2 \times \frac{-1}{(3-1)(t^2-1)^{3-1}} = \frac{-1}{(t^2-1)^2}$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

11. $\displaystyle\int \frac{t^3+1}{(t^4+4t+1)^2}\,\mathrm{d}t =$

Exercice n° 1 : Détermine les primitives suivantes :

$\boxed{\displaystyle\int u'u^n}$ $\boxed{\displaystyle\int \frac{u'}{u^n} = \frac{-1}{(n-1)u^{n-1}}}$ $\boxed{\displaystyle\int \frac{u'}{\sqrt{u}}}$ $\boxed{\displaystyle\int \frac{u'}{u}}$ $\boxed{\displaystyle\int u'\mathrm{e}^u}$

11. $\displaystyle\int \frac{t^3+1}{(t^4+4t+1)^2}\,\mathrm{d}t =$

Exercice n° 1 : Détermine les primitives suivantes :

$\boxed{\int u'u^n}$ $\boxed{\int \frac{u'}{u^n} = \frac{-1}{(n-1)u^{n-1}}}$ $\boxed{\int \frac{u'}{\sqrt{u}}}$ $\boxed{\int \frac{u'}{u}}$ $\boxed{\int u'\mathrm{e}^u}$

11. $\displaystyle\int \frac{t^3+1}{(t^4+4t+1)^2}\,\mathrm{d}t = \qquad \int \frac{\overbrace{}^{u'(t)}}{\underbrace{(t^4+4t+1)^2}_{u(t)^2}}\,\mathrm{d}t =$

Exercice n° 1 : Détermine les primitives suivantes :

$\boxed{\int u' u^n}$ $\boxed{\int \frac{u'}{u^n} = \frac{-1}{(n-1)u^{n-1}}}$ $\boxed{\int \frac{u'}{\sqrt{u}}}$ $\boxed{\int \frac{u'}{u}}$ $\boxed{\int u' \mathrm{e}^u}$

11. $\displaystyle\int \frac{t^3+1}{(t^4+4t+1)^2}\,\mathrm{d}t = \qquad \int \frac{\overbrace{4t^3+4}^{u'(t)}}{\underbrace{(t^4+4t+1)^2}_{u(t)^2}}\,\mathrm{d}t =$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n} = \frac{-1}{(n-1)u^{n-1}}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

11. $$\int \frac{t^3+1}{(t^4+4t+1)^2}\,\mathrm{d}t = \frac{1}{4} \times \int \frac{\overbrace{4t^3+4}^{u'(t)}}{\underbrace{(t^4+4t+1)^2}_{u(t)^2}}\,\mathrm{d}t =$$

Exercice n° 1 : Détermine les primitives suivantes :

$\boxed{\int u' u^n}$ $\boxed{\int \frac{u'}{u^n} = \frac{-1}{(n-1)u^{n-1}}}$ $\boxed{\int \frac{u'}{\sqrt{u}}}$ $\boxed{\int \frac{u'}{u}}$ $\boxed{\int u' \mathrm{e}^u}$

11. $$\int \frac{t^3+1}{(t^4+4t+1)^2}\,\mathrm{d}t = \frac{1}{4} \times \int \frac{\overbrace{4t^3+4}^{u'(t)}}{\underbrace{(t^4+4t+1)^2}_{u(t)^2}}\,\mathrm{d}t = \frac{1}{4} \times \frac{-1}{t^4+4t+1}$$

Exercice n° 1 : Détermine les primitives suivantes :

$\boxed{\int u'u^n}$ $\boxed{\int \frac{u'}{u^n} = \frac{-1}{(n-1)u^{n-1}}}$ $\boxed{\int \frac{u'}{\sqrt{u}}}$ $\boxed{\int \frac{u'}{u}}$ $\boxed{\int u'\mathrm{e}^u}$

11. $$\int \frac{t^3+1}{(t^4+4t+1)^2}\,\mathrm{d}t = \frac{1}{4} \times \int \frac{\overbrace{4t^3+4}^{u'(t)}}{\underbrace{(t^4+4t+1)^2}_{u(t)^2}}\,\mathrm{d}t = \frac{1}{4} \times \frac{-1}{t^4+4t+1}$$

$$= \frac{-1}{4t^4+16t+4}$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

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$$= \frac{-1}{4t^4+16t+4}$$

12. $$\int \tan(t)\,\mathrm{d}t =$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

11. $$\int \frac{t^3+1}{(t^4+4t+1)^2}\,\mathrm{d}t = \frac{1}{4} \times \int \frac{\overbrace{4t^3+4}^{u'(t)}}{\underbrace{(t^4+4t+1)^2}_{u(t)^2}}\,\mathrm{d}t = \frac{1}{4} \times \frac{-1}{t^4+4t+1}$$
$$= \frac{-1}{4t^4+16t+4}$$

12. $$\int \tan(t)\,\mathrm{d}t = \int \frac{\sin(t)}{\cos(t)}\,\mathrm{d}t =$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u} = \ln|u|} \quad \boxed{\int u'\mathrm{e}^u}$$

