Espressioni goniometriche

di angoli notevoli		
1	$\left(sen\,360° + \frac{1}{2}cos\,180°\right) ctg\,90°$	$R: 0$
2	$\left(tg\,0° - \frac{1}{3}sen\,270°\right)^{\frac{1}{2}}$	$R: \frac{\sqrt{3}}{3}$
3	$(sec\,180° + cosec\,90°)(1 + cos\,0°)$	$R: 0$
4	$\frac{cos\,270° + tg\,180°}{3\,cosec\,90°}$	$R: 0$
5	$sen^2\,90° + cos^2\,360°$	$R: 2$
6	$\frac{cos\,\pi + \frac{1}{2}cos\frac{\pi}{2}}{2\,sen\frac{3}{2}\pi}$	$R: \frac{1}{2}$
7	$sec\,\pi\,(sen^2\,2\pi + cos\,0)$	$R: -1$
8	$sec\,0\,sen\,\pi + \sqrt{5}\,sen\frac{\pi}{2}$	$R: \sqrt{5}$
9	$\frac{1 + tg\,\pi}{cosec\frac{\pi}{2}}$	$R: 1$
10	$4\,cos\,45°\,sen^2\,60°$	$R: \frac{3}{2}\sqrt{2}$
11	$(sen\,60° + ctg^2\,45°)\frac{1}{sen\,30°}$	$R: \sqrt{3} + 2$
12	$1 - sen\,45°\,cos\,45°$	$R: \frac{1}{2}$
13	$tg^2\,30°\,sen^2\,60°$	$R: \frac{1}{4}$
14	$\left(sen\frac{\pi}{3} + cos\frac{\pi}{6}\right)\frac{1}{tg\frac{\pi}{3}}$	$R: 1$
15	$\left(\sqrt{3}\,cos\frac{\pi}{6} + sen\frac{\pi}{6}\right) ctg^2\frac{\pi}{4}$	$R: 2$
16	$cosec\frac{\pi}{4}\frac{1}{sec\frac{\pi}{3}}$	$R: \frac{\sqrt{2}}{2}$

Espressioni goniometriche

17	$\dfrac{3\,tg\dfrac{\pi}{6}+tg\dfrac{\pi}{3}}{tg\dfrac{\pi}{4}}$	$R: 2\sqrt{3}$
18	$\dfrac{a\,cosec^2 90° + b\,sec^2 0°}{a\,sen\,270°}$	$R: -\dfrac{a+b}{a}$
19	$(2a\,cos\,180°)^2 + (2b\,cos\,270°)^2$	$R: 4a^2$
20	$\dfrac{b-cos\,90°}{sen\,270°} - \dfrac{a}{sec\,0°}$	$R: -(a+b)$
21	$\sqrt[3]{a}\,tg\,0° - \dfrac{b}{ctg^2\,90° - 1}$	$R: b$
22	$(tg^2\,\pi + a)\,cos\,0 + sen\dfrac{3}{2}\pi$	$R: a-1$
23	$\dfrac{a\,cos\,\pi + sen\dfrac{\pi}{2}}{a\,cosec\dfrac{3}{2}\pi + b\,sec\,\pi}$	$R: \dfrac{a-1}{a+b}$
24	$\dfrac{4a\sqrt{3}\,sen\dfrac{3}{2}\pi - b\,cos\dfrac{\pi}{2}}{a\,cosec\dfrac{3}{2}\pi}$	$R: 4\sqrt{3}$
25	$b\,cos\,2\pi(sec\,0 + a\,tg\,2\pi)$	$R: b$
26	$\sqrt{2ab(sen^2\,30° + ctg\,45°)}$	$R: \dfrac{\sqrt{10ab}}{2}$
27	$\dfrac{3}{2}a\,cosec\,60°(b\,cos\,45° - c\,tg\,30°)$	$R: \dfrac{\sqrt{6}ab}{2} - ac$
28	$\sqrt{a}\,ctg\,45° + \dfrac{b\,sen\,45°}{1 + c\,tg\,30°}$	$R: \sqrt{a} + \dfrac{3}{2}\sqrt{2}\dfrac{b}{3+\sqrt{3}c}$
29	$\dfrac{b^2\,cosec^2\,60°}{sen\,30°} + \dfrac{a}{sec^2\,60°}$	$R: \dfrac{8}{3}b^2 + \dfrac{a}{4}$
30	$\dfrac{2a + sen\,45°}{b\,cos\,60°}ctg\,30°$	$R: \dfrac{2\sqrt{3}}{b}\left(2a + \dfrac{\sqrt{2}}{2}\right)$
31	$\dfrac{\sqrt{a}\,sen\dfrac{\pi}{3}\sqrt{b}\,tg\dfrac{\pi}{4}}{c\,cosec\dfrac{\pi}{6}}$	$R: \dfrac{\sqrt{3ab}}{c}$
32	$\left(1 - a\,sen\dfrac{\pi}{4} - b\,sen\dfrac{\pi}{6}tg^2\dfrac{\pi}{4}\right)^{\frac{1}{3}}$	$R: \left(1 - \dfrac{a\sqrt{2}}{2} - \dfrac{b}{2}\right)^{\frac{1}{3}}$

