Trig Integration Recurrence Equations

Sine Integration Recurrence Equations

$\int \sin[c+d x]^m\,(A+B\sin[c+d x])\,(a+b\sin[c+d x])^n\,dx$ when $a^2-b^2==0$

- **Symmetric sine recurrence 1a: If $a^2-b^2==0$, then**

$$d\,(m+1)\int \sin[c+d x]^m\,(A+B\sin[c+d x])\,(a+b\sin[c+d x])^n\,dx ==$$
$$a\,A\cos[c+d x]\sin[c+d x]^{m+1}\,(a+b\sin[c+d x])^{n-1}+$$
$$d$$
$$\int \sin[c+d x]^{m+1}\,((A\,b+a\,B)\,(m+1)-A\,b\,(n-1)+(a\,A\,n+(a\,A+b\,B)\,(m+1))\sin[c+d x])\,(a+b\sin[c+d x])^{n-1}\,dx$$

- **Symmetric sine recurrence 1b: If $a^2-b^2==0$, then**

$$d\,(m+n+1)\int \sin[c+d x]^m\,(A+B\sin[c+d x])\,(a+b\sin[c+d x])^n\,dx ==$$
$$-b\,B\cos[c+d x]\sin[c+d x]^{m+1}\,(a+b\sin[c+d x])^{n-1}+$$
$$d\int \sin[c+d x]^m\,(a\,A\,n+(a\,A+b\,B)\,(m+1)+(A\,b+a\,B\,n+(A\,b+a\,B)\,(m+n))\sin[c+d x])\,(a+b\sin[c+d x])^{n-1}\,dx$$

- **Symmetric sine recurrence 2a: If $a^2-b^2==0$, then**

$$a^2\,d\,(2\,n+1)\int \sin[c+d x]^m\,(A+B\sin[c+d x])\,(a+b\sin[c+d x])^n\,dx ==$$
$$a\,(A\,b-a\,B)\cos[c+d x]\sin[c+d x]^m\,(a+b\sin[c+d x])^n+$$
$$d\int \sin[c+d x]^{m-1}\,(-m\,(A\,b-a\,B)+(b\,B\,n+a\,A\,(n+1)+m\,(a\,A-b\,B))\sin[c+d x])\,(a+b\sin[c+d x])^{n+1}\,dx$$

- **Symmetric sine recurrence 2b: If $a^2-b^2==0$, then**

$$b^2\,d\,(2\,n+1)\int \sin[c+d x]^m\,(A+B\sin[c+d x])\,(a+b\sin[c+d x])^n\,dx ==$$
$$-b\,(A\,b-a\,B)\cos[c+d x]\sin[c+d x]^{m+1}\,(a+b\sin[c+d x])^n+$$
$$d\int \sin[c+d x]^m\,(a\,A\,(2\,n+1)+(a\,A-b\,B)\,(m+1)-(A\,b-a\,B)\,(m+n+2)\sin[c+d x])\,(a+b\sin[c+d x])^{n+1}\,dx$$

- **Symmetric sine recurrence 3a: If $a^2-b^2==0$, then**

$$a\,d\,(m+n+1)\int \sin[c+d x]^m\,(A+B\sin[c+d x])\,(a+b\sin[c+d x])^n\,dx =$$
$$-a\,B\cos[c+d x]\sin[c+d x]^m\,(a+b\sin[c+d x])^n+$$
$$d\int \sin[c+d x]^{m-1}\,(a\,B\,m+(b\,B\,n+a\,A\,(m+n+1))\sin[c+d x])\,(a+b\sin[c+d x])^n\,dx$$

- **Symmetric sine recurrence 3b: If $a^2-b^2==0$, then**

$$a\,d\,(m+1)\int \sin[c+d x]^m\,(A+B\sin[c+d x])\,(a+b\sin[c+d x])^n\,dx =$$
$$a\,A\cos[c+d x]\sin[c+d x]^{m+1}\,(a+b\sin[c+d x])^n+$$
$$d\int \sin[c+d x]^{m+1}\,(a\,B\,(m+1)-b\,A\,n+a\,A\,(m+n+2)\sin[c+d x])\,(a+b\sin[c+d x])^n\,dx$$

$\int \text{Sin}[c+d x]^m (A+B \text{Sin}[c+d x]+C \text{Sin}[c+d x]^2) (a+b \text{Sin}[c+d x])^n \, dx$ when $a^2-b^2 \neq 0$

