

HATT Ch 3 Practice

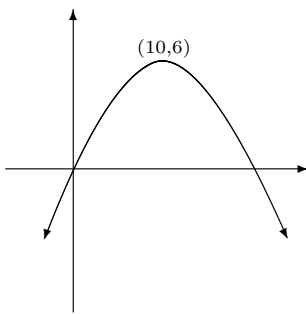
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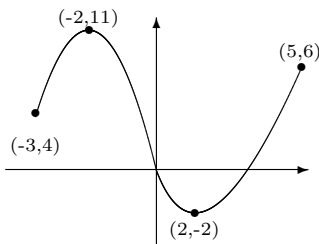
Seat:

1. (6 points) Consider the graph below

- (a) Is this a graph of a function?
- (b) On what interval is it increasing?
- (c) Where is the maximum?
- (d) What is the range?
- (e) Find an equation which has this graph.



2. (3 points) Consider the relation whose graph is



- (a) What is the domain?
- (b) What is the range?
- (c) On what interval(s) is it decreasing?

3. (2 points) Use interval notation to describe the

domain of $f(x) = \frac{\sqrt{1-x}}{x^2-1}$?

4. (3 points) Consider the relation

$$\{(3, 5), (-2, 3), (5, 4)\}$$

- (a) Is this a function?
- (b) What is the preimage of 3?
- (c) What is the image of 3?

5. Is $h(x) = \frac{2x}{x^2-1}$ even, odd or neither?

6. (4 points) Consider f/g , where $f(x) = x^2$ and $g(x) = |x-1|$

(a) (2 points) $(f/g)(x) =$

(b) What is the domain of f/g ?

(c) What is the range of f/g ?

7. (4 points) Consider $g+f$ where $f(x) = x^2$ and $g(x) = |x-1|$, what is $g+f$?

(a) (2 points) $(g+f)(x) =$

(b) What is the domain of $g+f$?

(c) What is the range of $g+f$?

8. (3 points) Recall the “slope” or “average rate of change” or “difference quotient” of a function can be computed in various ways:

$$\frac{\Delta y}{\Delta x} = \frac{f(x+h) - f(x)}{h} = \frac{f(b) - f(a)}{b - a}$$

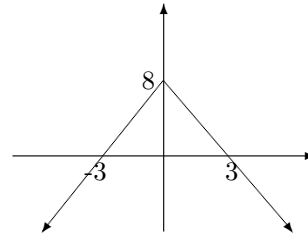
Let $f(x) = 2x^2 - x$

(a) What is the average rate of change of f from 0 to 1?

(b) What is the average rate of change of f from 1 to x ?

(c) What is the average rate of change of f from x to $x + h$?

9. (4 points) Consider

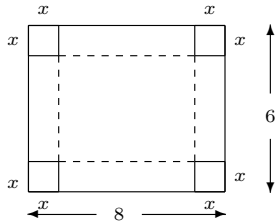


(a) What is the domain?

(b) What is the range?

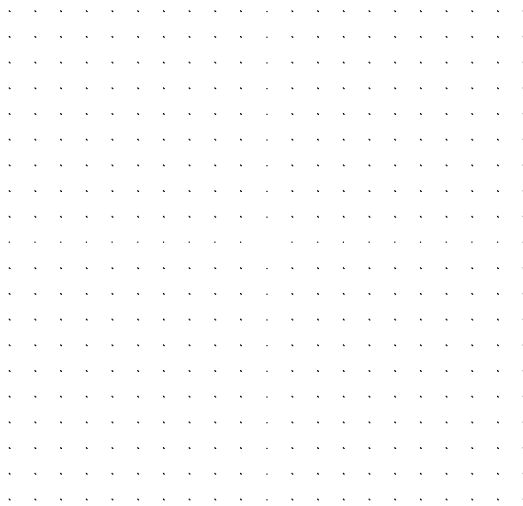
(c) Find an equation that has a graph like this.

