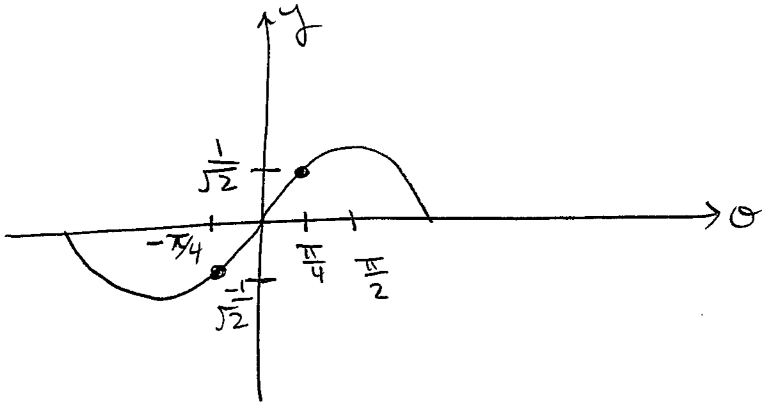
(1) [5] Determine the exact value of $\arcsin(-1/\sqrt{2})$.

$\arcsin\left(-\frac{1}{\sqrt{2}}\right) =$ angle θ in $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$
such that $\sin(\theta) = \frac{-1}{\sqrt{2}}$

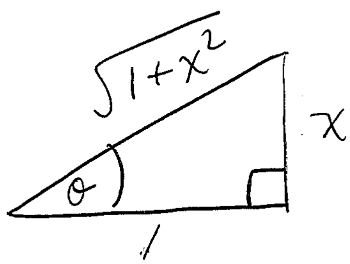


$\therefore \theta = -\frac{\pi}{4}$

$\therefore \arcsin\left(\frac{-1}{\sqrt{2}}\right) = \boxed{-\frac{\pi}{4}}$

(2) [5] Simplify $\cos(\tan^{-1} x)$. Your final simplified answer should not contain any trigonometric or inverse trigonometric functions.

Let $\theta = \tan^{-1} x$, so $\tan\theta = \frac{x}{1}$



$$\therefore \cos\left(\tan^{-1}(x)\right) = \cos\theta = \boxed{\frac{1}{\sqrt{1+x^2}}}$$

(3) [5] Differentiate

$$g(x) = \arccos(2-3x)$$

and state the domain of $g(x)$.

$$g'(x) = \frac{-1}{\sqrt{1-(2-3x)^2}} \cdot (-3)$$

$$= \frac{3}{\sqrt{1-(2-3x)^2}}$$

Domain of $g(x)$: Must have

$$-1 \le 2-3x \le 1$$

$$\Rightarrow \quad -3 \le -3x \le -1$$

$$\Rightarrow \quad \frac{1}{3} \le x \le 1$$

$\therefore$ domain is $\left[\frac{1}{3}, 1\right]$