2, 3, 5, 7, 11, 13, 17, 19, 23, 29

$$\frac{11}{30} + \frac{47}{108}$$

$$\begin{array}{r|l} 2 & 30 \\ 3 & 15 \\ & 5 \end{array} \qquad \begin{array}{r|l} 2 & 108 \\ 2 & 54 \\ 3 & 27 \\ 3 & 9 \\ & 3 \end{array}$$

$$\frac{11}{2\cdot3\cdot5}\cdot\frac{2\cdot3^2}{2\cdot3^2} + \frac{47}{2^2\cdot3^3}\cdot\frac{5}{5}$$

$$\boxed{LCD = 2^2\cdot3^3\cdot5}$$

$$\frac{198 + 235}{2^2\cdot3^3\cdot5} = \frac{433}{2^2\cdot3^3\cdot5}$$

$$\begin{array}{r} 18 \\ \underline{11} \\ 180 \\ \underline{18} \\ 158 \end{array}$$

$$\cancel{\frac{x-1}{(x+1)(x-3)} + \frac{2x+3}{(x-3)(x-2)}}$$

$$= \frac{x-1}{x^2-2x-3} + \frac{2x+3}{x^2-5x+6}$$

$$= \frac{(x^2-5x+6)(x-1) + (2x+3)(x^2-2x-3)}{(x^2-2x-3)(x^2-5x+6)}$$

$$\boxed{\begin{array}{c} x^2-2x-3 \\ (x-3)(x+1) \end{array}}$$

$x^2-2x-3=0$

$a=1, b=-2, c=-3$

$b^2-4ac = (-2)^2-4(1)(-3)$

$= 4+12 = 16 \rightarrow \sqrt{16} = 4$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{+2 \pm 4}{2(1)} = \frac{6}{2} = 3, \ \frac{-2}{2} = -1$

$x = 3, -1 \rightarrow (x-3)(x+1)$

x^2-5x+6

$= (x-3)(x-2)$

$$\frac{x-1}{(x+1)(x-3)} + \frac{2x+3}{(x-3)(x-2)}$$

$$\boxed{LCD = (x+1)(x-3)(x-2)}$$

$$\left(\frac{x-1}{(x+1)(x-3)}\right)\left(\frac{x-2}{x-2}\right) + \left(\frac{2x+3}{(x-3)(x-2)}\right)\left(\frac{x+1}{x+1}\right)$$

$$= \frac{x^2-3x+2 + (2x^2+5x+3)}{LCD}$$

$$\boxed{= \frac{3x^2+2x+5}{LCD}}$$

$b^2-4ac =$

$2^2-4(3)(5)$

$= 4-60 = -56$

No real sol'ns.

No real factors

$$\frac{(x-2)(x+17)}{(x-2)(x+1)(x-3)}$$

$\sqrt{169344}$

$$\begin{array}{r|l} 2 & 169344 \\ 2 & 84672 \\ 2 & 42336 \\ 2 & 21168 \\ 2 & 10584 \\ 2 & 5292 \\ 2 & 2646 \\ 3 & 1323 \\ 3 & 441 \\ 3 & 147 \\ 7 & 49 \\ & 7 \end{array}$$

Matthew Hoesch

$169344 = 2^7 \cdot 3^3 \cdot 7^2 \implies$

So... $\sqrt{2^7 \cdot 3^3 \cdot 7^2} = \sqrt{2^6 \cdot 2^1 \cdot 3^2 \cdot 3^1 \cdot 7^2}$

$= 2^3 \cdot 3^1 \cdot 7^1 \sqrt{2 \cdot 3}$

$= \boxed{168\sqrt{6}}$

$$\begin{array}{r} 24 \\ \times\ 7 \\ \hline 168 \end{array}$$

$\sqrt[3]{169344} = \sqrt[3]{2^7 \cdot 3^3 \cdot 7^2}$

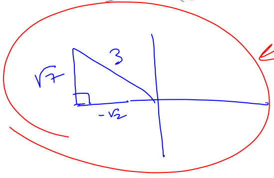
$= \sqrt[3]{2^6 \cdot 2^1 \cdot 3^3 \cdot 7^2}$

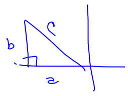
$= 2^2 \cdot 3^1 \sqrt[3]{2 \cdot 49}$

$= 12\sqrt[3]{98}$

Test 2 #3

(3) $\cos(u) = -\frac{\sqrt{2}}{3}$ & $\sin(u) > 0$



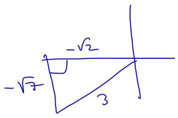


$a^2+b^2=c^2$

$(-\sqrt{2})^2+b^2=3^2$

$2+b^2=9$

$b^2=9-2=7 \rightsquigarrow b=\pm\sqrt{7}$



$-\sqrt{2}^2 = -2$

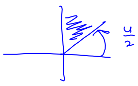
$(-\sqrt{2})^2 = +2$

$\sin\left(\frac{u}{2}\right) = \pm\sqrt{\frac{1-\cos u}{2}}$

what quadrant? (Deal w/ "±")

$90^\circ < u < 180^\circ$

$45^\circ < \frac{u}{2} < 90^\circ$

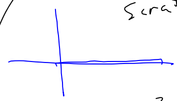


$\sin\left(\frac{u}{2}\right)$ & $\cos\left(\frac{u}{2}\right) > 0$

$\frac{u}{2} \in$ Q I $\quad$ +

$\sin\left(\frac{u}{2}\right) = +\sqrt{\frac{1-\cos u}{2}} = \sqrt{\frac{1-\left(-\frac{\sqrt{2}}{3}\right)}{2}}$

Scratch



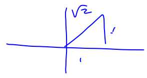
$\boxed{\cos\left(-\frac{\sqrt{2}}{3}\right)}$