11. $$\int \frac{t^3+1}{(t^4+4t+1)^2}\,\mathrm{d}t = \frac{1}{4} \times \int \frac{\overbrace{4t^3+4}^{u'(t)}}{\underbrace{(t^4+4t+1)^2}_{u(t)^2}}\,\mathrm{d}t = \frac{1}{4} \times \frac{-1}{t^4+4t+1}$$

$$= \frac{-1}{4t^4+16t+4}$$

12. $$\int \tan(t)\,\mathrm{d}t = \int \frac{\sin(t)}{\cos(t)}\,\mathrm{d}t = \int \frac{\overbrace{\qquad\qquad}^{u'(t)}}{\underbrace{\cos(t)}_{u(t)}}\,\mathrm{d}t =$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u} = \ln|u|} \quad \boxed{\int u'e^u}$$

11. $$\int \frac{t^3+1}{(t^4+4t+1)^2}\,dt = \frac{1}{4} \times \int \frac{\overbrace{4t^3+4}^{u'(t)}}{\underbrace{(t^4+4t+1)^2}_{u(t)^2}}\,dt = \frac{1}{4} \times \frac{-1}{t^4+4t+1}$$

$$= \frac{-1}{4t^4+16t+4}$$

12. $$\int \tan(t)\,dt = \int \frac{\sin(t)}{\cos(t)}\,dt = \int \frac{\overbrace{-\sin(t)}^{u'(t)}}{\underbrace{\cos(t)}_{u(t)}}\,dt =$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u' u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u} = \ln|u|} \quad \boxed{\int u' e^u}$$

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$$= \frac{-1}{4t^4+16t+4}$$

12. $$\int \tan(t)\,dt = \int \frac{\sin(t)}{\cos(t)}\,dt = -\int \frac{\overbrace{-\sin(t)}^{u'(t)}}{\underbrace{\cos(t)}_{u(t)}}\,dt =$$

Exercice n° 1 : Détermine les primitives suivantes :

$\boxed{\int u'u^n}$ $\boxed{\int \frac{u'}{u^n}}$ $\boxed{\int \frac{u'}{\sqrt{u}}}$ $\boxed{\int \frac{u'}{u} = \ln|u|}$ $\boxed{\int u'e^u}$

11. $$\int \frac{t^3+1}{(t^4+4t+1)^2}\,dt = \frac{1}{4} \times \int \frac{\overbrace{4t^3+4}^{u'(t)}}{\underbrace{(t^4+4t+1)^2}_{u(t)^2}}\,dt = \frac{1}{4} \times \frac{-1}{t^4+4t+1}$$
$$= \frac{-1}{4t^4+16t+4}$$

12. $$\int \tan(t)\,dt = \int \frac{\sin(t)}{\cos(t)}\,dt = -\int \frac{\overbrace{-\sin(t)}^{u'(t)}}{\underbrace{\cos(t)}_{u(t)}}\,dt = -\ln|\cos(t)|$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'e^u}$$

11. $$\int \frac{t^3+1}{(t^4+4t+1)^2}\,dt = \frac{1}{4} \times \int \frac{\overbrace{4t^3+4}^{u'(t)}}{\underbrace{(t^4+4t+1)^2}_{u(t)^2}}\,dt = \frac{1}{4} \times \frac{-1}{t^4+4t+1}$$
$$= \frac{-1}{4t^4+16t+4}$$

12. $$\int \tan(t)\,dt = \int \frac{\sin(t)}{\cos(t)}\,dt = -\int \frac{\overbrace{-\sin(t)}^{u'(t)}}{\underbrace{\cos(t)}_{u(t)}}\,dt = -\ln\left|\cos(t)\right|$$

13. $$\int \frac{dt}{\sqrt{t+1}} =$$

Exercice n° 1 : Détermine les primitives suivantes :

$\boxed{\displaystyle\int u' u^n}$ $\boxed{\displaystyle\int \frac{u'}{u^n}}$ $\boxed{\displaystyle\int \frac{u'}{\sqrt{u}}}$ $\boxed{\displaystyle\int \frac{u'}{u}}$ $\boxed{\displaystyle\int u' \mathrm{e}^u}$

11. $$\int \frac{t^3+1}{(t^4+4t+1)^2}\,\mathrm{d}t = \frac{1}{4} \times \int \frac{\overbrace{4t^3+4}^{u'(t)}}{\underbrace{(t^4+4t+1)^2}_{u(t)^2}}\,\mathrm{d}t = \frac{1}{4} \times \frac{-1}{t^4+4t+1}$$
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13. $$\int \frac{\mathrm{d}t}{\sqrt{t+1}} = \int \frac{\overbrace{}^{u'(t)}}{\sqrt{\underbrace{t+1}_{u(t)}}}\,\mathrm{d}t =$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

11. $$\int \frac{t^3+1}{(t^4+4t+1)^2}\,\mathrm{d}t = \frac{1}{4} \times \int \frac{\overbrace{4t^3+4}^{u'(t)}}{\underbrace{(t^4+4t+1)^2}_{u(t)^2}}\,\mathrm{d}t = \frac{1}{4} \times \frac{-1}{t^4+4t+1}$$
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13. $$\int \frac{\mathrm{d}t}{\sqrt{t+1}} = \int \frac{\overbrace{1}^{u'(t)}}{\sqrt{\underbrace{t+1}_{u(t)}}}\,\mathrm{d}t =$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

