MA1200 Hand-in Assignment #2 due November 3

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 November 3 (Friday)**. *Late submissions will* ***NOT*** *be marked.*
3. *Please write down your name and student ID.*

Questions:

1. Factorize $4x^3 - 20x^2 - 24x$.
2. Express the following rational functions in partial fraction.

   (a) $\dfrac{x^3 - x^2 + 9x - 1}{x^4 - 1}$, (b) $\dfrac{11x - 10}{x^2 - 2x}$, (c) $\dfrac{-x^5 - x^4 + 3x^3 + 5x^2 + 6x + 6}{x^4 + x^3}$.
3. Simplify

   (a) $(\cot\theta + \csc\theta)(\cot\theta - \csc\theta)$, (b) $1 - \frac{\sin^2 x}{1+\cos x}$.
4. It is given that $\sin A = -\dfrac{1}{2}$ with $-\dfrac{\pi}{2} < A < 0$, and that $\cos B = \dfrac{3}{5}$ with $0 < B < \frac{\pi}{2}$. Calculate the exact values of

   (a) $\sin(A + B)$, (b) $\cos(A - B)$.
5. Calculate
   (a) $\sin^{-1}(\sin(-\dfrac{5\pi}{4}))$, (b) $\cos^{-1}(\cos(-\dfrac{5\pi}{4}))$, (c) $\tan^{-1}(\tan(-\dfrac{5\pi}{4}))$,
   (d) $\sin^{-1}(\sin(2))$, (e) $\cos^{-1}(\cos(2))$, (f) $\tan^{-1}(\tan(2))$.
6. Does $\cos(\cos^{-1}(3))$ exist? If yes, find its value. If no, give your reason.
   How about $\tan(\tan^{-1}(3))$?
7. Given $\sec t = -\frac{13}{5}$ and t in the second quadrant, find the other five trigonometric functions of t.
8. Express $\cos x + \sin x$ in the form of $A\cos(x - \alpha)$ with $0 < \alpha < \dfrac{\pi}{2}$.
9. Find the general solution of $2\cos^2 4\theta = 1$.

End