Name____________________________________

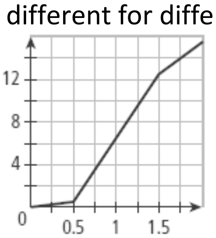
Honors Algebra 2 Ch 9 Notes Packet

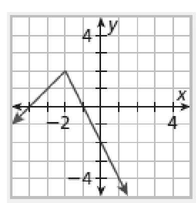
Section 9.1: Multiple Representations of Functions

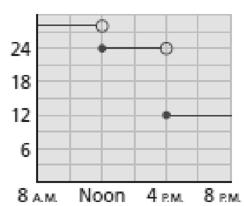
Read Section 9.1 carefully, including working through all examples FOR UNDERSTANDING before completing WS 9.1-2. There will likely be questions from Section 9.1 on the test for Ch 9. Write notes taken from Sec 9.1 from the book below (or attach a separate page)

Section 9.2: Piecewise Functions

A **PIECEWISE FUNCTION** is a function that is a combination of one or more functions where the function rule is different for different parts (or pieces) of the domain



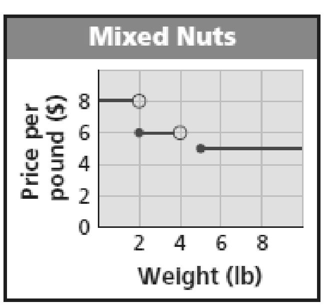




A **STEP FUNCTION** is a type of piecewise function that is constant for each domain interval. See Ex1 A&B

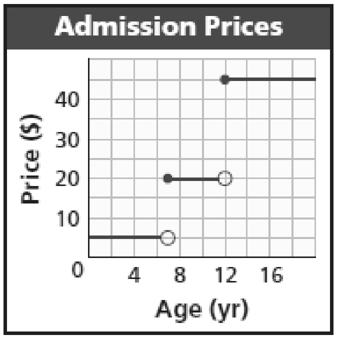
Ex1:

A.



Create a table for the data. Describe the different domain intervals for the situation. Verbally describe the situation and then create a function rule for the situation.

B.



Create a table for the data. Verbally describe the situation and then create a function rule for the situation.

❈ To find values for piecewise functions, you must determine which domain interval the given x value lies in, then plug it in to THAT part of the function rule.

Ex2: Evaluate each piecewise for $x = -2$ and $x = 4$

A.

$$f(x) = \begin{cases} 2 & \text{if } x \le -1 \\ 5x & \text{if } x > -1 \end{cases}$$

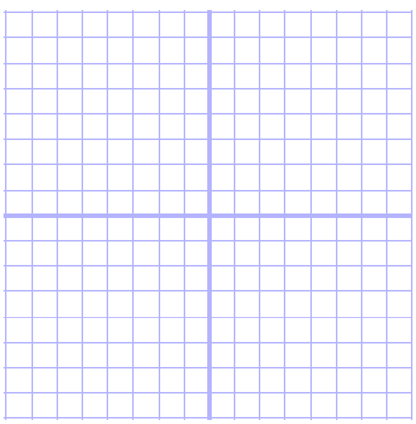
B.

$$g(x) = \begin{cases} 2x+1 & \text{if } x \le 2 \\ x^2 + 4 & \text{if } x > 2 \end{cases}$$

❈ Graphing Piecewise Functions: make tables or use Mateo's suggestion on p. 664 in your book.

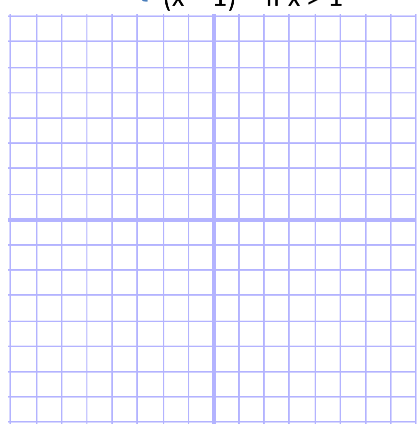
A.

$$f(x) = \begin{cases} \frac{1}{4}x + 3 & \text{if } x \le -1 \\ -2x + 3 & \text{if } x > -1 \end{cases}$$

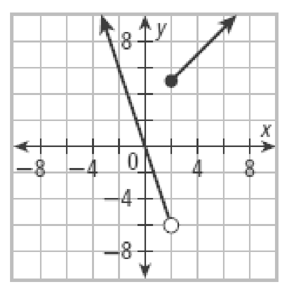


B.

$$f(x) = \begin{cases} 2x + 10 & \text{if } x \le -1 \\ -x + 1 & \text{if } x > -1 \\ (x-1)^2 & \text{if } x > 1 \end{cases}$$

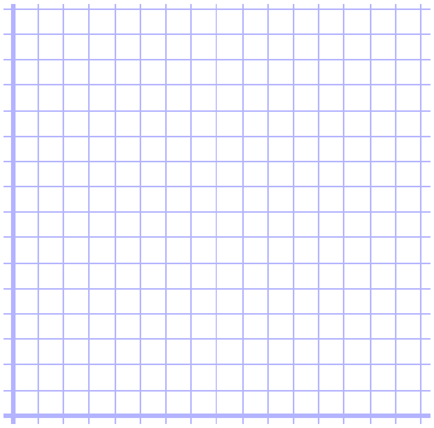


❈ Write the piecewise function for the given graph



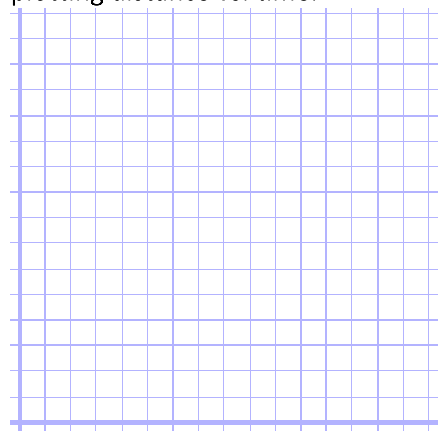
Applications:

A. The cost of renting cross country skis is $20 for the first 4 hours and $3 per hour for additional hours beyond the initial 4 hours. Sketch a graph of the cost of renting skis from 0 to 8 hours.