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13. $$\int \frac{\mathrm{d}t}{\sqrt{t+1}} = \int \frac{\overbrace{1}^{u'(t)}}{\sqrt{\underbrace{t+1}_{u(t)}}}\,\mathrm{d}t = 2\sqrt{t+1}$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

14. $\displaystyle\int \sqrt{t+1}\,\mathrm{d}t =$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n = \frac{u^{n+1}}{n+1}} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u' \mathrm{e}^u}$$

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Exercice n° 1 : Détermine les primitives suivantes :

$\boxed{\int u'u^n = \frac{u^{n+1}}{n+1}}$ $\boxed{\int \frac{u'}{u^n}}$ $\boxed{\int \frac{u'}{\sqrt{u}}}$ $\boxed{\int \frac{u'}{u}}$ $\boxed{\int u' e^u}$

14. $\int \sqrt{t+1}\,\mathrm{d}t = \int \underbrace{}_{u'(t)} \underbrace{(t+1)^{1/2}}_{u(t)^{\frac{1}{2}}}\,\mathrm{d}t =$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n = \frac{u^{n+1}}{n+1}} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

14. $\displaystyle\int \sqrt{t+1}\,\mathrm{d}t = \int \underbrace{1}_{u'(t)} \underbrace{(t+1)^{1/2}}_{u(t)^{\frac{1}{2}}}\,\mathrm{d}t =$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n = \frac{u^{n+1}}{n+1}} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u' \mathrm{e}^u}$$

14. $$\int \sqrt{t+1}\,\mathrm{d}t = \int \underbrace{1}_{u'(t)} \underbrace{(t+1)^{1/2}}_{u(t)^{\frac{1}{2}}} \mathrm{d}t = \frac{(t+1)^{\frac{1}{2}+1}}{\frac{1}{2}+1} =$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n = \frac{u^{n+1}}{n+1}} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

14. $\displaystyle \int \sqrt{t+1}\,\mathrm{d}t = \int \underbrace{1}_{u'(t)} \underbrace{(t+1)^{1/2}}_{u(t)^{\frac{1}{2}}}\mathrm{d}t = \frac{(t+1)^{\frac{1}{2}+1}}{\frac{1}{2}+1} = \frac{(t+1)^{\frac{3}{2}}}{\frac{3}{2}} =$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n = \frac{u^{n+1}}{n+1}} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

14. $$\int \sqrt{t+1}\,\mathrm{d}t = \int \underbrace{1}_{u'(t)}\underbrace{(t+1)^{1/2}}_{u(t)^{\frac{1}{2}}}\mathrm{d}t = \frac{(t+1)^{\frac{1}{2}+1}}{\frac{1}{2}+1} = \frac{(t+1)^{\frac{3}{2}}}{\frac{3}{2}} = \frac{2}{3}(t+1)^{\frac{3}{2}}$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

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15. $\displaystyle \int t\sqrt{t^2+1}\,\mathrm{d}t =$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n = \frac{u^{n+1}}{n+1}} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'e^u}$$

14. $$\int \sqrt{t+1}\,\mathrm{d}t = \int \underbrace{1}_{u'(t)} \underbrace{(t+1)^{1/2}}_{u(t)^{\frac{1}{2}}}\,\mathrm{d}t = \frac{(t+1)^{\frac{1}{2}+1}}{\frac{1}{2}+1} = \frac{(t+1)^{\frac{3}{2}}}{\frac{3}{2}} = \frac{2}{3}(t+1)^{\frac{3}{2}}$$

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$$\boxed{\int u'u^n = \frac{u^{n+1}}{n+1}} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

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15. $$\int t\sqrt{t^2+1}\,\mathrm{d}t = \int \underbrace{2t}_{u'(t)}\underbrace{(t^2+1)^{1/2}}_{u(t)^{\frac{1}{2}}}\mathrm{d}t =$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n = \frac{u^{n+1}}{n+1}} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

14. $$\int \sqrt{t+1}\,\mathrm{d}t = \int \underbrace{1}_{u'(t)} \underbrace{(t+1)^{1/2}}_{u(t)^{\frac{1}{2}}} \mathrm{d}t = \frac{(t+1)^{\frac{1}{2}+1}}{\frac{1}{2}+1} = \frac{(t+1)^{\frac{3}{2}}}{\frac{3}{2}} = \frac{2}{3}(t+1)^{\frac{3}{2}}$$

15. $$\int t\sqrt{t^2+1}\,\mathrm{d}t = \frac{1}{2} \times \int \underbrace{2t}_{u'(t)} \underbrace{(t^2+1)^{1/2}}_{u(t)^{\frac{1}{2}}} \mathrm{d}t =$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n = \frac{u^{n+1}}{n+1}} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'e^u}$$