Espressioni goniometriche

33	$\frac{\sqrt{2a}\,cosec\frac{\pi}{4}}{1+b\,sec\frac{\pi}{3}}\,b\,ctg\frac{\pi}{4}$	$R:\frac{2\sqrt{ab}}{1+2b}$
34	$\left(a\,cos^2\frac{\pi}{4}+b\,sen\frac{\pi}{6}\right)c\,cosec\frac{\pi}{3}$	$R:\left(\frac{a+b}{\sqrt{3}}\right)c$

con angoli superiori a 360°		
35	$(cos\,360°+2\,cos\,450°)(1-tg\,540°)$	$R:1$
36	$\sqrt{2}\,sen\,450°+tg^2\,360°$	$R:\sqrt{2}$
37	$\left(3\,tg\,540°+\frac{2}{5}ctg\,450°\right)^{\frac{\sqrt{2}}{2}}$	$R:0$
38	$sec\,360°\,cosec\,450°+\sqrt{3}\,tg\,540°$	$R:1$
39	$\left(cos\frac{5}{2}\pi+\frac{1}{2}cos\,3\pi\right)sen\frac{3}{2}\pi$	$R:\frac{1}{2}$
40	$\frac{tg\,\pi+ctg\frac{\pi}{2}}{cos\,2\pi}$	$R:0$
41	$\frac{1}{10}sec\,3\pi\,cosec\frac{3}{2}\pi$	$R:\frac{1}{10}$
42	$\sqrt{3}\,sen\frac{5}{2}\pi\frac{1}{3}cos\,2\pi$	$R:\frac{\sqrt{3}}{3}$
43	$2\,sen\,390°+\frac{cos^2\,390°}{sen\,405°}$	$R:\frac{4+3\sqrt{2}}{4}$
44	$\frac{1-cos\,420°}{1+cos\,420°}-ctg^2\,390°$	$R:-\frac{8}{3}$
45	$tg\,405°(1+ctg\,390°)-1$	$R:\sqrt{3}$
46	$\frac{sec\,390°}{1+tg^2\,420°}+\frac{1}{cosec\,390°}$	$R:\frac{\sqrt{3}+3}{6}$
47	$ctg^2\,420°-cosec^2\,390°+\frac{1}{sec\,405°}$	$R:\frac{3\sqrt{2}-22}{6}$
48	$\left(tg\frac{9}{4}\pi+1\right)sec\frac{7}{3}\pi$	$R:4$