- **Sine recurrence 1a:**

$$d (m+1) \int \text{Sin}[c+d x]^m \left(A+B \text{Sin}[c+d x]+C \text{Sin}[c+d x]^2\right) (a+b \text{Sin}[c+d x])^n \, dx ==$$
$$A \text{Cos}[c+d x] \text{Sin}[c+d x]^{m+1} (a+b \text{Sin}[c+d x])^n +$$
$$d \int \text{Sin}[c+d x]^{m+1} \left(a B (m+1) - b A n + (a A + (a A + b B + a C) (m+1)) \text{Sin}[c+d x] +\right.$$
$$\left. b (A (n+1) + (A+C) (m+1)) \text{Sin}[c+d x]^2\right) (a+b \text{Sin}[c+d x])^{n-1} \, dx$$

- **Sine recurrence 1b:**

$$d (m+n+2) \int \text{Sin}[c+d x]^m \left(A+B \text{Sin}[c+d x]+C \text{Sin}[c+d x]^2\right) (a+b \text{Sin}[c+d x])^n \, dx ==$$
$$-C \text{Cos}[c+d x] \text{Sin}[c+d x]^{m+1} (a+b \text{Sin}[c+d x])^n +$$
$$d \int \text{Sin}[c+d x]^m \left(a (A (n+1) + (A+C) (m+1)) + (A b + a B + (A b + a B + b C) (m+n+1)) \text{Sin}[c+d x] +\right.$$
$$\left. (a C n + b B (m+n+2)) \text{Sin}[c+d x]^2\right) (a+b \text{Sin}[c+d x])^{n-1} \, dx$$

- **Sine recurrence 2a:**

$$b d (n+1) \left(a^2-b^2\right) \int \text{Sin}[c+d x]^m \left(A+B \text{Sin}[c+d x]+C \text{Sin}[c+d x]^2\right) (a+b \text{Sin}[c+d x])^n \, dx ==$$
$$-\left(A b^2 - a b B + a^2 C\right) \text{Cos}[c+d x] \text{Sin}[c+d x]^m (a+b \text{Sin}[c+d x])^{n+1} +$$
$$d \int \text{Sin}[c+d x]^{m-1} \left(m \left(A b^2 - a b B + a^2 C\right) + b (a A - b B + a C) (n+1) \text{Sin}[c+d x] -\right.$$
$$\left.\left(b (A b - a B + b C) (n+1) + \left(A b^2 - a b B + a^2 C\right) (m+1)\right) \text{Sin}[c+d x]^2\right) (a+b \text{Sin}[c+d x])^{n+1} \, dx$$

- **Sine recurrence 2b:**

$$a d (n+1) \left(a^2-b^2\right) \int \text{Sin}[c+d x]^m \left(A+B \text{Sin}[c+d x]+C \text{Sin}[c+d x]^2\right) (a+b \text{Sin}[c+d x])^n \, dx ==$$
$$\left(A b^2 - a b B + a^2 C\right) \text{Cos}[c+d x] \text{Sin}[c+d x]^{m+1} (a+b \text{Sin}[c+d x])^{n+1} +$$
$$d \int \text{Sin}[c+d x]^m \left(A \left(a^2-b^2\right) (n+1) - \left(A b^2 - a b B + a^2 C\right) (m+1) -\right.$$
$$\left. a (A b - a B + b C) (n+1) \text{Sin}[c+d x] + \left(A b^2 - a b B + a^2 C\right) (m+n+3) \text{Sin}[c+d x]^2\right) (a+b \text{Sin}[c+d x])^{n+1} \, dx$$

- **Sine recurrence 3a:**

$$b d (m+n+2) \int \text{Sin}[c+d x]^m \left(A+B \text{Sin}[c+d x]+C \text{Sin}[c+d x]^2\right) (a+b \text{Sin}[c+d x])^n \, dx =$$
$$-C \text{Cos}[c+d x] \text{Sin}[c+d x]^m (a+b \text{Sin}[c+d x])^{n+1} +$$
$$d \int \text{Sin}[c+d x]^{m-1} \left(a C m + b (A + (A+C) (m+n+1)) \text{Sin}[c+d x] + (b B (n+1) + (b B - a C) (m+1)) \text{Sin}[c+d x]^2\right)$$
$$(a+b \text{Sin}[c+d x])^n \, dx$$

