

MATH-9 TEST 3 (Unit 3 - Functions and Graphs)

SAMPLE

100 points

NAME: _____

Show all work on the test. On graphs, you are expected to use your knowledge of shifting etc. as opposed to simply plotting points. Be sure to clearly show scale. No graphing calculators.

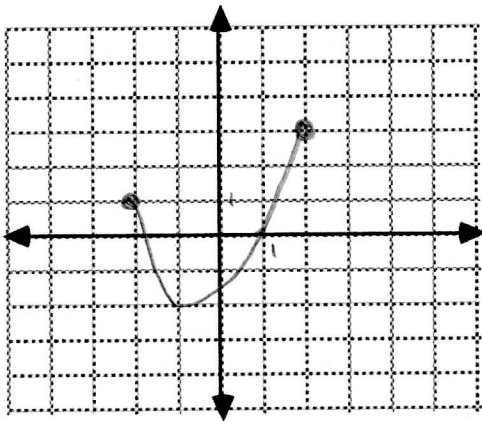
Fill in the blanks. (2 points each)

- (1) To obtain the graph of $f(x) = \sqrt{x-2} + 3$ we can shift the graph of $g(x) = \sqrt{x}$ (how many units, which way?) _____
- (2) The domain of $f(x) = \cot x$ is _____
- (3) Is $x^2 + y^2 = 4$ an example of a function? _____
- (4) Is $f(x) = x^3 \sin x$ even, odd, or neither? _____
- (5) The range of $f(x) = 3 \sin(x)$ is _____

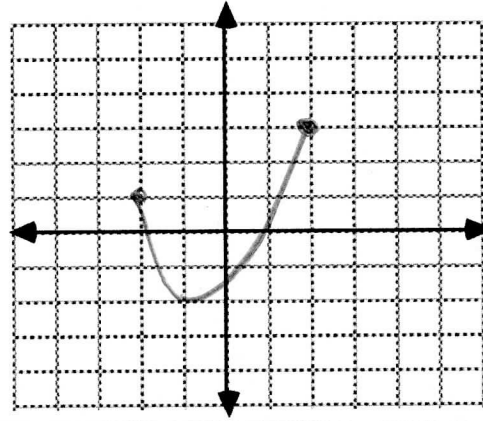
- (6) Given the graph of $y = f(x)$ as shown on both graphs below, (10 points)

(a) Find: Domain _____ Range _____

(b) Graph (a) $y = f(x+2)$



(b) $y = |f(x)|$



- (7) An isosceles triangle has a perimeter of 8 cm. Express the area of the triangle as a function of the length b of the base of the triangle. Simplify

(6 points)

- (8) Given $f(x) = 3x^2 - 2$ find and simplify:

(7 points)

$$\frac{f(x+h) - f(x)}{h}$$

(9) Find the domain for each of the following functions

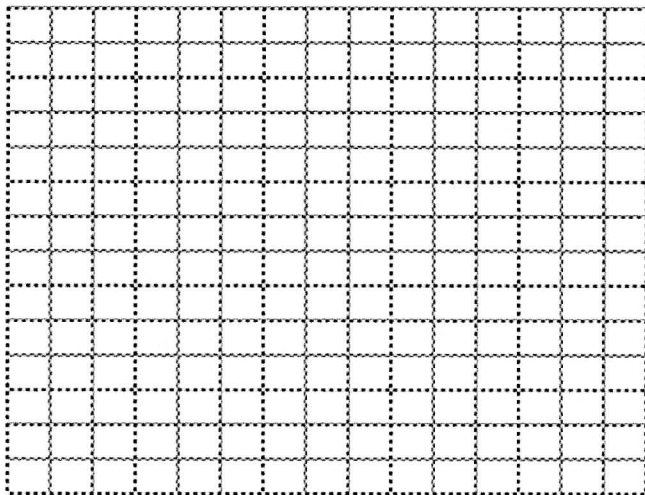
(4 points each)

(a) $f(x) = \frac{\sqrt{2-x}}{x^2 - x - 12}$

(b) $g(x) = \frac{x}{\cos 4x - 1}$

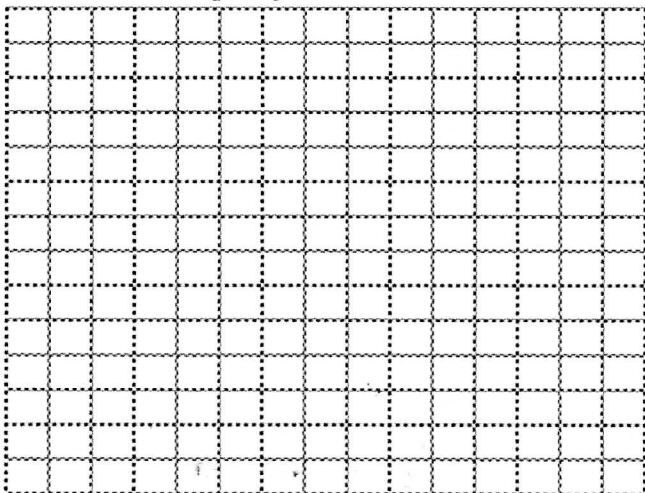
(10) Graph $f(x) = 2 \cos(3\pi x)$. Label coordinates of highs and lows.