14. $$\int \sqrt{t+1}\,\mathrm{d}t = \int \underbrace{1}_{u'(t)} \underbrace{(t+1)^{1/2}}_{u(t)^{\frac{1}{2}}} \mathrm{d}t = \frac{(t+1)^{\frac{1}{2}+1}}{\frac{1}{2}+1} = \frac{(t+1)^{\frac{3}{2}}}{\frac{3}{2}} = \frac{2}{3}(t+1)^{\frac{3}{2}}$$

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$$=$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n = \frac{u^{n+1}}{n+1}} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u' \mathrm{e}^u}$$

14. $$\int \sqrt{t+1}\,\mathrm{d}t = \int \underbrace{1}_{u'(t)} \underbrace{(t+1)^{1/2}}_{u(t)^{\frac{1}{2}}}\,\mathrm{d}t = \frac{(t+1)^{\frac{1}{2}+1}}{\frac{1}{2}+1} = \frac{(t+1)^{\frac{3}{2}}}{\frac{3}{2}} = \frac{2}{3}(t+1)^{\frac{3}{2}}$$

15. $$\int t\sqrt{t^2+1}\,\mathrm{d}t = \frac{1}{2} \times \int \underbrace{2t}_{u'(t)} \underbrace{(t^2+1)^{1/2}}_{u(t)^{\frac{1}{2}}}\,\mathrm{d}t = \frac{1}{2} \times \frac{(t^2+1)^{\frac{1}{2}+1}}{\frac{1}{2}+1}$$

$$= \frac{1}{2} \times \frac{2}{3}(t^2+1)^{\frac{3}{2}} =$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n = \frac{u^{n+1}}{n+1}} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

14. $$\int \sqrt{t+1}\,\mathrm{d}t = \int \underbrace{1}_{u'(t)} \underbrace{(t+1)^{1/2}}_{u(t)^{\frac{1}{2}}}\mathrm{d}t = \frac{(t+1)^{\frac{1}{2}+1}}{\frac{1}{2}+1} = \frac{(t+1)^{\frac{3}{2}}}{\frac{3}{2}} = \frac{2}{3}(t+1)^{\frac{3}{2}}$$

15. $$\int t\sqrt{t^2+1}\,\mathrm{d}t = \frac{1}{2} \times \int \underbrace{2t}_{u'(t)} \underbrace{(t^2+1)^{1/2}}_{u(t)^{\frac{1}{2}}}\mathrm{d}t = \frac{1}{2} \times \frac{(t^2+1)^{\frac{1}{2}+1}}{\frac{1}{2}+1}$$

$$= \frac{1}{2} \times \frac{2}{3}(t^2+1)^{\frac{3}{2}} = \frac{1}{3}(t^2+1)^{\frac{3}{2}}$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

14. $$\int \sqrt{t+1}\,\mathrm{d}t = \int \underbrace{1}_{u'(t)}\underbrace{(t+1)^{1/2}}_{u(t)^{\frac{1}{2}}}\,\mathrm{d}t = \frac{(t+1)^{\frac{1}{2}+1}}{\frac{1}{2}+1} = \frac{(t+1)^{\frac{3}{2}}}{\frac{3}{2}} = \frac{2}{3}(t+1)^{\frac{3}{2}}$$

15. $$\int t\sqrt{t^2+1}\,\mathrm{d}t = \frac{1}{2} \times \int \underbrace{2t}_{u'(t)}\underbrace{(t^2+1)^{1/2}}_{u(t)^{\frac{1}{2}}}\,\mathrm{d}t = \frac{1}{2} \times \frac{(t^2+1)^{\frac{1}{2}+1}}{\frac{1}{2}+1}$$

$$= \frac{1}{2} \times \frac{2}{3}\left(t^2+1\right)^{\frac{3}{2}} = \frac{1}{3}\left(t^2+1\right)^{\frac{3}{2}}$$

16. $$\int \frac{\mathrm{e}^t\,\mathrm{d}t}{\sqrt{\mathrm{e}^t - 1}} =$$

Exercice n° 1 : Détermine les primitives suivantes :

$$\boxed{\int u'u^n} \quad \boxed{\int \frac{u'}{u^n}} \quad \boxed{\int \frac{u'}{\sqrt{u}} = 2\sqrt{u}} \quad \boxed{\int \frac{u'}{u}} \quad \boxed{\int u'\mathrm{e}^u}$$

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17. $\int \frac{3}{t-1}\,\mathrm{d}t =$ $\int \frac{\overbrace{1}^{u'(t)}}{\underbrace{t-1}_{u(t)}}\,\mathrm{d}t =$

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17. $$\int \frac{3}{t-1}\,dt = 3 \times \int \frac{\overbrace{1}^{u'(t)}}{\underbrace{t-1}_{u(t)}}\,dt =$$

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17. $$\int \frac{3}{t-1}\,\mathrm{d}t = {\color{red}3 \times} \int \frac{\overbrace{\color{blue}1}^{\color{blue}u'(t)}}{\underbrace{t-1}_{u(t)}}\,\mathrm{d}t = 3\ln|t-1|$$

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18. $\displaystyle\int \frac{4}{3t+2}\,\mathrm{d}t =$

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19. $\displaystyle \int \frac{\ln t}{t}\,\mathrm{d}t = \int \underbrace{\frac{1}{t}}_{u'(t)}\,\underbrace{\ln(t)}_{u(t)}\,\mathrm{d}t =$