- **Sine recurrence 3b:**

$$a d (m+1) \int \text{Sin}[c+d x]^m \left(A+B \text{Sin}[c+d x]+C \text{Sin}[c+d x]^2\right) (a+b \text{Sin}[c+d x])^n \, dx =$$
$$A \text{Cos}[c+d x] \text{Sin}[c+d x]^{m+1} (a+b \text{Sin}[c+d x])^{n+1} +$$
$$d$$
$$\int \text{Sin}[c+d x]^{m+1} \left((a B - b A) (m+1) - b A (n+1) + a (A + (A+C) (m+1)) \text{Sin}[c+d x] + b A (m+n+3) \text{Sin}[c+d x]^2\right)$$

$(a + b \, \mathrm{Sin}[c + d\, x])^n \, dx$

Cosecant Integration Recurrence Equations

$\int Csc[c+d x]^m (A+B Csc[c+d x]) (a+b Csc[c+d x])^n dx$ when $a^2-b^2==0$

- **Symmetric cosecant recurrence 1a: If $a^2-b^2==0$, then**

$$d m \int Csc[c+d x]^m (A+B Csc[c+d x]) (a+b Csc[c+d x])^n dx ==$$
$$a A Cos[c+d x] Csc[c+d x]^{m+1} (a+b Csc[c+d x])^{n-1}+$$
$$d \int Csc[c+d x]^{m+1} ((A b+a B) m-A b (n-1)+(a A n+(a A+b B) m) Csc[c+d x]) (a+b Csc[c+d x])^{n-1} dx$$

- **Symmetric cosecant recurrence 1b: If $a^2-b^2==0$, then**

$$d (m+n) \int Csc[c+d x]^m (A+B Csc[c+d x]) (a+b Csc[c+d x])^n dx ==$$
$$-b B Cos[c+d x] Csc[c+d x]^{m+1} (a+b Csc[c+d x])^{n-1}+$$
$$d \int Csc[c+d x]^m (a A n+(a A+b B) m+(A b+a B n+(A b+a B) (m+n-1)) Csc[c+d x]) (a+b Csc[c+d x])^{n-1} dx$$

- **Symmetric cosecant recurrence 2a: If $a^2-b^2==0$, then**

$$a^2 d (2 n+1) \int Csc[c+d x]^m (A+B Csc[c+d x]) (a+b Csc[c+d x])^n dx ==$$
$$a (A b-a B) Cos[c+d x] Csc[c+d x]^m (a+b Csc[c+d x])^n+$$
$$d \int Csc[c+d x]^{m-1}$$
$$(-(A b-a B) (m-1)+(b B n+a A (n+1)+(a A-b B) (m-1)) Csc[c+d x]) (a+b Csc[c+d x])^{n+1} dx$$

- **Symmetric cosecant recurrence 2b: If $a^2-b^2==0$, then**

$$b^2 d (2 n+1) \int Csc[c+d x]^m (A+B Csc[c+d x]) (a+b Csc[c+d x])^n dx ==$$
$$-b (A b-a B) Cos[c+d x] Csc[c+d x]^{m+1} (a+b Csc[c+d x])^n+$$
$$d \int Csc[c+d x]^m (a A (2 n+1)+(a A-b B) m-(A b-a B) (m+n+1) Csc[c+d x]) (a+b Csc[c+d x])^{n+1} dx$$

- **Symmetric cosecant recurrence 3a: If $a^2-b^2==0$, then**

$$a d (m+n) \int Csc[c+d x]^m (A+B Csc[c+d x]) (a+b Csc[c+d x])^n dx =$$
$$-a B Cos[c+d x] Csc[c+d x]^m (a+b Csc[c+d x])^n+$$
$$d \int Csc[c+d x]^{m-1} (a B (m-1)+(b B n+a A (m+n)) Csc[c+d x]) (a+b Csc[c+d x])^n dx$$

- **Symmetric cosecant recurrence 3b: If $a^2-b^2==0$, then**

$$a d m \int Csc[c+d x]^m (A+B Csc[c+d x]) (a+b Csc[c+d x])^n dx =$$
$$a A Cos[c+d x] Csc[c+d x]^{m+1} (a+b Csc[c+d x])^n+$$
$$d \int Csc[c+d x]^{m+1} (a B m-b A n+a A (m+n+1) Csc[c+d x]) (a+b Csc[c+d x])^n dx$$

