

NAME: _____

DATE: 10/16A17B/2017 all non-calc

ASSIGNMENT: Trigonometric John Cusack Identities

Let $f(x) = \frac{1}{2} \cos^3 2x$

- Write down the period and range of the function $f(x)$ *[3 marks]*
- Consider $f(x) = -\frac{1}{16}$, $0 \leq x \leq \pi$. Write down the value(s) of x that satisfies the equation. *[4 marks]*
- Find the values of x for which the function $f(x)$ is maximum and minimum. *[4 marks]*

[Maximum mark: 7]

Solve $\cos 2x - 3 \cos x - 3 - \cos^2 x = \sin^2 x$, for $0 \leq x \leq 2\pi$.

Trigonometric identity	$\tan \theta = \frac{\sin \theta}{\cos \theta}$
Pythagorean identity	$\cos^2 \theta + \sin^2 \theta = 1$
Double angle formulae	$\sin 2\theta = 2 \sin \theta \cos \theta$ $\cos 2\theta = \cos^2 \theta - \sin^2 \theta = 2 \cos^2 \theta - 1 = 1 - 2 \sin^2 \theta$

Given that $\cos 2x = -\frac{7}{25}$ for $0^\circ < x < 360^\circ$ and x is **obtuse** angle,

a. Show that $\sin x = \frac{4}{5}$

[3 marks]

Solve $\tan^2 2\theta = 1$, in the interval $-\frac{\pi}{2} \leq \theta \leq \frac{\pi}{2}$.

Consider the function $f(x) = \cos x + \sin x$.

(a) (i) Show that $f(-\frac{\pi}{4}) = 0$.

(ii) Find in terms of π , the smallest **positive** value of x which satisfies $f(x) = 0$.

[3 marks]