Espressioni goniometriche

49	$\left(\frac{cos\frac{9}{4}\pi}{1-sen\frac{13}{6}\pi}\right)-sen\frac{9}{4}\pi$	$R:\frac{\sqrt{2}}{2}$
50	$\frac{ctg^2\frac{13}{6}\pi-cos^2\frac{7}{3}\pi}{cosec\frac{7}{3}\pi}$	$R:\frac{11}{8}\sqrt{3}$
51	$\frac{cosec\frac{7}{3}\pi}{sec\frac{7}{3}\pi}tg\frac{9}{4}\pi$	$R:\frac{\sqrt{3}}{3}$

52	$a\sqrt{3}(cos^2 360° + ctg\,450°)$	$R:\sqrt{3}a$
53	$\frac{sec\,360°}{a}\left(\sqrt{a}\,sen^2\,540° - b\,cos^2\,540°\right)$	$R:-\frac{b}{a}$
54	$(sen\,630° + a^2\,cos\,630°)^2$	$R:1$
55	$\sqrt{c}\left(\frac{\sqrt{3}}{2}a\ sec\,540° + \frac{\sqrt{2}}{3}b\,cosec\,450°\right)$	$R:\frac{\sqrt{2c}}{3}b-\frac{\sqrt{3ca}}{2}$
56	$\left(a\,cos\,3\pi + sen\frac{5}{2}\pi\right)^2 + \left(cos\frac{5}{2}\pi - \sqrt{b}\,sen\frac{7}{2}\pi\right)^2$	$R:b+(1-a)^2$
57	$\frac{a^2\,cosec\frac{7}{2}\pi + b\,sec\,2\pi}{a\,cos\,3\pi - b^3\,sen\,2\pi}$	$R:\frac{a^2-b}{a}$
58	$\left(b^4\,tg\,2\pi + a^6\,cosec\frac{7}{2}\pi\right)^2 2ab\,sen\frac{7}{2}\pi$	$R:-2a^{13}b$
59	$a^2\,cos^4\,3\pi - b^3\,sen^4\,3\pi - \frac{2c^4}{sec\frac{7}{2}\pi}$	$R:a^2$
60	$sen^2\,390°\frac{\sqrt{ab}}{cosec\,420°} + a\,ctg\,405°$	$R:\frac{\sqrt{3ab}}{8}+a$
61	$\frac{a\,tg\,420°}{b - ctg\,405°}c\,sec^2\,390°$	$R:\frac{4ac\sqrt{3}}{3(b-1)}$
62	$(sen\,420° + a^3\,tg\,405°)\,ctg\,405° - 3a^3$	$R:\frac{\sqrt{3}}{2}-2a^3$
63	$\left(\sqrt{a}\,tg^2\,420° - 1\right)sec^2\,390° + 1$	$R:\frac{4}{3}\left(3\sqrt{a}-1\right)+1$
64	$\left(\frac{(2b\,tg\,405°)^2}{cos^2\,420°}\right)^{\frac{1}{4}}$	$R:2\sqrt{b}$