$\cos(\cos(u))$

$\cos(45^\circ) = \frac{1}{\sqrt{2}}$

$\cos\left(\frac{1}{\sqrt{2}}\right)$ is CRAP

$\frac{3}{3}\cdot\frac{1}{1}+\frac{\sqrt{2}}{3}$



$= \sqrt{\frac{1+\frac{\sqrt{2}}{3}}{2}} = \sqrt{\frac{\frac{3+\sqrt{2}}{3}}{2}} = \sqrt{\left(\frac{3+\sqrt{2}}{3}\right)\left(\frac{1}{2}\right)}$

$= \sqrt{\frac{3+\sqrt{2}}{6}} = \frac{\sqrt{3+\sqrt{2}}}{\sqrt{6}}\cdot\frac{\sqrt{6}}{\sqrt{6}} = \frac{\sqrt{3+\sqrt{2}}\,\sqrt{6}}{6}$

$\sqrt{a}\sqrt{b} = \sqrt{ab}$ Yeah!

$\sqrt{a}+\sqrt{b} = \sqrt{a+b}$ No

$\frac{\sqrt{(3+\sqrt{2})(6)}}{6}$

$\boxed{= \frac{\sqrt{18+6\sqrt{2}}}{6}}$

$\cos\left(\frac{u}{2}\right) = +\sqrt{\frac{1+\cos u}{2}} = \ldots = \frac{\sqrt{18-6\sqrt{2}}}{6} = \cos\left(\frac{u}{2}\right)$

$\Rightarrow \tan\left(\frac{u}{2}\right) = \frac{\sin\left(\frac{u}{2}\right)}{\cos\left(\frac{u}{2}\right)} = \frac{\sqrt{18+6\sqrt{2}}}{6}\cdot\frac{6}{\sqrt{18-6\sqrt{2}}}$

$\frac{\sqrt{18+6\sqrt{2}}}{\sqrt{18-6\sqrt{2}}}\cdot\frac{\sqrt{18-6\sqrt{2}}}{\sqrt{18-6\sqrt{2}}}$

$= \frac{\sqrt{18+6\sqrt{2}}\,\sqrt{18-6\sqrt{2}}}{18-6\sqrt{2}}$

$(a+b)(a-b)$ $\quad a^2-b^2$

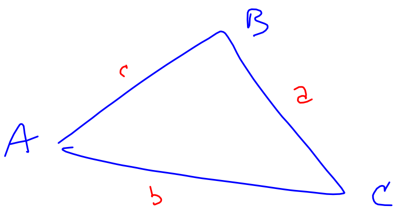
$2 \mid 252$, $2 \mid 126$, $3 \mid 63$, $3 \mid 21$, 7

$= \frac{\sqrt{(18+6\sqrt{2})(18-6\sqrt{2})}}{18-6\sqrt{2}} = \frac{\sqrt{324-72}}{18-6\sqrt{2}} = \frac{\sqrt{252}}{18-6\sqrt{2}} = \frac{2\cdot3\sqrt{7}}{18-6\sqrt{2}}$

$= \frac{6\sqrt{7}}{6(3-\sqrt{2})} = \left(\frac{\sqrt{7}}{3-\sqrt{2}}\right)\left(\frac{3+\sqrt{2}}{3+\sqrt{2}}\right)$ $\quad (6\sqrt{2})(6\sqrt{2}) = 36\cdot2$

$\frac{3\sqrt{7}+\sqrt{14}}{9-2} = \boxed{\frac{3\sqrt{7}+\sqrt{14}}{7}}$

§3.1 Law of Sines

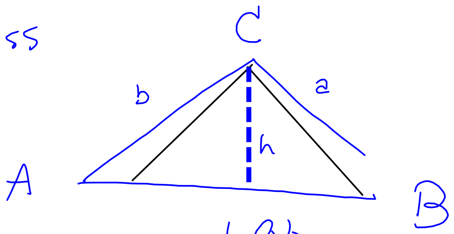


$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

SSS ✓

SAS ✓

ASS



ASS

Ambiguous

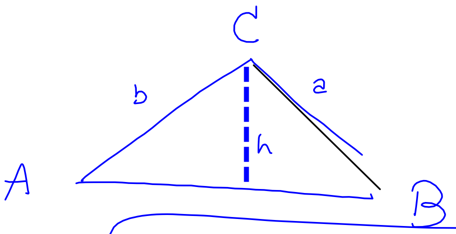
2 possibilities

when $h < a < b$

when $a > h$

& $a > b$

there's <u>one</u> solution



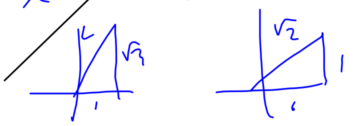
when $a < h \rightarrow$ impossible

$\sin(u+v)$

$= \sin u \cos v + \sin v \cos u$

$= \sin\frac{\pi}{3}\cos\frac{\pi}{4} + \sin\frac{\pi}{4}\cos\frac{\pi}{3}$

$\left(\frac{\sqrt{3}}{2}\right)\left(\frac{1}{\sqrt{2}}\right) + \left(\frac{1}{\sqrt{2}}\right)\left(\frac{1}{2}\right) = \frac{\sqrt{3}+1}{2\sqrt{2}}$



$$\sqrt{\frac{1+\cos u}{2}} = \sqrt{\frac{1+\frac{-\sqrt{2}}{3}}{2}} = \sqrt{\frac{\frac{3-\sqrt{2}}{3}}{2}}$$

$$= \sqrt{\frac{3-\sqrt{2}}{3}\cdot\frac{1}{2}} = \sqrt{\frac{3-\sqrt{2}}{6}} \quad \frac{\sqrt{6}}{\sqrt{6}}$$