Third Hour Exam

- Write clearly your name, the name of your TA, and the discussion time on the exam booklet.
- **Show all work in exam booklet. Clearly label and box answers. If no work then no credit.** Nothing written on the exam sheet will be marked.
- Turn in the exam booklet. You can keep the exam sheet.
- If you are asked to compute the exact value, this means you are not to use a calculator. No points will be awarded for the use of calculator in those questions.

(35 pts) **1. Inverse trignometric functions.**

    (a) State the domain and the range of the function $f(x) = \arcsin x$.

    (b) Compute the exact value of
$$\arcsin\left(\sin\frac{\pi}{5}\right).$$

    (c) Compute the exact value of
$$\arcsin\left(\sin\frac{4\pi}{5}\right).$$

    (d) Compute the exact value of
$$\cos\left(\arcsin(-0.8)\right).$$

    (Hint: use the trigonometric identity $\sin^2 x + \cos^2 x = 1$).

(35 pts) **2. Trigonometric equations.**

    (a) Solve the equation
$$\sin\alpha = \frac{1}{2}, \ 0 \le \alpha < 2\pi.$$

    (b) Solve the equation
$$\cos\alpha = -\frac{\sqrt{3}}{2}, \ 0 \le \alpha < 2\pi.$$

    (c) Solve the equation
$$\frac{1}{2}\cos\beta - \frac{\sqrt{3}}{2}\sin\beta = 1, \ 0 \le \beta < 2\pi.$$
    (Hint: use the formula for the sine of the sum of two angles).

(15 pts) **3. Simplify the expression.**

    (a) Simplify the expression. Do not compute!
$$\frac{\cos 7° + \cos 83°}{\cos 83°}$$

(15 pts) **4. Solving the right triangle.** In a right triangle ABC the angle C is $90°$, the side $a = 7cm$, and the angle B is $30°$. Find b, c and A.