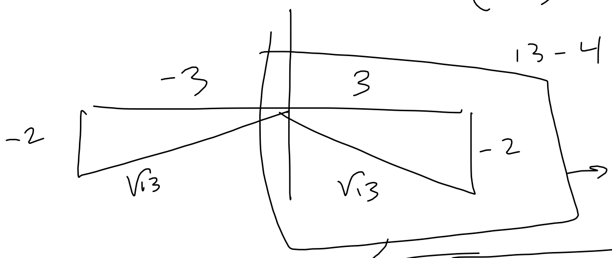
Test 1 solutions posted shortly (later, today).

3a $\sin\theta = -\frac{2}{\sqrt{13}}$

Pythagorus

$(\sqrt{13})^2 - (-2)^2 = b^2$ $\pm$

$13 - 4 = 9 = b^2 \Rightarrow b = 3$



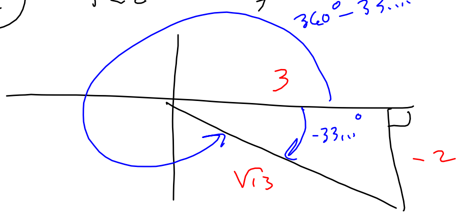
3b

$\sin\theta = -\frac{2}{\sqrt{13}}$ $\csc\theta = -\frac{\sqrt{13}}{2}$

$\cos\theta = \frac{3}{\sqrt{13}}$ $\sec\theta = \frac{\sqrt{13}}{3}$

$\tan\theta = -\frac{2}{3}$ $\cot\theta = -\frac{3}{2}$

3c Find the angle



$0 \le \theta < 2\pi$

$0 \le \theta < 360^\circ$

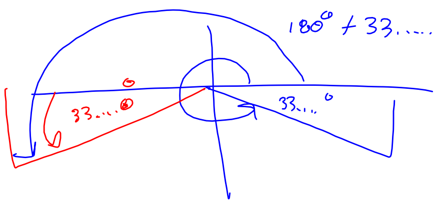
$\arcsin\left(-\frac{2}{\sqrt{13}}\right) \approx -33.69006753^\circ$

So $\theta \approx 360^\circ -$ $\approx 326.30993325^\circ$

$\approx \boxed{326.310^\circ}$

3d Find them <u>all</u>.

$180^\circ + 33.\ldots^\circ = \boxed{213.690\ldots^\circ}$



$\{326.310^\circ + 360^\circ n,\ 213.690^\circ + 360^\circ n \mid n \in \mathbb{Z}\}$

TIMES $\frac{\pi}{180^\circ}$:

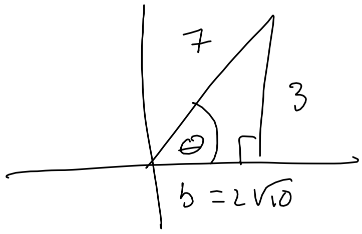
$= \{5.695 + 2n\pi,\ 3.730 + 2n\pi \mid n \in \mathbb{Z}\}$

$(360^\circ n)\left(\frac{\pi}{180^\circ}\right) = 2n\pi$!

TOP SCORE 96

BOTTOM OF C's 70

#9 $\cot\left(\arcsin\left(\frac{3}{7}\right)\right) = \cot\theta$



$7^2 - 3^2 = 49 - 9 = 40 = b^2$

$\sqrt{40} = b$

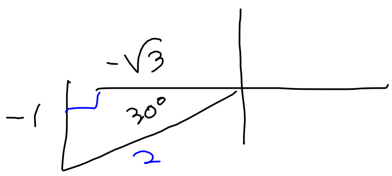
2 | 40
2 | 20
2 | 10
5

$2\sqrt{10}$

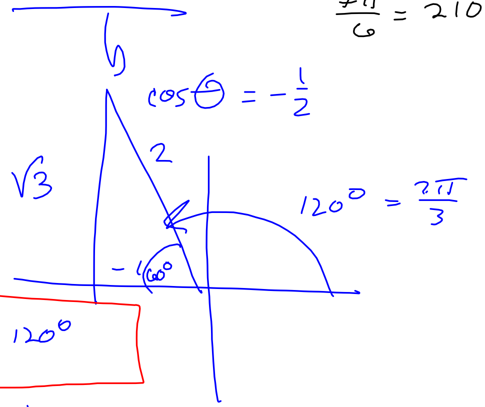
$\cot\theta = \frac{1}{\tan\theta} = \frac{1}{\frac{3}{2\sqrt{10}}} = \boxed{\frac{2\sqrt{10}}{3}}$

10 2 $\arccos\left(\sin\left(\frac{7\pi}{6}\right)\right) = \arccos\left(-\frac{1}{2}\right)$