Espressioni goniometriche

65	$\left(2a\,tg^2\frac{13}{6}\pi - 1\right) b\,cos^2\frac{9}{4}\pi$	$R: \frac{b}{6}(2a-3)$
66	$\left(\frac{a + sen\frac{9}{4}\pi - b\,cos\frac{9}{4}\pi}{1 + sen^2\frac{9}{4}\pi + b\,cos\frac{9}{4}\pi}\right)^{\frac{1}{2}}$	$R: \sqrt{\frac{2a+\sqrt{2}(1-b)}{3+\sqrt{2}b}}$
67	$\frac{\left(b - 3\,ctg^2\frac{7}{3}\pi\right)\left(b\,tg\frac{9}{4}\pi + 2\,cos\frac{7}{3}\pi\right)}{2b\,cosec\frac{13}{6}\pi - 1}$	$R: \frac{(b-1)(b+1)}{4b-1}$
68	$\frac{\sqrt{ab}\,cos\frac{13}{6}\pi\left(1 + a\,sen^2\frac{9}{4}\pi\right)^2}{\left(2\,ctg^2\frac{9}{4}\pi + \frac{a}{2}sec\frac{7}{3}\pi\right)^2}$	$R: \frac{\sqrt{3ab}}{8}$
	con angoli associati	
69	$\frac{1 + sen(180° - \alpha)\,cos(180° - \alpha)}{sen\,\alpha} + \frac{1}{cosec\,\alpha}$	$R: \frac{2\,sen^2\alpha - sen\,\alpha\,cos\,\alpha + cos^2\alpha}{sen\,\alpha}$
70	$\left(\frac{1}{tg(180° - \alpha)} - cosec\,\alpha\right) cos(180° - \alpha)$	$R: (cos\,\alpha - 1)\frac{cos\,\alpha}{sen\,\alpha}$
71	$\frac{tg^2\,\alpha}{sen^2(180° - \alpha)} + \frac{sec\,\alpha}{cosec(180° - \alpha)}$	$R: \frac{1 + sen\,\alpha\,cos\,\alpha}{cos^2\,\alpha}$
72	$ctg(180° - \alpha)(1 - sec^2\,\alpha) + tg(180° - \alpha)(1 + cosec^2\,\alpha)$	$R: \frac{-1}{sen\,\alpha\,cos\,\alpha}$
73	$2\,tg(\pi - \alpha)\,cos^2(\pi - \alpha) + sen\,\alpha\,cosec(\pi - \alpha)$	$R: 1 - 2\,sen\,\alpha\,cos\,\alpha$
74	$\frac{1 - cos(\pi - \alpha)}{sen^2(\pi - \alpha)}\,tg^2(\pi - \alpha) - 2\,sec^2(\pi - \alpha)$	$R: \frac{cos\,\alpha - 1}{cos^2\,\alpha}$
75	$\left(\frac{1}{1 + tg(\pi - \alpha)} - \frac{1}{ctg^2(\pi - \alpha)}\right) cos(\pi - \alpha)$	$R: \frac{cos\,\alpha - 2\,cos^3\,\alpha - sen^3\,\alpha}{cos\,\alpha(cos\,\alpha - sen\,\alpha)}$
76	$\frac{cosec(\pi - \alpha) - ctg(-\alpha)}{cos(\pi - \alpha)\,cosec\,\alpha}$	$R: -\frac{1 + cos\,\alpha}{cos\,\alpha}$
77	$\frac{1 + sen(180° + \alpha)\,cos(180° + \alpha)}{sen(180° + \alpha)} - \frac{1}{sec(180° + \alpha)}$	$R: -\,cosec\,\alpha$
78	$sec(180° + \alpha)\,cosec(180° + \alpha)(tg(180° + \alpha) + ctg\,\alpha)$	$R: sec^2\,\alpha\,cosec^2\,\alpha$
79	$\frac{1 + cos(180° + \alpha)}{1 - cos(180° + \alpha)} - \frac{1 + 2\,cos(180° + \alpha)}{sen^2(180° + \alpha)}$	$R: ctg^2\,\alpha$

Espressioni goniometriche

80	$sen(180° + \alpha)\, cos(180° + \alpha)(tg\,\alpha + ctg(180° + \alpha))$	$R: 1$
81	$\frac{sen^2(\pi + \alpha) - sen(\pi + \alpha)}{cos(\pi + \alpha)} + \frac{1}{ctg\,\alpha}$	$R: -sen\,\alpha\, tg\,\alpha$
82	$\frac{cos^2\alpha - cos^4(\pi + \alpha)}{1 - sen^2(\pi + \alpha)} - sen^2(\pi + \alpha)$	$R: 0$
83	$\frac{ctg(\pi + \alpha)}{ctg^2(\pi + \alpha) + 1} + cos\,\alpha(tg^2(\pi + \alpha) + 1)$	$R: sen\,\alpha\, cos\,\alpha + sec\,\alpha$
84	$\frac{1 - sen(\pi + \alpha) - sen^2\alpha}{sen(\pi + \alpha)\, cos(\pi + \alpha)} + \frac{cos(\pi + \alpha)}{1 - sen^2(\pi + \alpha)}$	$R: ctg\,\alpha$

