

Math 30 Test #1 Spring 2002

1. Find the domain of the function defined by  $f(x) = \sqrt{9 - x^2}$  (3 Points)

2. For the given function  $f(x)$ , shown in Figure 1, what transformations would you make to get the new function  $g(x)$ , shown in Figure 2. (show each step) (4 Points)

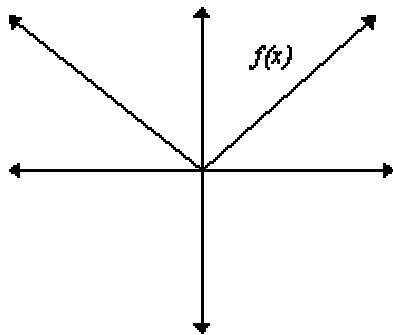


Figure 1

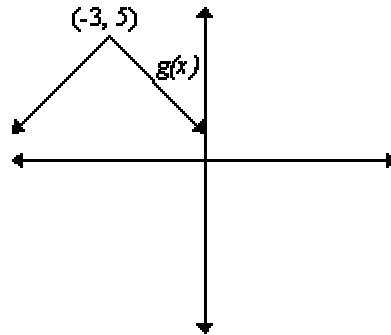


Figure 2

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3.

a) Find  $\sec \pi - \csc \frac{\pi}{2}$  do not use a calculator **(3 Points)**

b) Find the **exact** value of (without the use of a calculator) **(4 Points)**

$$4 \sin\left(\frac{8\pi}{3}\right) + 2 \cos\left(\frac{-3\pi}{4}\right)$$

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4.

a) Given that  $\cos\theta = 0.4$  find  $\cos(\theta + \pi)$  **(3 Points)**

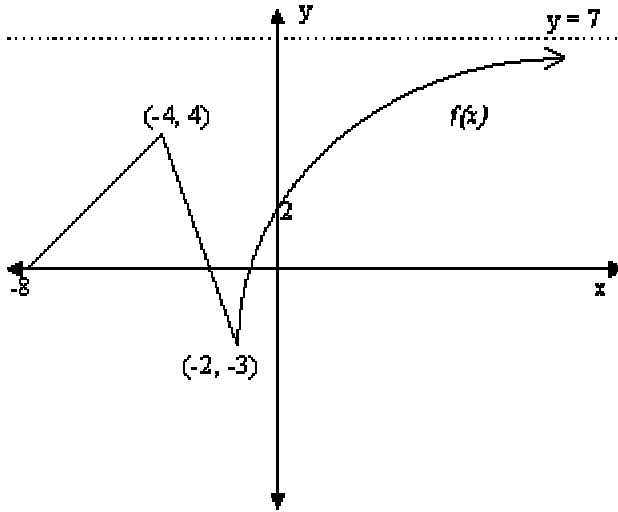
b) If  $\sin\theta = \frac{2}{5}$  and  $\cos\theta < 0$  find the exact value of the following **(5 points)**

(i)  $\tan \theta$

(ii)  $\csc(-\theta)$

5. Given the graph of the function  $y = f(x)$  below, identify the following:

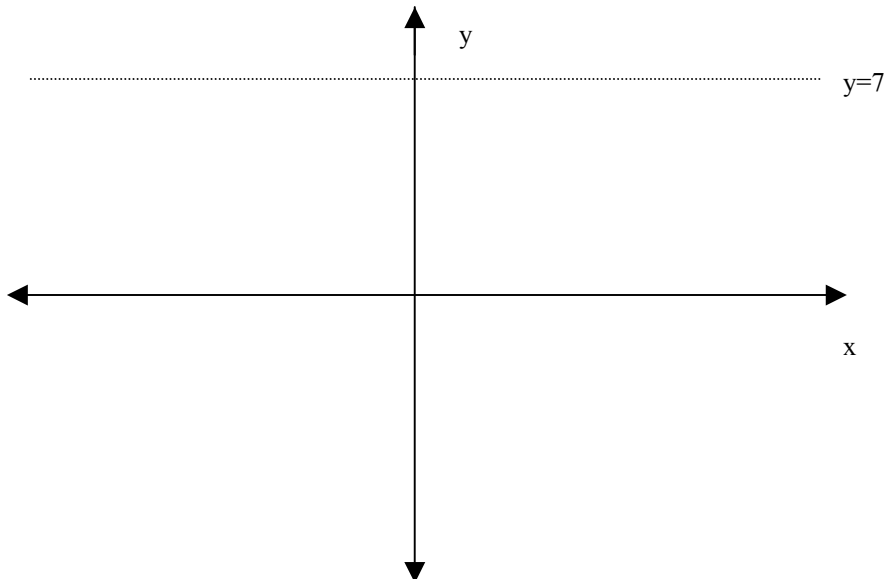
(5 points)



