

AAA

```
In[232]:= ClearAll["Global`*"]
(*200*)
h = 2;
k = 0;
l = 0;
β = 90;
a = 10.784;
b = 8.201;
c = 10.380;
(*monoclinic*)
d = 
$$\frac{a b c}{\sqrt{a^2 c^2 k^2 - 2 a b^2 c h l \cot[\beta] \csc[\beta] + b^2 c^2 h^2 \csc[\beta]^2 + a^2 b^2 l^2 \csc[\beta]^2}}$$
;
(*---*)
λ = 1.541;
λ / (2 d);
θ = ArcSin[λ / (2 d)] * 180 / π;
2 θ;

Print["d(200) = ", d]
Print["2θ = ", 2 θ]

d(200) = 5.392
2θ = 16.431
```

BBB

```
In[247]:= ClearAll["Global`*"]
(*200*)
h = 2;
k = 0;
l = 0;
β = 90;
a = 10.784;
b = 8.201;
c = 10.380;
(*monoclinic*)
d = 
$$\frac{1}{\sqrt{\frac{1}{\sin[\beta \text{ Degree}]^2} \left( \frac{h^2}{a^2} + \frac{k^2 \sin[\beta \text{ Degree}]^2}{b^2} + \frac{l^2}{c^2} - \frac{2 h l \cos[\beta \text{ Degree}]}{a c} \right)}}$$
;
λ = 1.541;
λ / (2 d);
θ = ArcSin[λ / (2 d)] * 180 / π;
2 θ;

Print["d(200)= ", d]
Print["2θ = ", 2 θ]

d(200) = 5.392
2θ = 16.431
```

Storage

$$n\lambda = 2d \sin \theta$$

```
In[262]:= ClearAll["Global`*"];
Solve[
$$\frac{1}{d^2} = \frac{1}{\sin[\beta \text{ Degree}]^2} \left( \frac{h^2}{a^2} + \frac{k^2 \sin[\beta \text{ Degree}]^2}{b^2} + \frac{l^2}{c^2} - \frac{2 h l \cos[\beta \text{ Degree}]}{a c} \right), d]$$

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Out[263]=
$$\left\{ \left\{ d \rightarrow -\frac{a b c}{\sqrt{a^2 c^2 k^2 - 2 a b^2 c h l \cot[\beta] \csc[\beta] + b^2 c^2 h^2 \csc[\beta]^2 + a^2 b^2 l^2 \csc[\beta]^2}} \right\}, \right.$$

$$\left. \left\{ d \rightarrow \frac{a b c}{\sqrt{a^2 c^2 k^2 - 2 a b^2 c h l \cot[\beta] \csc[\beta] + b^2 c^2 h^2 \csc[\beta]^2 + a^2 b^2 l^2 \csc[\beta]^2}} \right\} \right\}$$

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