Write a piecewise function representing the situation.

B. Garrett is competing in a 40 mile triathlon. He bikes 24 miles in 2 hours, then swims 1 mile in 1 hour and finally runs 15 miles in 3 hours. Sketch a graph of his race plotting distance vs. time.



Write a piecewise function representing the situation.

Section 9.3: Transforming Functions

Read Section 9.3 carefully, including working through all examples FOR UNDERSTANDING before completing the HW for Sec 9.3. There will likely be questions from Section 9.3 on the test for Ch 9. Write notes taken from Sec 9.3 from the book below (or attach a separate page)

Section 9.4: Operations with Functions

We have worked with functions quite a bit and you have seen that you can **ADD, SUBTRACT, MULTIPLY and DIVIDE functions**. Sometimes a shorthand notation may be used that looks like this:

Ex1: Simplify when $f(x) = x^2 + 3x - 18$, $g(x) = 2x - 6$.

A. B. C.

COMPOSITION of FUNCTIONS

Ex2: Evaluate the composition at the given value for x when $f(x) = 2x - 3$ and $g(x) = x^2$

A. B.

Ex3: Write the composition of functions and state the domain when f(x) = $x^2 - 1$ and g(x) = $\frac{x}{1-x}$

A.

B.

Section 9.5: Functions and their Inverses

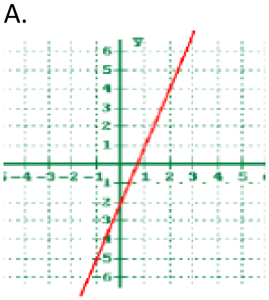
- How do you find the inverse of a function? [think equations, graphs AND tables]

- How can you quickly determine if a graph is a function?

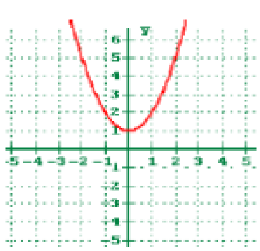
- How could you quickly determine if the graph's INVERSE is a function without actually graphing the inverse?

Ex 1: Determine if the inverse of the relation graphed is a function.

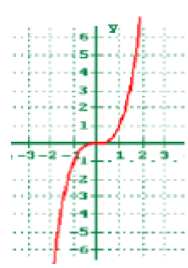
A.



B.



C.



Ex 2: Find the inverse of the given function. Then, determine whether the inverse is a function and state the domain and range.

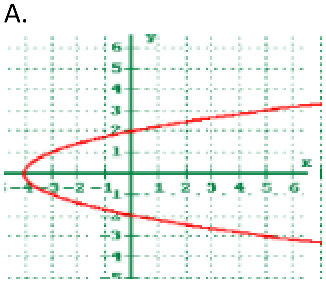
A. $\boldsymbol{f(x) = x^3 - 2}$

B. $\boldsymbol{f(x) = \left(\frac{x}{3} + 6\right)^2}$

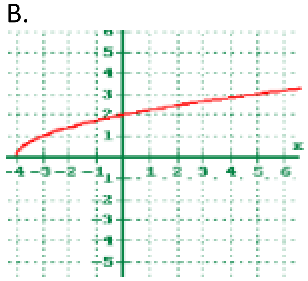
When a relation and its inverse are both determined to be functions then the two functions are **ONE-TO-ONE FUNCTIONS**.

Ex 3: Determine if the relation graphed is a one-to-one function.

A.



B.



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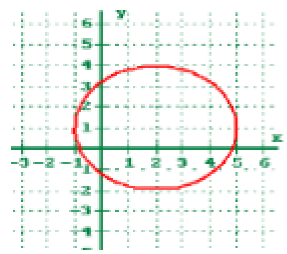
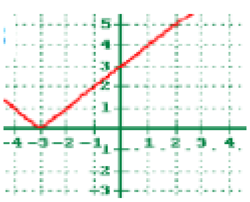
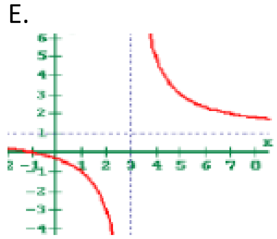


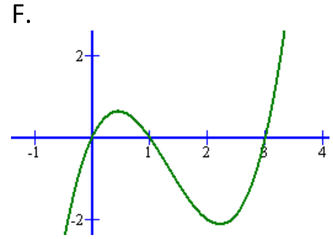
D.



E.



F.



We can also use composition of functions to determine if they are inverses:

Ex 4: Use composition to determine if the functions are inverses. State any domain restrictions.

A. $\boldsymbol{f(x) = 3x - 1}$ & $\boldsymbol{g(x) = \frac{1}{3}x + 1}$

B. $\boldsymbol{f(x) = \frac{1}{x-1}}$ & $\boldsymbol{g(x) = \frac{1}{x} + 1}$

C. $\boldsymbol{f(x) = \frac{1}{9}x^2}$ & $\boldsymbol{g(x) = 3\sqrt{x}}$

D. $\boldsymbol{f(x) = x^2 + 5}$ & $\boldsymbol{g(x) = \sqrt{x} - 5}$