85	$\frac{1 + sec^2(360° - \alpha)\,(sen^2(360° - \alpha) + 1)}{2\, sen\,\alpha\, sec^2(360° - \alpha)}$	$R: cosec\,\alpha$
86	$\frac{sen(360° - \alpha)\, cos(360° - \alpha)}{1 - sen^2\alpha} + \frac{1}{ctg(360° - \alpha)}$	$R: -2\, tg\,\alpha$
87	$\frac{tg^2(360° - \alpha)}{1 - tg^2(360° - \alpha)} - ctg(360° - \alpha)$	$R: \frac{ctg\,\alpha + tg^2\alpha - tg\,\alpha}{1 - tg^2\alpha}$
88	$\frac{1}{cosec^2(360° - \alpha)} + cos(360° - \alpha)\left(sen(360° - \alpha) + \frac{1}{sec\,\alpha}\right)$	$R: 1 - sen\,\alpha\, cos\,\alpha$
89	$\frac{1}{cos(2\pi - \alpha)(1 + tg^2(2\pi - \alpha))} + sec(2\pi - \alpha)$	$R: (2 + tg^2\alpha)\ cos\,\alpha$
90	$-sen(2\pi - \alpha)\, tg\,\alpha + \frac{1}{cosec(2\pi - \alpha)}$	$R: sen\,\alpha\ (tg\,\alpha - 1)$
91	$\frac{sen^2(2\pi - \alpha)}{1 - sen^2\alpha} - \frac{1 - cos^2(2\pi - \alpha)}{cos^2\alpha}$	$R: 0$
92	$sen(2\pi - \alpha)(cos^2(2\pi - \alpha) - 1)\frac{1}{tg^3(2\pi - \alpha)}$	$R: -cos^3\alpha$

93	$(1 - cos(-45°) + sen(-30°))\, tg^2(-60°)$	$R: \frac{3(1 - \sqrt{2})}{2}$
94	$\frac{sen(-90°) + sec(-45°)}{cos(-60°)}$	$R: 2(\sqrt{2} - 1)$
95	$2\, sen(-60°)\, cos(-30°) + tg(-45°)$	$R: -\frac{5}{2}$

Espressioni goniometriche

96	$ctg(-45°)+\dfrac{1}{cos(-270°)+cosec(-30°)}$	$R:-\dfrac{3}{2}$
97	$tg\left(-\dfrac{\pi}{3}\right)\left(ctg\dfrac{\pi}{4}+ctg\left(-\dfrac{\pi}{6}\right)\right)$	$R:\sqrt{3}(\sqrt{3}-1)$
98	$sec(-\pi)+tg\dfrac{\pi}{3}+\dfrac{1}{cosec\dfrac{\pi}{2}}$	$R:\sqrt{3}$
99	$2\left(tg\left(-\dfrac{\pi}{6}\right)-sen\left(-\dfrac{\pi}{4}\right)\right)\left(cos\,\pi+ctg\left(-\dfrac{\pi}{6}\right)+1\right)$	$R:2-\sqrt{6}$
100	$\dfrac{1+cos\left(-\dfrac{\pi}{3}\right)}{1-cos\left(-\dfrac{\pi}{3}\right)}+\dfrac{1}{sec\left(-\dfrac{\pi}{3}\right)}$	$R:\dfrac{7}{2}$