$\int \csc(c+d x)^m \left(A+B \csc(c+d x)+C \csc(c+d x)^2\right) (a+b \csc(c+d x))^n \, dx$ when $a^2-b^2 \neq 0$

- **Cosecant recurrence 1a:**

$$d\, m \int \csc(c+d x)^m \left(A+B \csc(c+d x)+C \csc(c+d x)^2\right) (a+b \csc(c+d x))^n \, dx = A \cos(c+d x) \csc(c+d x)^{m+1} (a+b \csc(c+d x))^n + d \int \csc(c+d x)^{m+1} \left(a B m-b A n+(a A+(a A+a C+b B) m) \csc(c+d x)+b (A (n+1)+(A+C) m) \csc(c+d x)^2\right) (a+b \csc(c+d x))^{n-1} \, dx$$

- **Cosecant recurrence 1b:**

$$d\, (m+n+1) \int \csc(c+d x)^m \left(A+B \csc(c+d x)+C \csc(c+d x)^2\right) (a+b \csc(c+d x))^n \, dx = -C \cos(c+d x) \csc(c+d x)^{m+1} (a+b \csc(c+d x))^n + d \int \csc(c+d x)^m \left(a (A (n+1)+(A+C) m)+(b A+a B+(b A+a B+b C) (m+n)) \csc(c+d x)+(a C n+b B (m+n+1)) \csc(c+d x)^2\right) (a+b \csc(c+d x))^{n-1} \, dx$$

- **Cosecant recurrence 2a:**

$$b\, d\, (n+1) \left(a^2-b^2\right) \int \csc(c+d x)^m \left(A+B \csc(c+d x)+C \csc(c+d x)^2\right) (a+b \csc(c+d x))^n \, dx = -\left(A b^2-a b B+a^2 C\right) \cos(c+d x) \csc(c+d x)^m (a+b \csc(c+d x))^{n+1} + d \int \csc(c+d x)^{m-1} \left(\left(A b^2-a b B+a^2 C\right) (m-1)+b (a A-b B+a C) (n+1) \csc(c+d x) - \left(\left(A b^2-a b B+b^2 C\right) (n+1)+\left(A b^2-a b B+a^2 C\right) m\right) \csc(c+d x)^2\right) (a+b \csc(c+d x))^{n+1} \, dx$$

- **Cosecant recurrence 2b:**

$$a\, d\, (n+1) \left(a^2-b^2\right) \int \csc(c+d x)^m \left(A+B \csc(c+d x)+C \csc(c+d x)^2\right) (a+b \csc(c+d x))^n \, dx = \left(A b^2-a b B+a^2 C\right) \cos(c+d x) \csc(c+d x)^{m+1} (a+b \csc(c+d x))^{n+1} + d \int \csc(c+d x)^m \left(A \left(a^2-b^2\right) (n+1)-\left(A b^2-a b B+a^2 C\right) m - a (b A-a B+b C) (n+1) \csc(c+d x)+\left(A b^2-a b B+a^2 C\right) (m+n+2) \csc(c+d x)^2\right) (a+b \csc(c+d x))^{n+1} \, dx$$

- **Cosecant recurrence 3a:**

$$b\, d\, (m+n+1) \int \csc(c+d x)^m \left(A+B \csc(c+d x)+C \csc(c+d x)^2\right) (a+b \csc(c+d x))^n \, dx = -C \cos(c+d x) \csc(c+d x)^m (a+b \csc(c+d x))^{n+1} + d \int \csc(c+d x)^{m-1} \left(a C (m-1)+b (A+(A+C) (m+n)) \csc(c+d x)+(b B (n+1)+(b B-a C) m) \csc(c+d x)^2\right) (a+b \csc(c+d x))^n \, dx$$

- **Cosecant recurrence 3b:**

$$a\, d\, m \int \csc(c+d x)^m \left(A+B \csc(c+d x)+C \csc(c+d x)^2\right) (a+b \csc(c+d x))^n \, dx = A \cos(c+d x) \csc(c+d x)^{m+1} (a+b \csc(c+d x))^{n+1} + d \int \csc(c+d x)^{m+1} \left((a B-b A) m-b A (n+1)+a (A+(A+C) m) \csc(c+d x)+b A (m+n+2) \csc(c+d x)^2\right) (a+b \csc(c+d x))^n \, dx$$

Tangent Integration Recurrence Equations

$\int \text{Tan}[c+d\,x]^m\,(A+B\,\text{Tan}[c+d\,x])\,(a+b\,\text{Tan}[c+d\,x])^n\,dx$ when $a^2+b^2==0$