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19. $\displaystyle\int \frac{\ln t}{t}\,\mathrm{d}t = \int \underbrace{\frac{1}{t}}_{u'(t)}\underbrace{\ln(t)}_{u(t)}\,\mathrm{d}t = \frac{\ln^2(t)}{2}$

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20. $\displaystyle\int \left(\frac{3}{t-1} + \sqrt{t+1}\right) \mathrm{d}t =$

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20. $$\int \left(\frac{3}{t-1} + \sqrt{t+1}\right) \mathrm{d}t = \int \frac{3}{t-1}\,\mathrm{d}t + \int \sqrt{t+1}\,\mathrm{d}t$$

$$=$$

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20. $$\int \left(\frac{3}{t-1} + \sqrt{t+1}\right) dt = \int \frac{3}{t-1}\, dt + \int \sqrt{t+1}\, dt$$
$$= 3\ln|t-1| + \frac{2}{3}(t+1)^{\frac{3}{2}}$$

21. (★) $$\int \frac{dt}{t\ln^2(t)} = \int \frac{\overbrace{\frac{1}{t}}^{u'(t)}}{\underbrace{\ln^2(t)}_{u(t)^2}}\, dt = \frac{-1}{\ln(t)}$$

22. (★) $$\int \frac{dt}{t\ln(t)} = \int \frac{\overbrace{}^{u'(t)}}{\underbrace{\ln(t)}_{u(t)}}\, dt =$$

Exercice n° 1 : Détermine les primitives suivantes :

$\boxed{\int u'u^n}$ $\boxed{\int \frac{u'}{u^n}}$ $\boxed{\int \frac{u'}{\sqrt{u}}}$ $\boxed{\int \frac{u'}{u} = \ln|u|}$ $\boxed{\int u'e^u}$

20. $$\int \left(\frac{3}{t-1} + \sqrt{t+1}\right) \mathrm{d}t = \int \frac{3}{t-1}\,\mathrm{d}t + \int \sqrt{t+1}\,\mathrm{d}t$$
$$= 3\ln|t-1| + \frac{2}{3}(t+1)^{\frac{3}{2}}$$

21. (★) $$\int \frac{\mathrm{d}t}{t\ln^2(t)} = \int \frac{\overbrace{\frac{1}{t}}^{u'(t)}}{\underbrace{\ln^2(t)}_{u(t)^2}}\,\mathrm{d}t = \frac{-1}{\ln(t)}$$

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Exercice n° 1 : Détermine les primitives suivantes :

$\boxed{\displaystyle\int u' u^n}$ $\boxed{\displaystyle\int \frac{u'}{u^n}}$ $\boxed{\displaystyle\int \frac{u'}{\sqrt{u}}}$ $\boxed{\displaystyle\int \frac{u'}{u} = \ln|u|}$ $\boxed{\displaystyle\int u' e^u}$

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$$= 3 \ln \left| t-1 \right| + \frac{2}{3} (t+1)^{\frac{3}{2}}$$

21. (★) $$\int \frac{\mathrm{d}t}{t \ln^2(t)} = \int \frac{\overbrace{\frac{1}{t}}^{u'(t)}}{\underbrace{\ln^2(t)}_{u(t)^2}} \mathrm{d}t = \frac{-1}{\ln(t)}$$

22. (★) $$\int \frac{\mathrm{d}t}{t \ln(t)} = \int \frac{\overbrace{\frac{1}{t}}^{u'(t)}}{\underbrace{\ln(t)}_{u(t)}} \mathrm{d}t = \ln \left| \ln(t) \right|$$

Exercice n° 2 : Détermine les primitives suivantes :

1. Calcule $\displaystyle\int \cos(t)\sin^2(t)\,\mathrm{d}t =$

Exercice n° 2 : Détermine les primitives suivantes :

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Exercice n° 2 : Détermine les primitives suivantes :

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Exercice n° 2 : Détermine les primitives suivantes :

1. Calcule $\int \cos(t)\sin^2(t)\,\mathrm{d}t = \int \underbrace{\cos(t)}_{u'(t)}\underbrace{\sin^2(t)}_{u(t)^2}\,\mathrm{d}t = \dfrac{\sin^3(t)}{3}$

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2. Déduis-en $\int \cos^3(t)\,\mathrm{d}t =$

Exercice n° 2 : Détermine les primitives suivantes :

1. Calcule $\displaystyle\int \cos(t)\sin^2(t)\,\mathrm{d}t = \int \underbrace{\cos(t)}_{u'(t)}\underbrace{\sin^2(t)}_{u(t)^2}\,\mathrm{d}t = \frac{\sin^3(t)}{3}$

2. Déduis-en $\displaystyle\int \cos^3(t)\,\mathrm{d}t = \int \cos(t)\times\cos^2(t)\,\mathrm{d}t$

$$=$$

Exercice n° 2 : Détermine les primitives suivantes :

1. Calcule $\displaystyle\int \cos(t)\sin^2(t)\,\mathrm{d}t = \int \underbrace{\cos(t)}_{u'(t)}\underbrace{\sin^2(t)}_{u(t)^2}\,\mathrm{d}t = \frac{\sin^3(t)}{3}$

