1. $\cos^{-1}(-1) = \pi$

2. $\tan^{-1}\left(\sqrt{3}\right) = \dfrac{\pi}{3}$

3. $\sin^{-1}\left(-\dfrac{1}{\sqrt{2}}\right) = -\dfrac{\pi}{4}$

4. $\sin(\sin^{-1} 0.7) = 0.7$

5. $\sin\left(\cos^{-1}\dfrac{4}{5}\right) = \dfrac{3}{5}$

6. $\arcsin\left(\sin\dfrac{5\pi}{4}\right) = \arcsin\left(-\dfrac{1}{\sqrt{2}}\right) = -\dfrac{\pi}{4}$

7. $\sin^{-1} 1 = \dfrac{\pi}{2}$

8. $\cos^{-1} 0 = \dfrac{\pi}{2}$

9. $$\begin{aligned} f'(x) &= \frac{2}{\sqrt{1-(2x-1)^2}} \\ &= \frac{2}{\sqrt{4x-4x^2}} \\ &= \frac{2}{2\sqrt{x-x^2}} \\ &= \frac{1}{\sqrt{x-x^2}} \end{aligned}$$

10. $$\begin{aligned} \frac{dy}{dx} &= \left(2\sin^{-1} x\right)\left(\frac{1}{\sqrt{1-x^2}}\right) \\ &= \frac{2\sin^{-1} x}{\sqrt{1-x^2}} \end{aligned}$$

11. $$\begin{aligned} f'(x) &= \left(\sin^{-1} x\right)\frac{1}{x} + (\ln x)\frac{1}{\sqrt{1-x^2}} \\ &= \frac{\sin^{-1} x}{x} + \frac{\ln x}{\sqrt{1-x^2}} \\ &= \frac{\sin^{-1} x\,\sqrt{1-x^2} + x\ln x}{x\,\sqrt{1-x^2}} \end{aligned}$$

12. $$f'(t) = \frac{(t)\left(-\frac{1}{\sqrt{1-t^2}}\right) - \left(\cos^{-1} t\right)(1)}{t^2}$$

$$= \frac{-t - \left(\cos^{-1} t\right)\ \sqrt{1-t^2}}{t^2\ \sqrt{1-t^2}}$$

13. $$F'(t) = \frac{1}{2}\ (1-t^2)^{-1/2}(-2t) + \frac{1}{\sqrt{1-t^2}}$$

$$= \frac{1-t}{\sqrt{1-t^2}}$$

14. $$\frac{dy}{dx} = \frac{2x}{\sqrt{1-x^4}}$$

15. $$\frac{dy}{dx} = \frac{\frac{2x}{2\sqrt{1+x^2}}}{\sqrt{1+x^2}\sqrt{1+x^2-1}}$$

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

$$= \frac{x}{(1+x^2)|x|}$$

16. $$\frac{dy}{dx} = \frac{\cos x}{1+\sin^2 x}$$

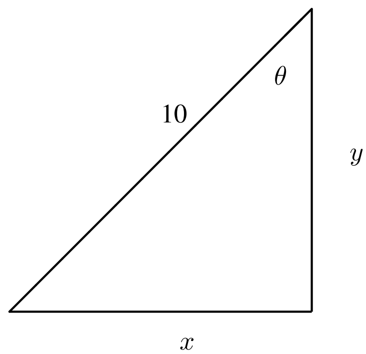
17. $$f'(x) = -\left(\tan^{-1} x\right)^{-2}\ \frac{1}{1+x^2}$$

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

18. $$\frac{dy}{dx} = (x^2)\left(-\frac{3}{1+9x^2}\right) + \left(\cot^{-1} 3x\right)(2x)$$

$$= 2x\cot^{-1} 3x - \frac{3x^2}{1+9x^2}$$

19. Find $\dfrac{d\theta}{dt}$ when $x = 6$.



$$\sin\theta = \frac{x}{10}$$

$$\theta = \sin^{-1}\frac{1}{10}x$$

$$\frac{d\theta}{dt} = \frac{\frac{1}{10}\;\frac{dx}{dt}}{\sqrt{1-\frac{x^2}{100}}}$$

For $x = 6$ and $\dfrac{dx}{dt} = 2$

$$\frac{d\theta}{dt}=\frac{1}{4}$$

Therefore the angle is increasing at $\frac{1}{4}$ radians per second.