

Math 105
Summer 2012
Dr. Lily Yen

Quiz 2

Show all your work

Name: _____
Score: ____/32

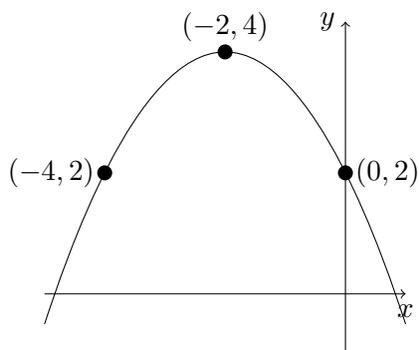
No Calculator allowed in this part.

Problem 1: Solve the inequality and write the answer using interval notation.

$$x^2 + 3 > 2x$$

Score: /3

Problem 2: Given the graph, write a functional expression for the parabola.



Score: /3

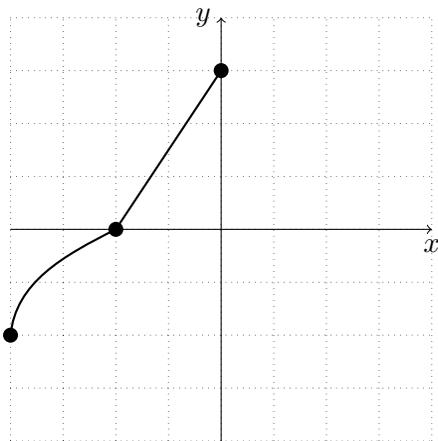
Problem 3: Given $f(x) = \sqrt{25 - x^2}$ and $g(x) = \sqrt{9 + x^2}$. Find $g \circ f$ and the domain of this new function.

Score: /3

Problem 4: Given $h(x) = 3\sqrt{4 - \frac{5}{x}}$, express h as a composition of THREE simple functions.

Score: /3

Problem 5: Given the graph of f below, is f one-to-one? Provide reason for your answer. Draw the graph of f^{-1} on the same grid.



Score: /3

Problem 6: Given that $f(x) = \frac{x+1}{5-x}$, find $f^{-1}(x)$ and state the domain of f^{-1} .

Score: /4

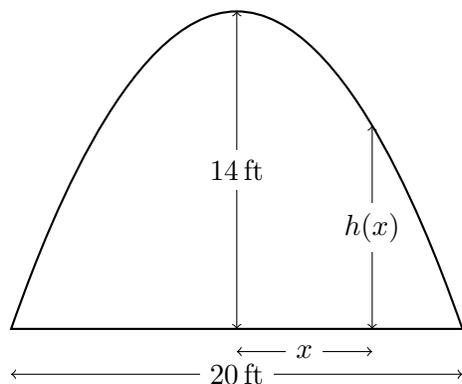
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Calculator allowed in this part.

Problem 7: The arch of a bridge is in the shape of a parabola 14 feet high at the centre and 20 feet wide at the base. Express the height of the arch, $h(x)$, in terms of the distance, x , from the centre. State the domain of h .



Score: /4

Problem 8: A weather balloon is rising vertically. An observer is standing on the ground 100 metres from the point where the weather balloon was released.

- a. Express the distance, d , between the balloon and the observer as a function of the balloon's distance, h , above the ground. Provide a diagram as part of your solution.

- b. If the balloon's distance (in metres) above the ground after t seconds is given by $h = 5t$, express the distance, d , between the balloon and the observer as a function of t .

Score: /4

Problem 9: Old MacDonald has 100 metres of fencing material to be used in the construction of two identical rectangular pens sharing a common side.

a. Express the total area $A(x)$ enclosed by both pens as a function of the length x of the common side.

b. From physical considerations, what is the domain of the function A ?

c. Find the dimensions of the pens that will make the total enclosed area maximum.

Score: /5