Review: $150^\circ = \frac{5}{6}\pi$, $72^\circ = \frac{2\pi}{5}$

$\frac{\pi}{7} = \frac{180^\circ}{7}$, $-1 = -\frac{180^\circ}{\pi}$

$$\sin\left(\frac{\pi}{2}-x\right) = \sin\left(\frac{\pi}{2}\right)\cos x - \cos\left(\frac{\pi}{2}\right)\sin x = \cos x$$

$$\cos\left(\frac{\pi}{2}+x\right) = -\sin x$$

$$\tan(x+y) = \frac{\sin(x+y)}{\cos(x+y)} = \frac{\sin x\cos y + \cos x \sin y}{\cos x\cos y - \sin x \sin y}$$

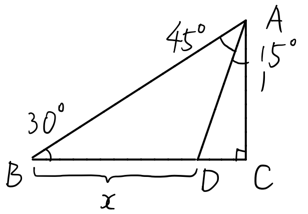
divide $\cos x \cos y$ $= \dfrac{\tan x + \tan y}{1-\tan x \tan y}$

$$\tan\left(x+\frac{\pi}{2}\right) = -\frac{1}{\tan x} = -\cot x$$

$\sin t = \frac{1}{2} \Rightarrow t = \frac{\pi}{6}+2k\pi$, $\frac{5\pi}{6}+2k\pi$, $k\in\mathbb{Z}$

$\cos t = -1 \Rightarrow t = -\pi + 2k\pi$, $k\in\mathbb{Z}$

$\cos t = 0 \Rightarrow t = k\pi$, $k \in \mathbb{Z}$



$$\frac{1}{BC} = \frac{AC}{BC} = \tan 30^\circ = \frac{\sqrt{3}}{3} \Rightarrow BC = \sqrt{3}$$

$$DC = \frac{DC}{AC} = \tan 15^\circ = \tan(45^\circ - 30^\circ)$$

$$= \frac{\tan 45^\circ - \tan 30^\circ}{1+\tan 45^\circ \tan 30^\circ} = \frac{1-\frac{\sqrt{3}}{3}}{1+1\times\frac{\sqrt{3}}{3}}$$

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

$$= \frac{\frac{4}{3}-\frac{2\sqrt{3}}{3}}{\frac{2}{3}} = \frac{4-2\sqrt{3}}{2} = 2-\sqrt{3}$$

$$x = BD = BC - DC = \sqrt{3} - (2-\sqrt{3}) = 2\sqrt{3}-2$$

Section 8.3

$\frac{d}{dt}\sin t = \cos t$, $\frac{d}{dt}\cos t = -\sin t$

$(\sin 3t)' = 3\cos 3t$, $(\cos(t^3))' = -3t^2 \sin t^3$

$$(t^2\cos 3t)' = (t^2)'\cos 3t + t^2(\cos 3t)'$$
$$= 2t\cos 3t - 3t^2 \sin 3t$$

$\int \cos t \, dt = \sin t + C$, $\int \sin t = -\cos t + C$

$$\int \cos 3t\, dt = \frac{1}{3}\int \cos 3t\, d(3t) = \frac{1}{3}\sin 3t + C$$

$$\int_0^{\pi} \sin t\, dt = \left[-\cos t\right]\Big|_0^{\pi} = \left[-(-1) - (-1)\right] = 2$$

$$\lim_{h\to 0} \frac{\sin h}{h} = \lim_{h\to 0} \frac{\sin(0+h) - \sin(0)}{h} = \cos 0 = 1$$

$$\int \tan t\, dt = \int \frac{\sin t}{\cos t}\, dt = -\int \frac{1}{\cos t}\, d(\cos t) = -\ln|\cos t| + C$$

$$\int \cos \frac{x-2}{2}\, dx = \int \cos \frac{x-2}{2}\, d(x-2) = 2\int \cos \frac{x-2}{2}\, d\frac{x-2}{2} =$$

$$2\sin \frac{x-2}{2} + C$$