2. Déduis-en $\displaystyle\int \cos^3(t)\,\mathrm{d}t = \int \cos(t)\times\cos^2(t)\,\mathrm{d}t$

$$= \int \cos(t)\times\left(1-\sin^2(t)\right)\mathrm{d}t.$$

Exercice n° 2 : Déterminer les primitives suivantes :

1. Calcule $\displaystyle\int \cos(t)\sin^2(t)\,\mathrm{d}t = \int \underbrace{\cos(t)}_{u'(t)}\underbrace{\sin^2(t)}_{u(t)^2}\,\mathrm{d}t = \frac{\sin^3(t)}{3}$

2. Déduis-en $\displaystyle\int \cos^3(t)\,\mathrm{d}t = \int \cos(t)\times\cos^2(t)\,\mathrm{d}t$

$$= \int \cos(t)\times\left(1-\sin^2(t)\right)\mathrm{d}t.$$

$$= \int \left[\cos(t) - \cos(t)\sin^2(t)\right]\mathrm{d}t$$

Exercice n° 2 : Détermine les primitives suivantes :

1. Calcule $\displaystyle\int \cos(t)\sin^2(t)\,\mathrm{d}t = \int \underbrace{\cos(t)}_{u'(t)}\underbrace{\sin^2(t)}_{u(t)^2}\,\mathrm{d}t = \frac{\sin^3(t)}{3}$

2. Déduis-en $\displaystyle\int \cos^3(t)\,\mathrm{d}t = \int \cos(t)\times\cos^2(t)\,\mathrm{d}t$

$$= \int \cos(t)\times\left(1-\sin^2(t)\right)\mathrm{d}t.$$

$$= \int \left[\cos(t)-\cos(t)\sin^2(t)\right]\mathrm{d}t$$

$$= \int \cos(t)\,\mathrm{d}t - \int \cos(t)\sin^2(t)\,\mathrm{d}t$$

Exercice n° 2 : Détermine les primitives suivantes :

1. Calcule $\displaystyle\int \cos(t)\sin^2(t)\,\mathrm{d}t = \int \underbrace{\cos(t)}_{u'(t)}\underbrace{\sin^2(t)}_{u(t)^2}\,\mathrm{d}t = \frac{\sin^3(t)}{3}$

2. Déduis-en
$$\begin{aligned}\int \cos^3(t)\,\mathrm{d}t &= \int \cos(t)\times\cos^2(t)\,\mathrm{d}t\\ &= \int \cos(t)\times\left(1-\sin^2(t)\right)\mathrm{d}t.\\ &= \int \left[\cos(t)-\cos(t)\sin^2(t)\right]\mathrm{d}t\\ &= \int \cos(t)\,\mathrm{d}t - \int \cos(t)\sin^2(t)\,\mathrm{d}t\\ &= \sin(t)-\frac{\sin^3(t)}{3}\end{aligned}$$

Exercice n° 3 :

1. $\displaystyle\int_2^{\mathrm{e}} \frac{\mathrm{d}x}{x\ln(x)} =$

Exercice n° 3 :

1. $$\int_2^{\mathrm{e}} \frac{\mathrm{d}x}{x\ln(x)} = \int_2^{\mathrm{e}} \frac{\overbrace{\phantom{\mathrm{d}x}}^{u'(x)}\mathrm{d}x}{\underbrace{\ln(x)}_{u(x)}} =$$

Exercice n° 3 :

1. $$\int_2^{\mathrm{e}} \frac{\mathrm{d}x}{x\ln(x)} = \int_2^{\mathrm{e}} \frac{\overbrace{\frac{1}{x}}^{u'(x)}\ \mathrm{d}x}{\underbrace{\ln(x)}_{u(x)}} =$$

Exercice n° 3 :

1. $$\int_2^{\mathrm{e}} \frac{\mathrm{d}x}{x\ln(x)} = \int_2^{\mathrm{e}} \frac{\overbrace{\frac{1}{x}}^{u'(x)}\,\mathrm{d}x}{\underbrace{\ln(x)}_{u(x)}} = \Big[\ln\big|\ln(x)\big|\Big]_2^{\mathrm{e}} =$$

Exercice n° 3 :

1. $$\int_2^{\mathrm{e}} \frac{\mathrm{d}x}{x\ln(x)} = \int_2^{\mathrm{e}} \frac{\overbrace{\frac{1}{x}}^{u'(x)}\,\mathrm{d}x}{\underbrace{\ln(x)}_{u(x)}} = \Big[\ln\big|\ln(x)\big|\Big]_2^{\mathrm{e}} = \ln\big|\ln(\mathrm{e})\big| - \ln\big|\ln(2)\big|$$

$$=$$

Exercice n° 3 :

1. $$\int_2^{\mathrm{e}} \frac{\mathrm{d}x}{x\ln(x)} = \int_2^{\mathrm{e}} \frac{\overbrace{\frac{1}{x}}^{u'(x)}\,\mathrm{d}x}{\underbrace{\ln(x)}_{u(x)}} = \Big[\ln\big|\ln(x)\big|\Big]_2^{\mathrm{e}} = \ln\big|\ln(\mathrm{e})\big| - \ln\big|\ln(2)\big|$$

$$= \ln(1) - \ln\big(\ln(2)\big) =$$

Exercice n° 3 :

