Math 100A – WORKSHEET 6
INVERSE TRIGONOMETRIC FUNCTIONS

1. REVIEW

(1) Differentiate
   (a) $e^{\sqrt{\cos x}}$

(2) (Final, 2014) Let $y = x^{\log x}$. Find $\frac{\mathrm{d}y}{\mathrm{d}x}$ in terms of x only.

(3) Find the line tangent to the curve $y^2 = 4x^3 + 2x$ at the point $(2, 6)$.
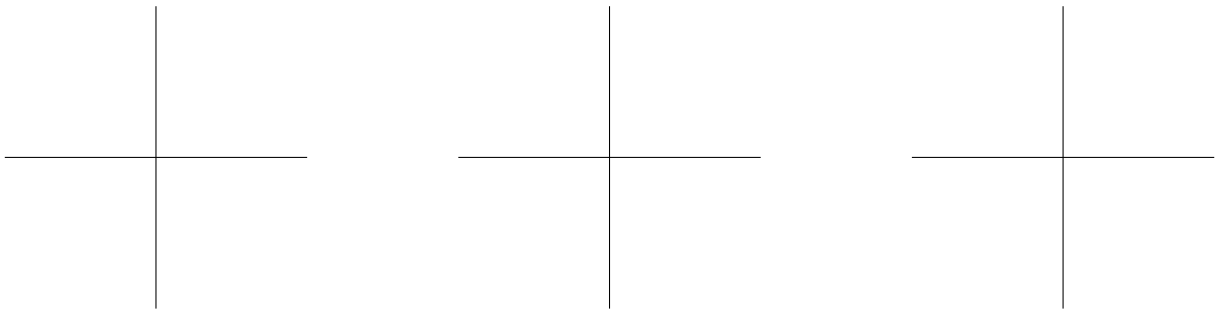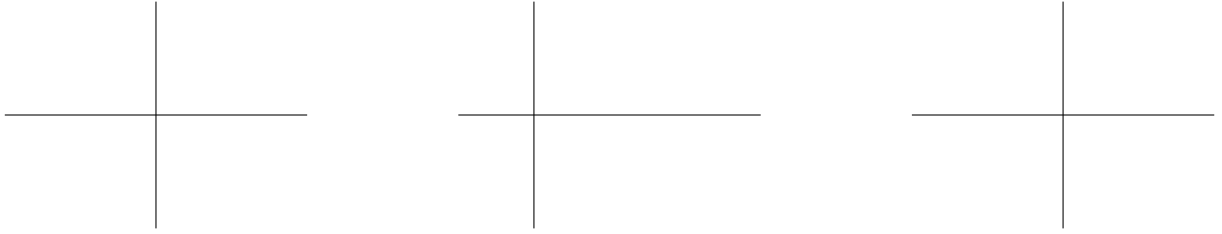
(4) (Final, 2015) Let $xy^2 + x^2y = 2$. Find $\frac{\mathrm{d}y}{\mathrm{d}x}$ at the point $(1, 1)$.

(5) (Final 2012) Find the slope of the line tangent to the curve $y + x\cos y = \cos x$ at the point $(0, 1)$.

(6) Find y'' (in terms of x, y) along the curve $x^5 + y^5 = 10$ (ignore points where $y = 0$).

2. Inverse trig functions

(7) Draw on the following axes graphs of $\sin\theta$ on $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$, $\cos\theta$ on $[0, \pi]$ and $\tan\theta$ on $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$, then of their inverse functions. What are their domains and ranges?

(8) Evaluation
  (a) (Final 2014) Evaluate $\arcsin\left(-\frac{1}{2}\right)$ and $\arcsin\left(\sin\left(\frac{31\pi}{11}\right)\right)$.

  (b) (Final 2015) Simplify $\sin(\arctan 4)$

  (c) Find $\tan(\arccos(0.4))$

(9) Differentiation

    (a) Find $\frac{d}{dx}\left(\arctan x\right)$

    (b) Find $\frac{d}{dx}\left(\arcsin\left(2x\right)\right)$

    (c) Find the line tangent to $y = \sqrt{1 + \left(\arctan(x)\right)^2}$ at the point where $x = 1$.

    (d) Find y' if $y = \arcsin\left(e^{5x}\right)$. What is the domain of the functions y, y'?