

## +2 Mathematics Work Sheet

### Based on the Focus Area From Chapter 2

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1. (a) Find the principal value  $\sin^{-1}\left(-\frac{1}{2}\right)$

(b) Hence find  $\sin\left(\frac{\pi}{3} - \sin^{-1}\left(-\frac{1}{2}\right)\right)$

2. Simplify the following:

(a)  $\tan^{-1}\left(\frac{\cos x}{1 - \sin x}\right)$

b)  $\tan^{-1}\sqrt{\frac{1 - \cos x}{1 + \cos x}}$

(c)  $\tan^{-1}\left(\frac{\cos x - \sin x}{\cos x + \sin x}\right)$

(d)  $\tan^{-1}\frac{\sqrt{1+x^2}-1}{x}$

3. Prove that (i)  $\tan^{-1}\left(\frac{1}{7}\right) + \tan^{-1}\left(\frac{1}{13}\right) = \tan^{-1}\left(\frac{2}{9}\right)$

(ii)  $2\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{5}\right) = \tan^{-1}\left(\frac{23}{11}\right)$

4. Solve (i)  $\sin^{-1}\left(\frac{3}{5}\right) = \tan^{-1}(x)$

(ii)  $\tan^{-1}(2x) + \tan^{-1}(3x) = \frac{\pi}{4}$