$\frac{7\pi}{6} = 210^\circ$

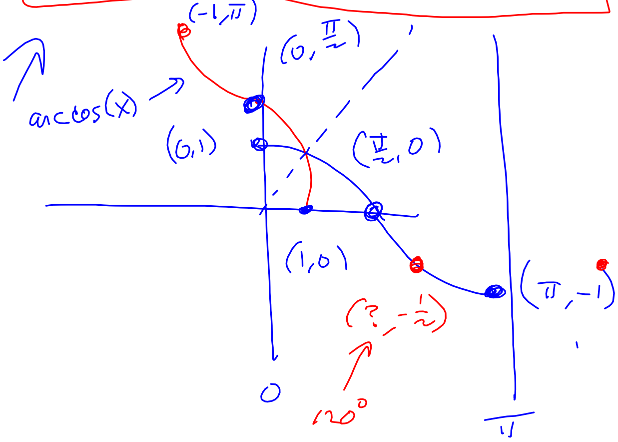


$\cos\theta = -\frac{1}{2}$



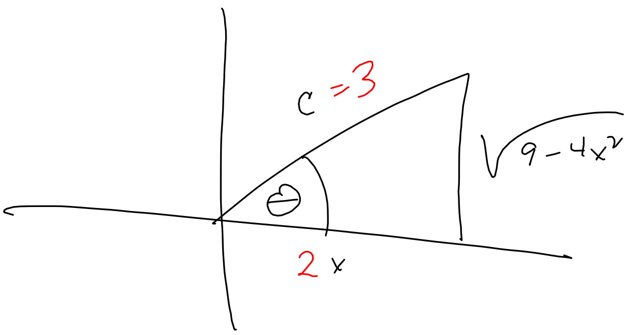
$120^\circ = \frac{2\pi}{3}$

$\boxed{\arccos\left(-\frac{1}{2}\right) = \frac{2\pi}{3} \text{ or } 120^\circ}$



$$\csc\left(\arctan\left(\frac{\sqrt{9-4x^2}}{2x}\right)\right) = \csc\theta = \frac{1}{\sin\theta} = \frac{1}{\frac{\sqrt{9-4x^2}}{3}} = \frac{3}{\sqrt{9-4x^2}}$$

$$= \frac{3}{\sqrt{9-4x^2}}$$



$$c^2 = a^2 + b^2 = (2x)^2 + \left(\sqrt{9-4x^2}\right)^2$$

$$= 4x^2 + 9 - 4x^2 = 9 = c^2$$

$$\Longrightarrow c = \pm\sqrt{9} = \pm 3 \Longrightarrow$$

$c = 3$, b/c hypotenuse is ALWAYS positive.

SLEDGEHAMMER

Factor $6x^2 + 7x + 11$

$a = 6,\ b = 7,\ c = 11$

$b^2 - 4ac = 7^2 - 4(6)(11)$

$= 49 - 264$

$= -215$

$240 + 24 = 264$

$5 \,\overline{)\,215}$ → 43

$\sqrt{-215} = i\sqrt{215}$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-7 \pm i\sqrt{215}}{2(6)} = \frac{-7 \pm i\sqrt{215}}{12}$$

$$6x^2 + 7x + 11 = 6\left(x - \left(\frac{-7 + i\sqrt{215}}{12}\right)\right)\left(x - \left(\frac{-7 - i\sqrt{215}}{12}\right)\right)$$

$(5x+14)(3x-10) = 15x^2 - 8x - 140$

$a = 15,\ b = -8,\ c = -140$

$b^2 - 4ac = (-8)^2 - 4(15)(-140)$

$= 64 + 8400$

$= 8464 = 92^2$

$140 \cdot 60 = 8400$

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

$2 \,|\, 8464$, $2 \,|\, 4232$, $2 \,|\, 2116$, $2 \,|\, 1058$, $23 \,|\, 529$, 23

$\sqrt{8464} = 2 \cdot 2 \cdot 23 = 92$

$$x = \frac{8 \pm 92}{2(15)} = \frac{8 \pm 92}{30}$$

$\frac{100}{30}$, $\frac{-84}{30}$

$14,\ \cancel{42},\ \cancel{84},\ \cancel{30},\ \cancel{15},\ 5$

$\boxed{\frac{10}{3},\ \frac{-14}{5}}$

$15\left(x - \frac{10}{3}\right)\left(x + \frac{14}{5}\right)$

$= 3 \cdot 5\left(x - \frac{10}{3}\right)\left(x + \frac{14}{5}\right)$

$= (3x-10)(5x+14)$ & your teacher's very happy you can factor!

$2\sin^2 x + 3\sin x + 1 = 0$

$2u^2 + 3u + 1 = 0$

$(2u+1)(u+1)$

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

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

$= 9 - 8 = 1$

$x = \dfrac{-b \pm \sqrt{b^2-4ac}}{2a} = \dfrac{-3 \pm \sqrt{1}}{4} = \dfrac{-3 \pm 1}{4}$

$\dfrac{-4}{4} = -1$

$\dfrac{-2}{4} = -\dfrac{1}{2}$

$2(u-(-1))(u-(-\tfrac{1}{2}))$

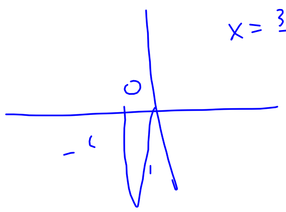
$= 2(u+1)(u+\tfrac{1}{2})$

$(u+1)(2u+1)$

$\sin x + 1 = 0$

$\sin x = -1$

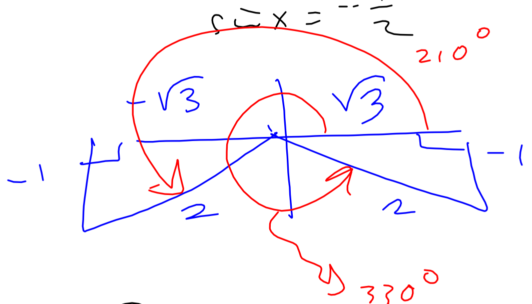
$x = \dfrac{3\pi}{2} = 270^\circ$



$2\sin x + 1 = 0$

$2\sin x = -1$

$\sin x = -\dfrac{1}{2}$



$x \in \left\{ \dfrac{3\pi}{2}, \dfrac{7\pi}{6}, \dfrac{11\pi}{6} \right\}$

$= \{270^\circ, 210^\circ, 330^\circ\}$