di riepilogo con angoli associati

101	$sen^2(180°-\alpha)-1+cos(360°-\alpha)+cos^2(-\alpha)$	$R:cos\,\alpha$
102	$2\,sen^2(180°+\alpha)+cos^4(180°-\alpha)\,tg^2(180°+\alpha)-sen^4(180°-\alpha)$	$R:sen^2\,\alpha(3-2\,sen^2\,\alpha)$
103	$\dfrac{a\,cos(-45°)-tg(-30°)}{-\dfrac{3}{2}b\,cosec(-30°)}$	$R:\dfrac{3a\sqrt{2}+2\sqrt{3}}{18b}$
104	$\dfrac{1-cos^2(360°-\alpha)}{sen(180°+\alpha)\,cos(360°-\alpha)}+\dfrac{1}{sen\,\alpha\,cos(180°+\alpha)}$	$R:-\dfrac{sen^2\,\alpha+1}{sen\,\alpha\,cos\,\alpha}$
105	$\left(\dfrac{ctg^2(-30°)}{a\,sen(-30°)}\dfrac{b^2\,cos(-30°)}{tg(-30°)}\right)^{\frac{1}{2}}$	$R:\dfrac{3\sqrt{ab^2}}{a}$
106	$cosec(360°-\alpha)-cos(180°+\alpha)\,ctg(180°-\alpha)$	$R:\dfrac{sen^2\,\alpha-2}{sen\,\alpha}$
107	$cos^2(\pi-\alpha)\,tg\,\alpha-cos^2(-\alpha)\,ctg(\pi-\alpha)$	$R:ctg\,\alpha$
108	$\dfrac{\sqrt{a}}{2}ctg^2(-45°)+\dfrac{\sqrt{b}}{a}\dfrac{sen(-45°)}{1+cos(-60°)}$	$R:\dfrac{\sqrt{a}}{2}-\dfrac{\sqrt{2b}}{3a}$
109	$cos\,\alpha-\dfrac{cos^2(\pi+\alpha)-sen^2(2\pi-\alpha)}{sen(2\pi-\alpha)-cos(2\pi-\alpha)}$	$R:2\,cos\,\alpha-sen\,\alpha$
110	$\dfrac{3b\left(tg\left(-\dfrac{\pi}{3}\right)-ctg\left(-\dfrac{\pi}{3}\right)\right)}{2a\left(tg\left(-\dfrac{\pi}{6}\right)+ctg\left(\dfrac{\pi}{6}\right)\right)}$	$R:-\dfrac{3}{2}\dfrac{b}{a}$
111	$sen(\pi+\alpha)\,cosec(2\pi-\alpha)(tg(-\alpha)+ctg\,\alpha)$	$R:\dfrac{1-2\,sen^2\,\alpha}{sen\,\alpha\,cos\,\alpha}$

Espressioni goniometriche

112	$cos(2\pi+\alpha)\,tg(\pi-\alpha)+sen(\pi-\alpha)\,ctg(2\pi+\alpha)$	$R: cos\,\alpha - sen\,\alpha$
113	$b^3\,cos\left(-\frac{\pi}{4}\right)\left(1+tg^2\left(\frac{\pi}{4}\right)\right)+\sqrt[3]{b}\,ctg^2\left(-\frac{\pi}{3}\right)$	$R: \sqrt{2}b^3+\frac{1}{3}\sqrt[3]{b}$
114	$\frac{2a+sen\left(-\frac{\pi}{3}\right)}{cos^2\left(-\frac{\pi}{3}\right)}+\frac{3b-cos\left(-\frac{\pi}{6}\right)}{sen^2\left(-\frac{\pi}{6}\right)}$	$R: 4\left(2a-\sqrt{3}+3b\right)$
115	$cosec(\pi-\alpha)(1-sen^2(\pi+\alpha))$	$R: ctg\,\alpha\,cos\,\alpha$
116	$\left(2a\,sen\left(-\frac{\pi}{3}\right)-2b\,cos\left(-\frac{\pi}{3}\right)\right)^2+\frac{\sqrt{b}}{b}$	$R: \left(\sqrt{3}a+b\right)^2+\frac{\sqrt{b}}{b}$

