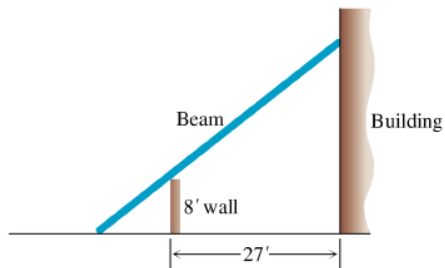


Maxima 5.21.1 <http://maxima.sourceforge.net>
 using Lisp GNU Common Lisp (GCL) GCL 2.6.7 (a.k.a. GCL)
 Distributed under the GNU Public License. See the file COPYING.
 Dedicated to the memory of William Schelter.
 The function bug_report() provides bug reporting information.

2. The 8 ft wall shown here stands 27 ft from the building.



Find the length of the shortest straight beam that will reach to the side of the building from the ground outside the wall.

Since this problem is easy to work by hand, the reason for this worksheet is leaning Maxima.

(%i1) eq1:h/w=b/(w+27);

(%o1) $\frac{h}{w} = \frac{b}{w+27}$

(%i2) eq2:h=sqrt(w^2+8^2);

(%o2) $h = \sqrt{w^2 + 64}$

(%i3) B:h*(w+27)/w;

(%o3) $\frac{h(w+27)}{w}$

(%i4) v:subst(eq2,B);

(%o4) $\frac{(w+27)\sqrt{w^2+64}}{w}$

(%i5) dbdw:diff(v,w);

(%o5) $-\frac{(w+27)\sqrt{w^2+64}}{w^2} + \frac{\sqrt{w^2+64}}{w} + \frac{w+27}{\sqrt{w^2+64}}$

(%i7) dbdws:ratsimp(dbdw);

(%o7) $\frac{w^3 - 1728}{w^2 \sqrt{w^2 + 64}}$

(%i9) s:solve(dbdws=0,w);

(%o9) $[w = 2 \cdot 3^{\frac{3}{2}}i - 6, w = -2 \cdot 3^{\frac{3}{2}}i - 6, w = 12]$

(%i11) subst(s[3],v);

(%o11) $13^{\frac{3}{2}}$

(%i12)