

# Math 112 Carter Sample Test

General Instructions: Problems on the test will be selected from problems similar to, but not identical to the following. Expect between 10 and 15 such problems.

1. For each of the following graph  $f(x)$  indicating horizontal, vertical and other asymptotic behavior. Write solutions to each of the the inequalities  $f(x) \leq 0$ ,  $f(x) < 0$ ,  $0 < f(x)$ , and  $0 \geq f(x)$

(a)

$$f(x) = \frac{x^2}{x^2 - 4}$$

(b)

$$f(x) = \frac{x}{x^2 - 4}$$

(c)

$$f(x) = \frac{1}{x^2 - 4}$$

(d)

$$f(x) = \frac{x^3}{x^2 - 4}$$

(e)

$$f(x) = \frac{1}{(x - 4)(x - 2)}$$

(f)

$$f(x) = \frac{x^3}{x^2 + 3x - 2}$$

(g)

$$f(x) = \frac{(x - 2)(x + 3)(x - 4)}{(x - 1)(3x - 4)(x + 2)}$$

2. Solve the equation or inequality

(a)

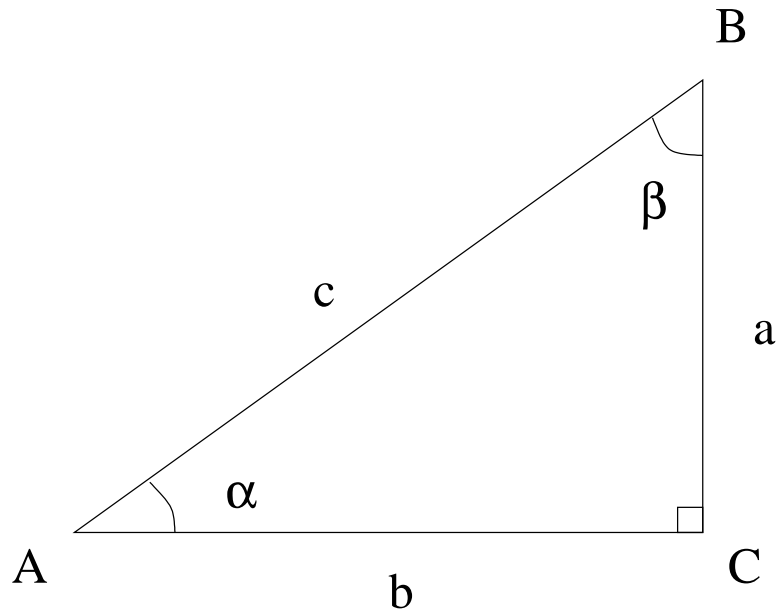
$$\frac{x}{x - 2} + \frac{2}{x} = \frac{1}{x^2 - 2x}$$

(b)

$$\frac{1}{x + 2} - \frac{2}{x - 2} \leq \frac{x}{x^2 - 4}$$

(c)

$$\frac{x}{x - 3} \leq x$$



3. Referring to the triangle depicted above give the definitions of the 6 trigonometric functions of the angle  $\alpha$ .
4. Assume the figure is not to scale to fill in the following tables.

$\alpha$	$\beta$	$a$	$b$	$c$
$20^\circ$	?	5	?	?
$\frac{\pi}{3}$	?	4	?	?
?	$\frac{\pi}{4}$	$\sqrt{2}$	?	?
?	$53^\circ$	20	?	?
?	?	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	?

angle = $\theta$	$\sin \theta$	$\cos \theta$	$\tan \theta$	$\sec \theta$	$\csc \theta$	$\cot \theta$
$\theta = \alpha = 65^\circ$	?	?	?	?	?	?
$\theta = \beta = 25^\circ$	?	?	?	?	?	?
$\theta = \alpha = \frac{\pi}{6}$	?	?	?	?	?	?
$\theta = \beta = \frac{\pi}{6}$	?	?	?	?	?	?
$\theta = \alpha = 72^\circ$	?	?	?	?	?	?
$\theta = \beta = 12^\circ$	?	?	?	?	?	?

5. For each angle in the preceding table, assume that  $b = 5$  and find the remaining sides.
6. For each angle in the preceding table, assume that  $a = 5$  and find the remaining sides.
7. For each angle in the preceding table, assume that  $c = 5$  and find the remaining sides.
8. Sketch the graphs of the following functions. MAKE SURE THAT HORIZONTAL AND VERTICAL SCALES ARE INDICATED.

(a)

$$y = 3 \sin(\pi x)$$

(b)

$$y = -2 \cos\left(3x - \frac{\pi}{2}\right)$$

(c)

$$y = \tan 4x$$

(d)

$$y = 5 \csc 2\pi x$$