risolubili con le formule di addizione e sottrazione

117	$sen(\alpha+\beta)\,sen(\alpha-\beta)$	$R: sen^2\,\alpha - sen^2\,\beta$
118	$cos(\alpha+\beta)\,cos(\alpha-\beta)$	$R: cos^2\,\alpha - sen^2\,\beta$
119	$cos(\alpha-\beta)\,cos\,\alpha+sen(\alpha-\beta)\,sen\,\alpha$	$R: cos\,\beta$
120	$\frac{cos(\alpha+\beta)+cos(\alpha-\beta)}{sen(\alpha+\beta)+sen(\alpha-\beta)}$	$R: ctg\,\alpha$
121	$\frac{sen(\alpha+\beta)}{sen(\alpha-\beta)}$	$R: \frac{tg\,\alpha+tg\,\beta}{tg\,\alpha-tg\,\beta}$
122	$tg(\alpha+\beta)\,tg(\alpha-\beta)$	$R: \frac{tg^2\,\alpha-tg^2\,\beta}{1-tg^2\,\alpha\,tg^2\,\beta}$
123	$\frac{tg(\alpha+\beta)}{ctg(\alpha-\beta)}$	$R: \frac{tg\,\alpha\,ctg\,\beta-tg\,\beta\,ctg\,\alpha}{ctg\,\alpha\,ctg\,\beta-tg\,\alpha\,tg\,\beta}$
124	$\frac{tg(\alpha-\beta)+tg\,\beta}{tg(\alpha+\beta)-tg\,\beta}$	$R: \frac{cos(\alpha+\beta)}{cos(\alpha-\beta)}$

risolubili con le formule di duplicazione e bisezione

125	$sen^2\,2\alpha+cos\,2\alpha-4\,sen^4\,\alpha$	$R: 2\,sen^2\,\alpha+1$
126	$\frac{2-sen^2\,2\alpha}{2}$	$R: sen^4\,\alpha+cos^4\,\alpha$

Espressioni goniometriche

127	$sen\,2\alpha(tg\,\alpha + ctg\,\alpha)$	$R: 2$
128	$\frac{1-cos\,2\alpha}{2}(ctg^2\,\alpha - 1)$	$R: cos\,2\alpha$
129	$\frac{1}{2}tg\,2\alpha(1 + tg\,\alpha)$	$R: \frac{tg\,\alpha}{1-tg\,\alpha}$
130	$\frac{tg\,2\alpha}{4\,sen\,\alpha\,ctg\,2\alpha}$	$R: \frac{sen^2\,\alpha\ cos^2\alpha}{cos^2(2\alpha)}$
131	$2\,tg^2\,\alpha\,sen^2\frac{\alpha}{2} + tg\,\alpha\,sen\,\alpha$	$R: tg^2\,\alpha$
132	$\frac{1}{1-tg^2\frac{\alpha}{2}} - \frac{1}{1-ctg^2\frac{\alpha}{2}}$	$R: \frac{1}{cos\,\alpha}$

risolubili con le formule di prostaferesi e Werner

133	$\cos(60° + \alpha) + \cos(60° - \alpha)$	$R: cos\,\alpha$
134	$ctg(45° + \alpha) + ctg(45° - \alpha)$	$R: \frac{2}{cos\,2\alpha}$
135	$sen\,\alpha\,sen\,\beta - \frac{1}{2}cos(\alpha - \beta)$	$R: -\frac{1}{2}\cos(\alpha + \beta)$
136	$\frac{sen\,\alpha - sen\,\beta}{cos\,\alpha + cos\,\beta}$	$R: \mathrm{tg}\frac{\alpha - \beta}{2}$
137	$sen\left(\frac{\pi}{3} + \alpha\right) + sen\left(\frac{\pi}{3} - \alpha\right)$	$R: \sqrt{3}\cos\alpha$
138	$\frac{sen\left(\frac{\pi}{3} + \alpha\right) + cos\left(\frac{5}{6}\pi - \alpha\right)}{cos\left(\frac{\pi}{3} + \alpha\right) + sen\left(\frac{5}{6}\pi - \alpha\right)}$	$R: tg\,\alpha$
139	$2\,sen\,\alpha\,cos\,3\alpha$	$R: sen\,4\alpha - sen\,2\alpha$
140	$\frac{cos\left(\alpha - \frac{\pi}{4}\right)sen\left(\frac{3}{4}\pi + \alpha\right)}{cos\,\alpha + sen\,\alpha}$	$R: \frac{1}{2}(cos\,\alpha - sen\alpha)$