1. $$\int_2^{\mathrm{e}} \frac{\mathrm{d}x}{x\ln(x)} = \int_2^{\mathrm{e}} \frac{\overbrace{\frac{1}{x}}^{u'(x)}\,\mathrm{d}x}{\underbrace{\ln(x)}_{u(x)}} = \Big[\ln\big|\ln(x)\big|\Big]_2^{\mathrm{e}} = \ln\big|\ln(\mathrm{e})\big| - \ln\big|\ln(2)\big|$$

$$= \ln(1) - \ln\big(\ln(2)\big) = -\ln\big(\ln(2)\big)$$

2. $$\int_0^{\frac{\pi}{4}} \frac{e^{\tan(x)}}{\cos^2(x)}\,\mathrm{d}x =$$

Exercice n° 3 :

1. $$\int_2^{\mathrm{e}} \frac{\mathrm{d}x}{x\ln(x)} = \int_2^{\mathrm{e}} \frac{\overbrace{\frac{1}{x}}^{u'(x)}\,\mathrm{d}x}{\underbrace{\ln(x)}_{u(x)}} = \Big[\ln\big|\ln(x)\big|\Big]_2^{\mathrm{e}} = \ln\big|\ln(\mathrm{e})\big| - \ln\big|\ln(2)\big|$$

$$= \ln(1) - \ln\big(\ln(2)\big) = -\ln\big(\ln(2)\big)$$

2. $$\int_0^{\frac{\pi}{4}} \frac{e^{\tan(x)}}{\cos^2(x)}\,\mathrm{d}x = \int_0^{\frac{\pi}{4}} \underbrace{\qquad\qquad}_{u'(x)} \mathrm{e}^{\overbrace{\tan(x)}^{u(x)}}\,\mathrm{d}x =$$

Exercice n° 3 :

❶ $$\int_2^{e} \frac{dx}{x\ln(x)} = \int_2^{e} \frac{\overbrace{\frac{1}{x}}^{u'(x)}\,dx}{\underbrace{\ln(x)}_{u(x)}} = \Big[\ln\big|\ln(x)\big|\Big]_2^{e} = \ln\big|\ln(e)\big| - \ln\big|\ln(2)\big|$$

$$= \ln(1) - \ln\big(\ln(2)\big) = -\ln\big(\ln(2)\big)$$

❷ $$\int_0^{\frac{\pi}{4}} \frac{e^{\tan(x)}}{\cos^2(x)}\,dx = \int_0^{\frac{\pi}{4}} \underbrace{\frac{1}{\cos^2(x)}}_{u'(x)} e^{\overbrace{\tan(x)}^{u(x)}}\,dx =$$

Exercice n° 3 :

1. $$\int_2^{\mathrm{e}} \frac{\mathrm{d}x}{x\ln(x)} = \int_2^{\mathrm{e}} \frac{\overbrace{\frac{1}{x}}^{u'(x)}}{\underbrace{\ln(x)}_{u(x)}}\,\mathrm{d}x = \Big[\ln\big|\ln(x)\big|\Big]_2^{\mathrm{e}} = \ln\big|\ln(\mathrm{e})\big| - \ln\big|\ln(2)\big|$$

$$= \ln(1) - \ln\big(\ln(2)\big) = -\ln\big(\ln(2)\big)$$

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$$=$$

Exercice n° 3 :

1. $$\int_2^{\mathrm{e}} \frac{\mathrm{d}x}{x\ln(x)} = \int_2^{\mathrm{e}} \frac{\overbrace{\frac{1}{x}}^{u'(x)}}{\underbrace{\ln(x)}_{u(x)}}\,\mathrm{d}x = \Big[\ln\big|\ln(x)\big|\Big]_2^{\mathrm{e}} = \ln\big|\ln(\mathrm{e})\big| - \ln\big|\ln(2)\big|$$

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$$= \mathrm{e}^{\tan(\pi/4)} - \mathrm{e}^{\tan(0)} =$$

Exercice n° 3 :

1. $$\int_2^{e} \frac{dx}{x\ln(x)} = \int_2^{e} \frac{\overbrace{\frac{1}{x}}^{u'(x)}}{\underbrace{\ln(x)}_{u(x)}}\,dx = \Big[\ln\big|\ln(x)\big|\Big]_2^{e} = \ln\big|\ln(e)\big| - \ln\big|\ln(2)\big|$$

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$$= e^{\tan(\pi/4)} - e^{\tan(0)} = e^1 - e^0 =$$

Exercice n° 3 :

1. $$\int_2^{\mathrm{e}} \frac{\mathrm{d}x}{x\ln(x)} = \int_2^{\mathrm{e}} \frac{\overbrace{\frac{1}{x}}^{u'(x)}}{\underbrace{\ln(x)}_{u(x)}}\,\mathrm{d}x = \Big[\ln\big|\ln(x)\big|\Big]_2^{\mathrm{e}} = \ln\big|\ln(\mathrm{e})\big| - \ln\big|\ln(2)\big|$$
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$$= \mathrm{e}^{\tan(\pi/4)} - \mathrm{e}^{\tan(0)} = \mathrm{e}^1 - \mathrm{e}^0 = \mathrm{e} - 1$$

