

## Homework Answers

Section 1.2 exercise (page 19) (12 problems):

- 1
- 2
- 3
- 4

6 Domain =  
Range =

8 Domain =  
Range =

14 Domain =  
Range =

16 Domain =  
Range =

Notes

## Topics Today

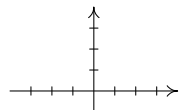
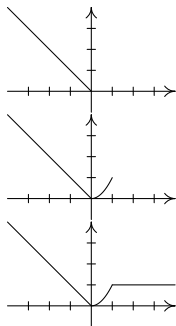
- Piecewise functions
- Composite functions

Notes

## Graphing Piecewise Functions

Example

$$y = f(x) = \begin{cases} -x, & x < 0 \\ x^2, & 0 \leq x \leq 1 \\ 1, & x > 1 \end{cases}$$



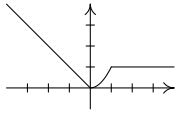
Now try graphing the following:

$$y = f(x) = \begin{cases} 4 - x^2, & x < 1 \\ \frac{3x}{2} + \frac{3}{2}, & 1 \leq x \leq 3 \\ x + 3, & x > 3 \end{cases}$$

Notes

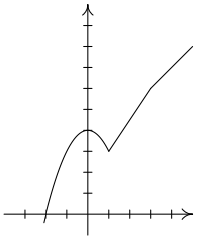
Notes

$$y = f(x) = \begin{cases} 4 - x^2, & x < 1 \\ \frac{3x}{2} + \frac{3}{2}, & 1 \leq x \leq 3 \\ x + 3, & x > 3 \end{cases}$$



## Writing Formulas for Piecewise Functions

Notes



$$y = \begin{cases} x, & 0 \leq x < 1 \\ x - 1, & 1 \leq x < 2 \end{cases}$$

## Composite Functions

Notes

Sometimes the output for one function (say  $g$ ) is used as the input for another function (say  $f$ )

$$x \rightarrow \boxed{g} \xrightarrow{g(x)} \boxed{f} \xrightarrow{f(g(x))}$$

We will write this as  $\boxed{f(g(x))}$  or  $\boxed{f \circ g}$  or  $\boxed{(f \circ g)(x)}$ .

### Example

Let  $f(x) = x - 7$  and  $g(x) = x^2$ .

- $g(2) = 4$
- $f(4) = -3$
- $f(g(2)) = f(4) = -3$
- $f(g(x)) = f(x^2) = x^2 - 7$
- $g(f(x)) = g(x - 7) = (x - 7)^2$

## Practice Problem

Let  $f(x) = x + 5$  Let  $g(x) = x^2 - 3$

- $f(g(x)) = f(x^2 - 3) = x^2 + 2$
- $g(f(x)) = g(x + 5) = (x + 5)^2 - 3 = x^2 + 10x + 22$
- $f(g(0)) = f(-3) = 2$
- $g(f(0)) = g(5) = 22$
- $g(g(-2)) = g(1) = -2$
- $f(f(x)) = f(x + 5) = x + 10$

Notes

## Homework

Section 1.2 (page 19):

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