Question 1. Evaluate:

(a) $\arccos^{-1}(-\frac{\sqrt{3}}{2})$

(b) $\csc^{-1}(-2)$

(c) $\tan^{-1} 0$

(d) $\cos^{-1} 0$

Question 2. (a) If $\sin\theta = \frac{5}{7}$ and $0 \leq \theta \leq \pi/2$, find $\cos\theta$.

(b) Find $\tan(\cos^{-1}(-2/3))$.

Question 3. (a) Find an equivalent algebraic expression for $\cos(\tan^{-1} x)$.

(b) Find an equivalent algebraic expression for $\tan(\sin^{-1} x)$ if $x > 0$.

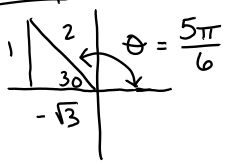
Solutions on the next page

Question 1. Evaluate:

(a) $\arccos^{-1}(-\frac{\sqrt{3}}{2}) = \boxed{\frac{5\pi}{6}}$

$0 \le \theta \le \pi$

negative: QII

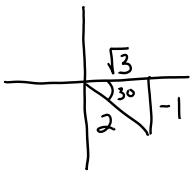


$\cos\theta = \frac{A}{H}$

(b) $\csc^{-1}(-2) = \boxed{-\frac{\pi}{6}}$

$-\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$

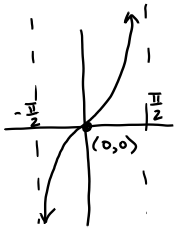
negative: QIV



$\csc\theta = \frac{1}{\sin\theta} = \frac{H}{O}$

(c) $\tan^{-1} 0 = \boxed{0}$

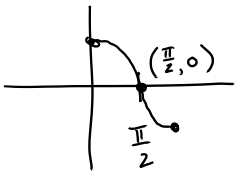
y-value = 0 on graph of $y = \tan x$



(d) $\cos^{-1} 0 = \boxed{\frac{\pi}{2}}$

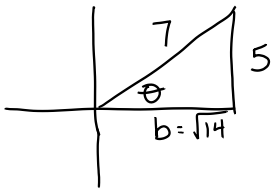
y-value = 0 on graph of $y = \cos x$

$0 \le \theta \le \pi$



Question 2. (a) If $\sin\theta = \frac{5}{7}$ and $0 \le \theta \le \pi/2$, find $\cos\theta$.

Q1



$\sin\theta = \frac{O \to 5}{H \to 7}$

$\boxed{\cos\theta = \frac{\sqrt{14}}{7}}$ $\left(\frac{A}{H}\right)$

$b^2 + 5^2 = 7^2$

$b^2 = 14$ so $b = \sqrt{14}$

(b) Find $\tan(\cos^{-1}(-2/3))$.

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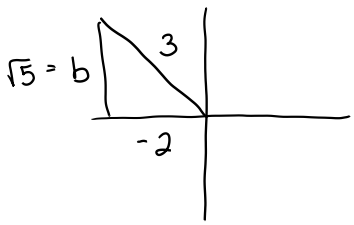
$0 \le \theta \le \pi$

negative, so QII

$\boxed{\tan\theta = -\frac{\sqrt{5}}{2}}$



Find b: $(-2)^2 + b^2 = 3^2$

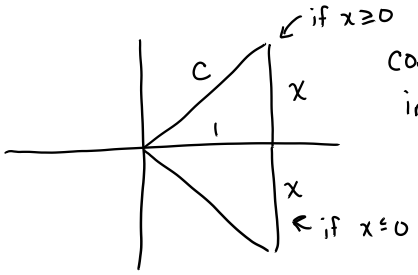
$b^2 = 5$

$b = \sqrt{5}$

Question 3. (a) Find an equivalent algebraic expression for $\cos(\tan^{-1} x)$.

"cosine of the angle whose tangent is $\frac{x}{1}$"

↓ between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$



cosine is positive in both quadrants

Find c: $1^2 + x^2 = c^2$

$c = \sqrt{1+x^2}$

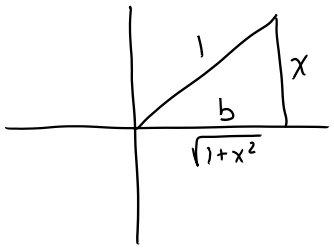
(must be positive)

$\cos(\tan^{-1} x) = \frac{1}{c} = \boxed{\frac{1}{\sqrt{1+x^2}}}$

(b) Find an equivalent algebraic expression for $\tan(\sin^{-1} x)$ if $x > 0$.

"the tangent of the angle whose sine is $\frac{x}{1}$"

↓ between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$



must be in Q1 because $x > 0$

Find b:

$b^2 + x^2 = 1^2$

$b = \sqrt{1-x^2}$

(must be positive)

$\tan(\sin^{-1} x) = \frac{x}{\sqrt{1-x^2}}$