a) Range of  $f(x)$ :

b)  $f(-4) =$

c) Graph the following without the aid of a calculator  $f(|x|)$



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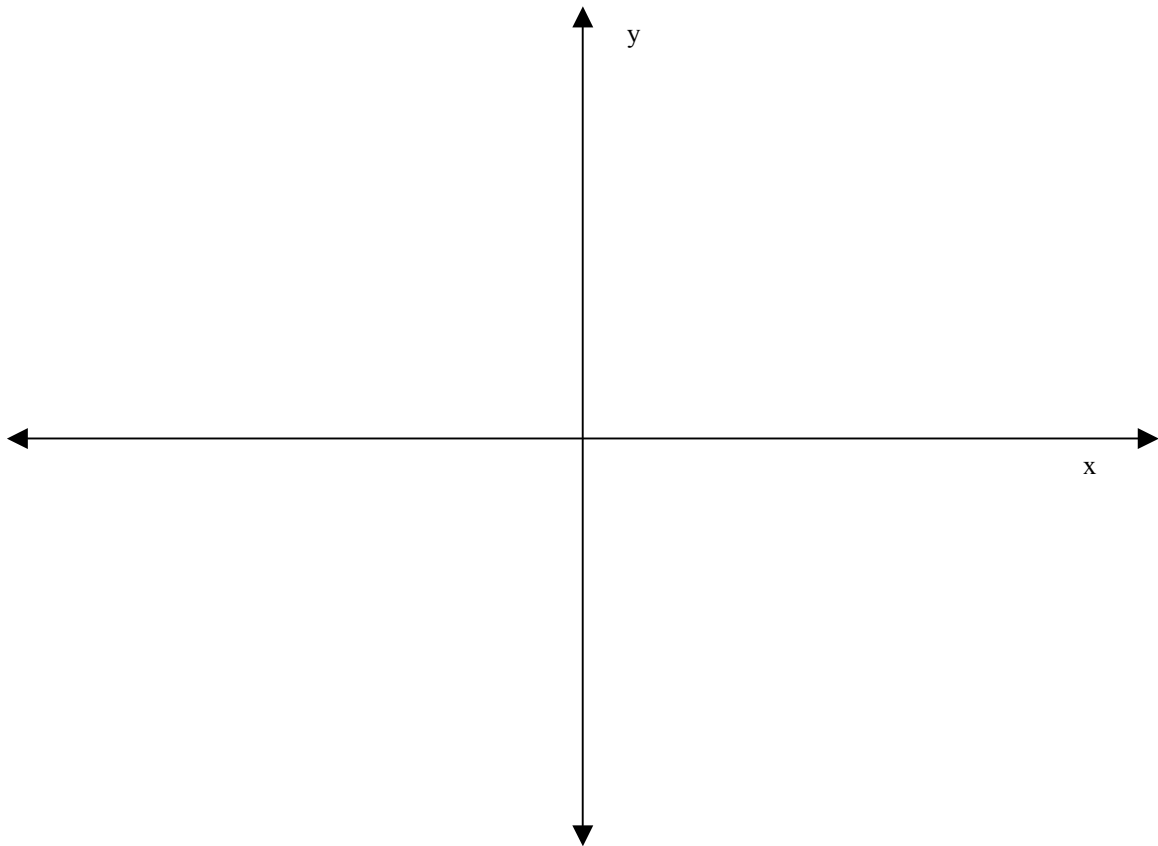
6. Given that  $f(x)$  is defined as follows

**(6 points)**

$$f(x) = \begin{cases} -2x - 3 & \text{for } x \leq -1 \\ 3 & \text{for } -1 < x < 4 \\ \sqrt{x} & \text{for } x \geq 4 \end{cases}$$

a) Find  $(f \circ f)(-5)$

b) graph  $f(x)$ . Label your graph (i.e. show x, y intercepts, etc.).



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7. Solve the following inequalities [answer in interval notation]:

(a)

$$\frac{x-5}{x(x+3)^2} \leq 0$$

**(5 points)**

(b)

$$|4-x| \geq 7$$

**(4 Points)**

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8. The volume  $V$  of a sphere of radius  $r$  is  $V = \frac{4}{3}\pi r^3$ ; the surface area  $S$  of this sphere is

$S = 4\pi r^2$ . Express the volume  $V$  as a function of the surface area  $S$ . **Simplify your answer (4 Points)**

9. If the Clock on Bell Tower on UNC campus has the minute hand of length 14 feet, find out how far does the tip of the hand move in 20 minutes? **(4 Points)**