

Problem 1

What is the greatest possible value of  $f$  if

$$f(x) = \frac{8 \sin 2x}{2} - \frac{1}{2}?$$

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Problem 2

If  $\cos\left(\frac{\pi}{3}\right) = a$ , what is the value of  $\left(\frac{a}{3}\right)^2$ ?

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Problem 3

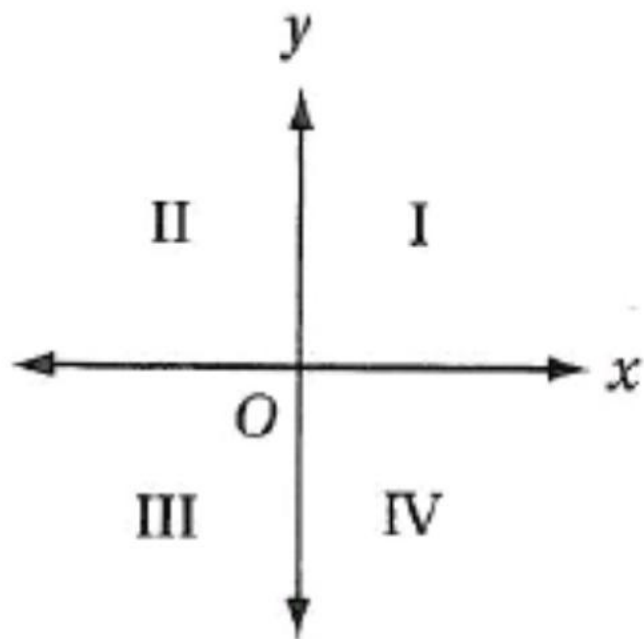
If  $(\sin x - \cos x)^2 = 0.83$ , what is the value of  $(\sin x + \cos x)^2$ ?

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Which of the following is equivalent to  $\frac{\sin\left(\frac{\pi}{6}\right)}{\cos\left(\frac{\pi}{3}\right)}$  ?

- A)  $\frac{1}{\sqrt{6}}$       B)  $\frac{1}{\sqrt{3}}$       C)  $\frac{\sqrt{3}}{\sqrt{2}}$       D) 1

Problem 5



If  $\sin \theta < 0$  and  $\sin \theta \cos \theta < 0$ , then  $\theta$  must be in which quadrant of the figure above?

- A) I      B) II      C) III      D) IV

Problem 6

If  $\sin x = \frac{a}{b}$  and  $0 < x < \frac{\pi}{2}$ , which of the following expressions is equal to  $\frac{b}{a}$ ?

- A)  $\sin\left(\frac{1}{x}\right)$
- B)  $\frac{1}{\cos\left(\frac{\pi}{2} - x\right)}$
- C)  $1 - \sin^2 x$
- D)  $\sin\left(\frac{\pi}{2} - x\right)$

If  $\sin b = a$ , which of the following could be the value of  $\cos(b + \pi)$ ?

A)  $\sqrt{a^2 - 1}$

B)  $a^2 - 1$

C)  $-\sqrt{1 - a^2}$

D)  $1 - a^2$

Problem 8

If  $0 < x < \frac{\pi}{2}$  and  $\frac{\cos x}{1 - \sin^2 x} = \frac{3}{2}$ , what is the value of

$\cos x$ ?

A)  $\frac{1}{9}$

B)  $\frac{1}{3}$

C)  $\frac{4}{9}$

D)  $\frac{2}{3}$