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1. $$\int_2^{\mathrm{e}} \frac{\mathrm{d}x}{x\ln(x)} = \int_2^{\mathrm{e}} \frac{\overbrace{\frac{1}{x}}^{u'(x)}}{\underbrace{\ln(x)}_{u(x)}}\,\mathrm{d}x = \Big[\ln\big|\ln(x)\big|\Big]_2^{\mathrm{e}} = \ln\big|\ln(\mathrm{e})\big| - \ln\big|\ln(2)\big|$$
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3. $$\int_0^{\frac{\pi}{4}} \tan^2(x)\,\mathrm{d}x =$$

Exercice n° 3 :

1. $$\int_2^{\mathrm{e}} \frac{\mathrm{d}x}{x\ln(x)} = \int_2^{\mathrm{e}} \frac{\overbrace{\frac{1}{x}}^{u'(x)}\,\mathrm{d}x}{\underbrace{\ln(x)}_{u(x)}} = \Big[\ln\big|\ln(x)\big|\Big]_2^{\mathrm{e}} = \ln\big|\ln(\mathrm{e})\big| - \ln\big|\ln(2)\big|$$

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$$= \mathrm{e}^{\tan(\pi/4)} - \mathrm{e}^{\tan(0)} = \mathrm{e}^1 - \mathrm{e}^0 = \mathrm{e} - 1$$

3. $$\int_0^{\frac{\pi}{4}} \tan^2(x)\,\mathrm{d}x = \int_0^{\frac{\pi}{4}} \big[1+\tan^2(x)-1\big]\,\mathrm{d}x =$$

Exercice n° 3 :

1. $$\int_2^{\mathrm{e}} \frac{\mathrm{d}x}{x\ln(x)} = \int_2^{\mathrm{e}} \frac{\overbrace{\frac{1}{x}}^{u'(x)}}{\underbrace{\ln(x)}_{u(x)}}\,\mathrm{d}x = \Big[\ln\big|\ln(x)\big|\Big]_2^{\mathrm{e}} = \ln\big|\ln(\mathrm{e})\big| - \ln\big|\ln(2)\big|$$

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$$=$$

Exercice n° 3 :

1. $$\int_2^{\mathrm{e}} \frac{\mathrm{d}x}{x\ln(x)} = \int_2^{\mathrm{e}} \frac{\overbrace{\frac{1}{x}}^{u'(x)}}{\underbrace{\ln(x)}_{u(x)}}\,\mathrm{d}x = \Big[\ln\big|\ln(x)\big|\Big]_2^{\mathrm{e}} = \ln\big|\ln(\mathrm{e})\big| - \ln\big|\ln(2)\big|$$
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$$= \Big[\tan(x)\Big]_0^{\frac{\pi}{4}} - \Big[x\Big]_0^{\frac{\pi}{4}} =$$

Exercice n° 3 :

1. $$\int_2^{\mathrm{e}} \frac{\mathrm{d}x}{x\ln(x)} = \int_2^{\mathrm{e}} \frac{\overbrace{\frac{1}{x}}^{u'(x)}}{\underbrace{\ln(x)}_{u(x)}}\,\mathrm{d}x = \Big[\ln\big|\ln(x)\big|\Big]_2^{\mathrm{e}} = \ln\big|\ln(\mathrm{e})\big| - \ln\big|\ln(2)\big|$$

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3. $$\int_0^{\frac{\pi}{4}} \tan^2(x)\,\mathrm{d}x = \int_0^{\frac{\pi}{4}} \left[1+\tan^2(x)-1\right]\mathrm{d}x = \int_0^{\frac{\pi}{4}} \left[1+\tan^2(x)\right]\mathrm{d}x - \int_0^{\frac{\pi}{4}} 1\,\mathrm{d}x$$

$$= \Big[\tan(x)\Big]_0^{\frac{\pi}{4}} - \Big[x\Big]_0^{\frac{\pi}{4}} = \tan\frac{\pi}{4} - \tan(0) - \frac{\pi}{4} =$$

Exercice n° 3 :

1. $$\int_2^{\mathrm{e}} \frac{\mathrm{d}x}{x\ln(x)} = \int_2^{\mathrm{e}} \frac{\overbrace{\frac{1}{x}}^{u'(x)}\,\mathrm{d}x}{\underbrace{\ln(x)}_{u(x)}} = \Big[\ln\big|\ln(x)\big|\Big]_2^{\mathrm{e}} = \ln\big|\ln(\mathrm{e})\big| - \ln\big|\ln(2)\big|$$
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$$= \Big[\tan(x)\Big]_0^{\frac{\pi}{4}} - \Big[x\Big]_0^{\frac{\pi}{4}} = \tan\frac{\pi}{4} - \tan(0) - \frac{\pi}{4} = 1 - \frac{\pi}{4}$$