

MA1200 Hand-in Assignment #2 due Oct. 9

Instructions to students:

1. Please submit it via Canvas in a PDF file (you can handwrite the answers and take photos by your phone, then make it into a PDF file, see, for example, <https://www.wikihow.com/Convert-JPG-to-PDF> for how to combine JPG files to a PDF; you can also do it by note-taking apps on an iPad or a Surface)
2. The assignment is due on **23:59 of October 9 (Sunday)**. Late submissions will **NOT** be marked.
3. Please write down your name and student ID.

Questions:

1. Factorize $6x^3 - 17x^2 + 6x + 8$. (Hint: try $x = 2$)
2. Express the following rational functions in partial fraction.
(a) $\frac{4x - 5}{(x + 2)(x^2 - 4)}$, (b) $\frac{x^2 - 3x - 10}{x^3 - 3x^2 + x - 3}$, (c) $\frac{x^3 - 5x^2 + 10x - 9}{x^2 - 3x + 2}$.
3. If $t = \tan \frac{x}{2}$, show that $\tan x + \sec x = \frac{1 + t}{1 - t}$.
4. It is given that $\sin A = -\frac{12}{13}$ with $-\frac{\pi}{2} < A < 0$, and that $\cos B = \frac{3}{5}$ with $0 < B < \frac{\pi}{2}$. Calculate the exact values of
(a) $\sin(A + B)$, (b) $\cos(A - B)$.
5. Calculate
(a) $\sin^{-1}(\sin(\frac{5\pi}{4}))$, (b) $\cos^{-1}(\cos(\frac{5\pi}{4}))$, (c) $\tan^{-1}(\tan(\frac{5\pi}{4}))$,
(d) $\sin^{-1}(\sin(-1))$, (e) $\cos^{-1}(\cos(-1))$, (f) $\tan^{-1}(\tan(-1))$.
6. Does $\sin(\sin^{-1}(-3))$ exist? If yes, find its value. If no, give your reason. How about $\tan(\tan^{-1}(-3))$?
7. Express $\cos x - \sqrt{3}\sin x$ in the form of $A \sin(x - \alpha)$ with $0 < \alpha < \frac{\pi}{2}$.
8. Find the general solution of $\cos x + \sqrt{3}\sin x = -1$.

End