10. (4 points) An open box with a rectangular base is to be made with a piece of cardboard 6 in. by 8 in. by cutting out a square from each corner and turning up the sides (see figure). How large should x be to have the most volume?



- (a) Make a function $V(x)$ that expresses the volume of the box as a function of x .
- (b) Because of the size of the cardboard, this function needs to have a limited domain. What should be the domain of V ?

- (c) Sketch a graph of V over this domain (you may use your calculator to help, if you wish)



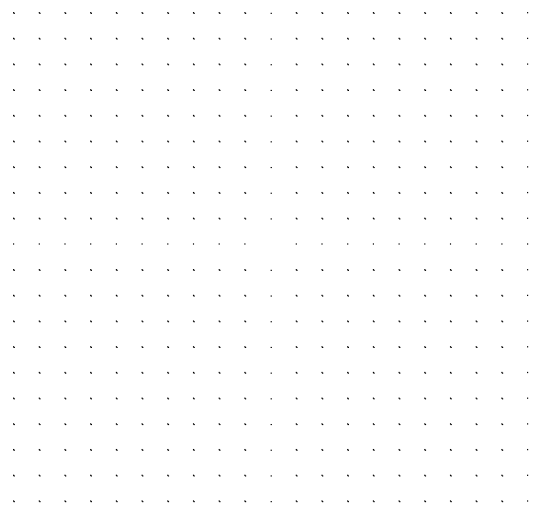
- (d) What length x should be chosen to maximize volume V ?

11. (4 points) A camera company has found that the revenue from sales R (measured in dollars), is a function of the unit price p it charges:

$$R(p) = -2p^2 + 850p$$

- (a) If we wish to make more than \$0 in revenue, what is the domain?

- (b) Sketch a graph of R over this domain (you may use your calculator to help, if you wish)



- (c) What unit price p should be charged to maximize revenue?

12. (6 points) Consider $g(x) = 3 - 2|x + 1|$

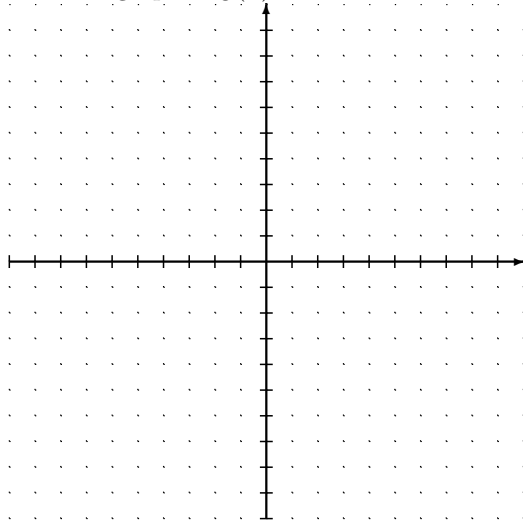
(a) What family of functions does g belong to?

(b) How much is the horizontal shift (left or right)?

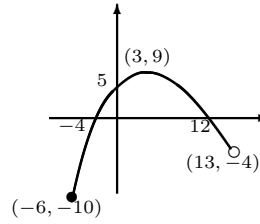
(c) How much is the vertical shift (up or down)?

(d) Is there any horizontal or vertical reflection?

(e) Sketch a graph of $g(x)$



13. (5 points) Consider the graph of $g(x)$ below:



(a) Describe the domain of g in interval notation

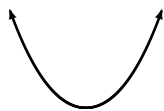
(b) Describe the range of g in interval notation

(c) Describe the maximum of g

(d) Describe the minimum of g

(e) Describe all zeros of g

14. (9 points) Name the function family of each graph. 15. (3 points) Sketch a graph of $f(x) = (x - 3)^2 + 4$



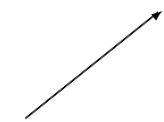
(a)



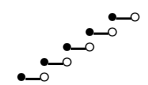
(b)



(c)



(d)



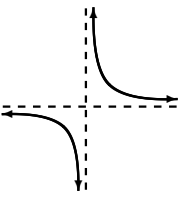
(e)