- **Symmetric tangent recurrence 1a (10): If $a^2+b^2==0$, then**

$$d\,(m+1)\int \text{Tan}[c+d\,x]^m\,(a+b\,\text{Tan}[c+d\,x])^n\,(A+B\,\text{Tan}[c+d\,x])\,dx ==$$
$$A\,a\,\text{Tan}[c+d\,x]^{m+1}\,(a+b\,\text{Tan}[c+d\,x])^{n-1} -$$
$$d\int \text{Tan}[c+d\,x]^{m+1}\,(A\,b\,(n-1)-(A\,b+B\,a)\,(m+1)+(A\,a\,(m+n)-B\,b\,(m+1))\,\text{Tan}[c+d\,x])\,(a+b\,\text{Tan}[c+d\,x])^{n-1}\,dx$$

- **Symmetric tangent recurrence 1b (9): If $a^2+b^2==0$, then**

$$d\,(m+n)\int \text{Tan}[c+d\,x]^m\,(a+b\,\text{Tan}[c+d\,x])^n\,(A+B\,\text{Tan}[c+d\,x])\,dx ==$$
$$B\,b\,\text{Tan}[c+d\,x]^{m+1}\,(a+b\,\text{Tan}[c+d\,x])^{n-1} +$$
$$d\int \text{Tan}[c+d\,x]^m\,(A\,a\,(n+m)-B\,b\,(m+1)+(B\,a\,(n-1)+(A\,b+B\,a)\,(m+n))\,\text{Tan}[c+d\,x])\,(a+b\,\text{Tan}[c+d\,x])^{n-1}\,dx$$

- **Symmetric tangent recurrence 2a (7): If $a^2+b^2==0$, then**

$$2\,a^2\,n\,d\int \text{Tan}[c+d\,x]^m\,(a+b\,\text{Tan}[c+d\,x])^n\,(A+B\,\text{Tan}[c+d\,x])\,dx ==$$
$$-a\,(A\,b-B\,a)\,\text{Tan}[c+d\,x]^m\,(a+b\,\text{Tan}[c+d\,x])^n +$$
$$d\int \text{Tan}[c+d\,x]^{m-1}\,((A\,b-B\,a)\,m+(B\,b\,(m-n)+A\,a\,(m+n))\,\text{Tan}[c+d\,x])\,(a+b\,\text{Tan}[c+d\,x])^{n+1}\,dx$$

- **Symmetric tangent recurrence 2b (12): If $a^2+b^2==0$, then**

$$2\,a^2\,n\,d\int \text{Tan}[c+d\,x]^m\,(a+b\,\text{Tan}[c+d\,x])^n\,(A+B\,\text{Tan}[c+d\,x])\,dx ==$$
$$-a\,(a\,A+b\,B)\,\text{Tan}[c+d\,x]^{1+m}\,(a+b\,\text{Tan}[c+d\,x])^n +$$
$$d\int \text{Tan}[c+d\,x]^m\,(b\,B\,(m+1)+a\,A\,(m+2\,n+1)-(A\,b-a\,B)\,(m+n+1)\,\text{Tan}[c+d\,x])\,(a+b\,\text{Tan}[c+d\,x])^{n+1}\,dx$$

- **Symmetric tangent recurrence 3a (8): If $a^2+b^2==0$, then**

$$a\,d\,(m+n)\int \text{Tan}[c+d\,x]^m\,(a+b\,\text{Tan}[c+d\,x])^n\,(A+B\,\text{Tan}[c+d\,x])\,dx ==$$
$$a\,B\,\text{Tan}[c+d\,x]^m\,(a+b\,\text{Tan}[c+d\,x])^n +$$
$$d\int \text{Tan}[c+d\,x]^{m-1}\,(-(B\,a\,m)+(A\,a\,m+(A\,a-B\,b)\,n)\,\text{Tan}[c+d\,x])\,(a+b\,\text{Tan}[c+d\,x])^n\,dx$$

