

> restart;

> A:=1/2*(x+sqrt(a^2-b^2+x^2))*sqrt(b^2-x^2);

$$A := \frac{1}{2} (x + \sqrt{a^2 - b^2 + x^2}) \sqrt{b^2 - x^2}$$

> dA:=diff(A,x);

$$dA := \frac{1}{2} \left(1 + \frac{x}{\sqrt{a^2 - b^2 + x^2}} \right) \sqrt{b^2 - x^2} - \frac{(x + \sqrt{a^2 - b^2 + x^2}) x}{2 \sqrt{b^2 - x^2}}$$

> dA2:=simplify(dA);

$$dA2 := - \frac{(x + \sqrt{a^2 - b^2 + x^2}) (-b^2 + x^2 + x \sqrt{a^2 - b^2 + x^2})}{2 \sqrt{a^2 - b^2 + x^2} \sqrt{b^2 - x^2}}$$

> N:=dA2*sqrt(a^2-b^2+x^2)*sqrt(b^2-x^2)*2;

$$N := -(x + \sqrt{a^2 - b^2 + x^2}) (-b^2 + x^2 + x \sqrt{a^2 - b^2 + x^2})$$

> S:=solve(N=0,x);

$$S := \frac{b^2}{\sqrt{a^2 + b^2}}, - \frac{b^2}{\sqrt{a^2 + b^2}}$$

> l:=x+sqrt(a^2-b^2+x^2);

$$l := x + \sqrt{a^2 - b^2 + x^2}$$

> h:=2*sqrt(b^2-x^2);

$$h := 2 \sqrt{b^2 - x^2}$$

> simplify(subs(x=S[1],l)) assuming a>0,b>0;

$$\sqrt{a^2 + b^2}$$

> simplify(subs(x=S[1],h)) assuming a>0,b>0;

$$\frac{2 b a}{\sqrt{a^2 + b^2}}$$

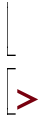
> C:=20*(w^2+9/w);

$$C := 20 w^2 + \frac{180}{w}$$

> nC:=subs(w=(9/2)^(1/3),C);

$$nC := 30 9^{(2/3)} 2^{(1/3)}$$

> evalf(nC);



163.5408534