(8 points)

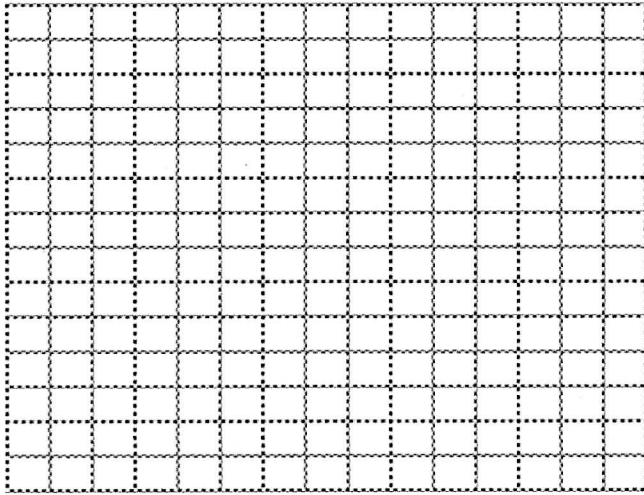


(11) Graph $f(x) = \sin\left(\frac{1}{2}x + \frac{\pi}{6}\right)$. Label coordinates of highs and lows.

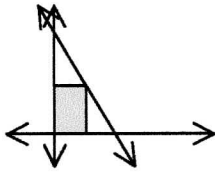
(10 points)



(12) Graph $f(x) = \begin{cases} 2x+3 & \text{if } x \leq -2 \\ |x|+1 & \text{if } -2 < x \leq 1 \\ \sqrt{x-1} & \text{if } x > 1 \end{cases}$ (10 points)

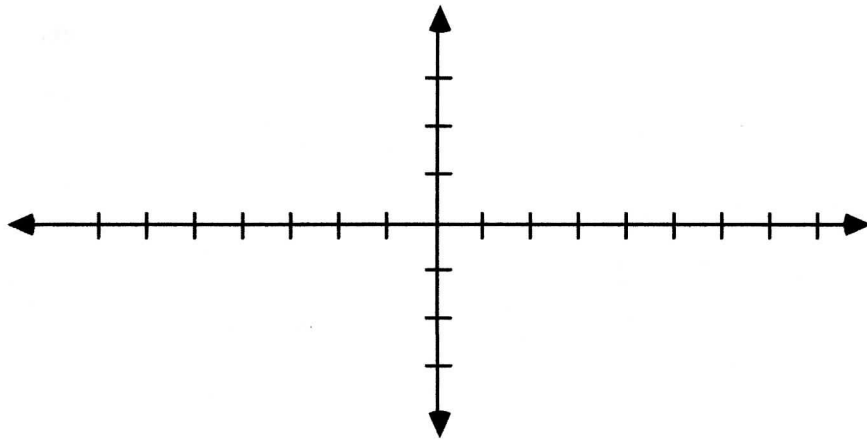


- (13) The point P lies in the first quadrant on the graph of the line $y = 8 - 2x$. From the point P, perpendiculars are drawn to both the x-axis and the y-axis. What is the largest possible area for the rectangle thus formed? (10 points)



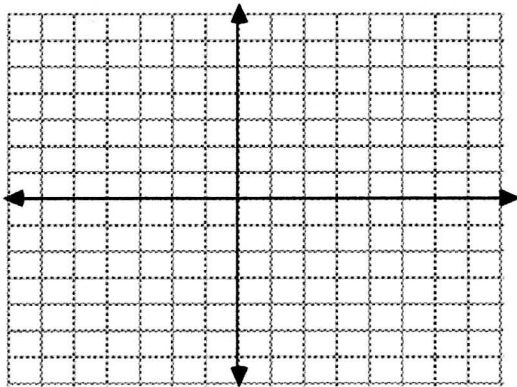
(14) Graph $f(x) = \tan(3x)$. Two periods. Show asymptotes.

(8 points)



(15) Given the function $f(x) = 3x^2 - 6x + 1$
put $f(x)$ in the form $f(x) = a(x-h)^2 + k$ and sketch the graph. On the graph label the vertex plus one other point.

(8 points)



(16) Find an equation corresponding to the graph below:

(5 points)