- **Symmetric tangent recurrence 3b (11): If $a^2+b^2==0$, then**

$$a\,d\,(m+1)\int \text{Tan}[c+d\,x]^m\,(a+b\,\text{Tan}[c+d\,x])^n\,(A+B\,\text{Tan}[c+d\,x])\,dx ==$$
$$a\,A\,\text{Tan}[c+d\,x]^{m+1}\,(a+b\,\text{Tan}[c+d\,x])^n -$$
$$d\int \text{Tan}[c+d\,x]^{m+1}\,(A\,b\,n-B\,a\,(m+1)+A\,a\,(m+n+1)\,\text{Tan}[c+d\,x])\,(a+b\,\text{Tan}[c+d\,x])^n\,dx$$

$\int \tan[c+dx]^m \left(A+B\tan[c+dx]+C\tan[c+dx]^2\right)\left(a+b\tan[c+dx]\right)^n dx$ when $a^2+b^2\neq 0$

- **Tangent recurrence 1a:**

$$d(m+1)\int \tan[c+dx]^m\left(A+B\tan[c+dx]+C\tan[c+dx]^2\right)(a+b\tan[c+dx])^n dx = A\tan[c+dx]^{m+1}(a+b\tan[c+dx])^n + d\int \tan[c+dx]^{m+1}\left(aB(m+1)-Abn+(bB-a(A-C))(m+1)\tan[c+dx]+b(C(m+1)-A(m+n+1))\tan[c+dx]^2\right)(a+b\tan[c+dx])^{n-1} dx$$

- **Tangent recurrence 1b:**

$$d(m+n+1)\int \tan[c+dx]^m\left(A+B\tan[c+dx]+C\tan[c+dx]^2\right)(a+b\tan[c+dx])^n dx = C\tan[c+dx]^{m+1}(a+b\tan[c+dx])^n + d\int \tan[c+dx]^m\left((Aa(m+n+1)-C(m+1)a)+(aB+b(A-C))(m+n+1)\tan[c+dx]+(aCn+bB(m+n+1))\tan[c+dx]^2\right)(a+b\tan[c+dx])^{n-1} dx$$

- **Tangent recurrence 2a:**

$$bd(n+1)\left(a^2+b^2\right)\int \tan[c+dx]^m\left(A+B\tan[c+dx]+C\tan[c+dx]^2\right)(a+b\tan[c+dx])^n dx = \left(Ab^2-abB+a^2C\right)\tan[c+dx]^m(a+b\tan[c+dx])^{n+1} + d\int \tan[c+dx]^{m-1}\left(-\left(Ab^2-abB+a^2C\right)m+b(bB+a(A-C))(n+1)\tan[c+dx]-\left(b(Ab-aB)(m+n+1)-C\left(-a^2m+b^2(n+1)\right)\right)\tan[c+dx]^2\right)(a+b\tan[c+dx])^{n+1} dx$$

- **Tangent recurrence 2b:**

$$ad(n+1)\left(a^2+b^2\right)\int \tan[c+dx]^m\left(A+B\tan[c+dx]+C\tan[c+dx]^2\right)(a+b\tan[c+dx])^n dx = -\left(Ab^2-abB+a^2C\right)\tan[c+dx]^{m+1}(a+b\tan[c+dx])^{n+1} + d\int \tan[c+dx]^m\left(-a(bB-aC)(m+1)+A\left(a^2(n+1)+b^2(m+n+2)\right)+a(aB-b(A-C))(n+1)\tan[c+dx]+\left(Ab^2-abB+a^2C\right)(m+n+2)\tan[c+dx]^2\right)(a+b\tan[c+dx])^{n+1} dx$$

- **Tangent recurrence 3a:**

$$bd(m+n+1)\int \tan[c+dx]^m\left(A+B\tan[c+dx]+C\tan[c+dx]^2\right)(a+b\tan[c+dx])^n dx = C\tan[c+dx]^m(a+b\tan[c+dx])^{n+1} - d\int \tan[c+dx]^{m-1}\left(aCm-b(A-C)(m+n+1)\tan[c+dx]+(aCm-bB(m+n+1))\tan[c+dx]^2\right)(a+b\tan[c+dx])^n dx$$

- **Tangent recurrence 3b:**

$$ad(m+1)\int \tan[c+dx]^m\left(A+B\tan[c+dx]+C\tan[c+dx]^2\right)(a+b\tan[c+dx])^n dx = A\tan[c+dx]^{m+1}(a+b\tan[c+dx])^{n+1} + d\int \tan[c+dx]^{m+1}\left(aB(m+1)-Ab(m+n+2)-a(A-C)(m+1)\tan[c+dx]-Ab(m+n+2)\tan[c+dx]^2\right)(a+b\tan[c+dx])^n dx$$