di riepilogo con formule goniometriche

141	$\frac{1}{2}sen\,2(\alpha + \beta)$	$R: sen\,\alpha\,cos\,\alpha\,cos\,2\beta + + sen\,\beta\,cos\,\beta\,cos\,2\alpha$
142	$cos^4\,\alpha - sen^4\,\alpha$	$R: cos\,2\alpha$

Espressioni goniometriche

143	$\frac{\cos 8\alpha + \cos \alpha}{\cos 8\alpha - \cos \alpha}$	$R: -\operatorname{ctg}\frac{9}{2}\alpha \operatorname{ctg}\frac{7}{2}\alpha$
144	$\frac{sen(3\alpha+\beta)\, sen(3\alpha-\beta) - sen(\alpha+\beta)\, sen(\alpha-\beta)}{sen\, 4\alpha\, sen\, 2\alpha}$	$R: 1$
145	$2\, tg\, \alpha\, sen^2\frac{\alpha}{2} + sen\, \alpha$	$R: tg\, \alpha$
146	$\frac{sen^2\, \alpha - sen^2\, \beta}{cos^2\, \alpha - cos^2\, \beta}$	$R: -1$
147	$\frac{1 + \operatorname{ctg}\frac{\alpha}{2} tg\frac{\alpha+\beta}{2}}{\operatorname{ctg}\frac{\alpha}{2} - tg\frac{\alpha+\beta}{2}}$	$R: tg\left(\alpha + \frac{\beta}{2}\right)$
148	$\frac{2tg\left(\frac{\pi}{2}-\alpha\right)}{1+[ctg(\pi-\alpha)]^2} - \left[cos\left(\frac{\pi}{2}-\alpha\right) + sen\left(\frac{\pi}{2}-\alpha\right)\right]$	$R: sen\, 2\alpha - sen\, \alpha - cos\, \alpha$
149	$cos\, 75°\, cos\, 15°$	$R: \frac{1}{4}$
150	$\frac{tg^2\, 22{,}5°}{4} + sen\, 45°$	$R: \frac{3}{4}$
151	$\frac{cos\, 72°}{sen^2\, 30°} + tg\, 45°$	$R: \sqrt{5}$
152	$tg\, 7{,}5°\, tg\, 67{,}5° - 3\, tg\, 30°$	$R: -\sqrt{2}$
153	$tg\, 15° + \frac{tg\, 21° + tg\, 39°}{1 - tg\, 21°\, tg\, 39°}$ *[come si risolve in maniera semplice?]*	$R: 2$
154	$sen\, 18°\, tg\, 9°$	$R: 1 - \frac{\sqrt{10+2\sqrt{5}}}{4}$
155	$\frac{1}{2}(\sqrt{3}\, cos\, 6° - sen\, 6°)$	$R: \frac{\sqrt{5}+1}{4}$
156	$(\sqrt{3} - tg\, 24°)/(1 + \sqrt{3}\, tg\, 24°)$	$R: \sqrt{5-2\sqrt{5}}$
157	$(tg\, 22° - tg\, 5°)\, cotg\, 17°\, cotg\, 5°/(cotg\, 5° + tg\, 22°)$	$R: 1$
158	$16\, sen^5\, 18° - 20\, sen^3\, 18° + 5\, sen\, 18°$ *[esercizio difficile]*	$R: 1$