(f)



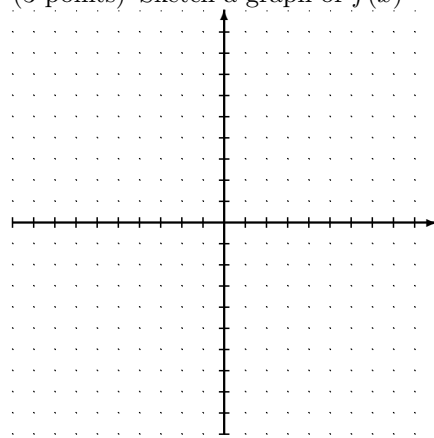
(g)



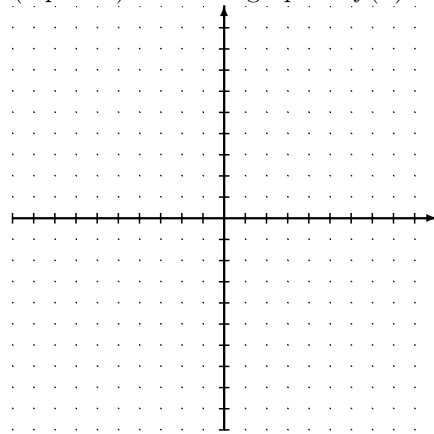
(h)



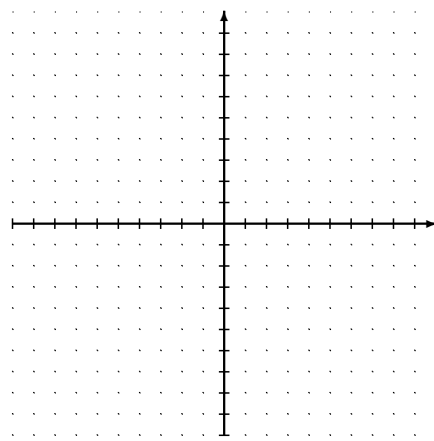
(i)



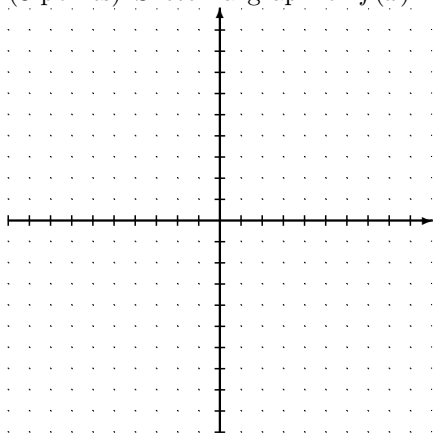
16. (3 points) Sketch a graph of $f(x) = 2|x - 1| - 3$



17. (3 points) Sketch a graph of $f(x) = \frac{1}{x + 3} - 2$



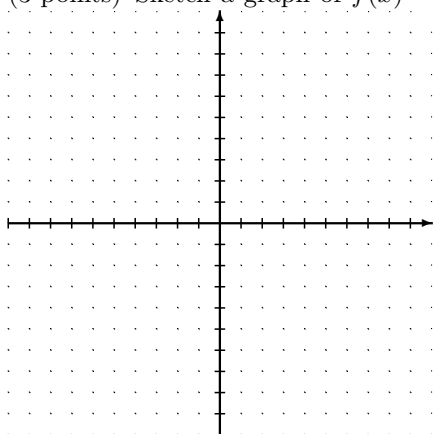
18. (3 points) Sketch a graph of $f(x) = -2\sqrt{x+1}$ 20. (4 points) First class mail rates for letters in 2010:



Weight not over	Price
1	.44
2	.61
3	.78
3.5	.95

- (a) Define a piece-wise function $P(w)$ that describes price as a function of weight w .

19. (3 points) Sketch a graph of $f(x) = \lceil x - 2 \rceil + 3$



- (b) Graph your function

