

Part 1

Review Homework 8.0

ARoC6.tex

Exercise 1 Let $f(x) = \frac{1}{x^2}$.

(a) Compute $\text{AROC}_{[2,4]}$.

$$\text{AROC}_{[2,4]} = \boxed{-\frac{3}{32}}.$$

(b) Compute $\text{AROC}_{[100,101]}$.

$$\text{AROC}_{[100,101]} = \boxed{-\frac{201}{102010000}}.$$

ARoC7.tex

Exercise 2 Let $f(x) = x^4$.

(a) Compute $\text{AROC}_{[1,3]}$.

$$\text{AROC}_{[1,3]} = \boxed{40}.$$

BNF1.tex

Exercise 3 Let f be a function defined by $f(x) = 2x^2$ and g be a function defined by $g(x) = 5 - 3x$. Use the pair of functions f and g to find the following values, if they exist. If the value does not exist, enter DNE.

(a) $(f + g)(2) = \boxed{7}$

(b) $(f - g)(-1) = \boxed{-6}$

(c) $(g - f)(1) = \boxed{0}$

(d) $(f \cdot g)\left(\frac{1}{2}\right) = \boxed{\frac{7}{4}}$

(e) $\left(\frac{f}{g}\right)(0) = \boxed{0}$

(f) $\left(\frac{g}{f}\right)(-2) = \boxed{\frac{11}{8}}$

CoF8.tex

Use the given pair of functions to find and simplify expressions for the following functions and state the domain of each using interval notation.

Exercise 4 For $f(x) = 3x^2 - 2x + 7$ and $g(x) = -x + 3$

- $(g \circ f)(x) = \boxed{-3x^2 + 2x - 4}$ with domain $\left(\boxed{-\infty}, \boxed{\infty}\right)$
- $(f \circ g)(x) = \boxed{3x^2 - 16x + 28}$ with domain $\left(\boxed{-\infty}, \boxed{\infty}\right)$
- $(f \circ f)(x) = \boxed{27x^4 - 36x^3 + 132x^2 - 80x + 140}$ with domain $\left(\boxed{-\infty}, \boxed{\infty}\right)$

Exercise 5 For $f(x) = x^2 - 9$ and $g(x) = |x|$

- $(g \circ f)(x) = \boxed{|x^2 - 9|}$ with domain $\left(\boxed{-\infty}, \boxed{\infty}\right)$
- $(f \circ g)(x) = \boxed{x^2 - 9}$ with domain $\left(\boxed{-\infty}, \boxed{\infty}\right)$
- $(f \circ f)(x) = \boxed{x^4 - 18x^2 + 72}$ with domain $\left(\boxed{-\infty}, \boxed{\infty}\right)$

Exercise 6 For $f(x) = 4x + 3$ and $g(x) = -\sqrt{x}$

- $(g \circ f)(x) = \boxed{-\sqrt{4x + 3}}$ with domain $\left[\boxed{-\frac{3}{4}}, \boxed{\infty}\right)$
- $(f \circ g)(x) = \boxed{-4\sqrt{x} + 3}$ with domain $\left[\boxed{0}, \boxed{\infty}\right)$
- $(f \circ f)(x) = \boxed{16x + 15}$ with domain $\left(\boxed{-\infty}, \boxed{\infty}\right)$

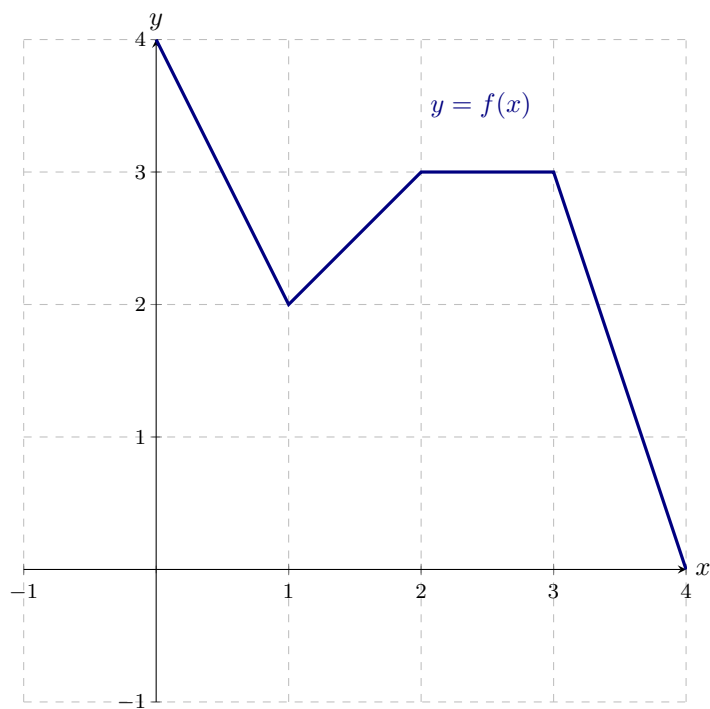
Exercise 7 For $f(x) = |x|$ and $g(x) = \sqrt{9 - x}$

- $(g \circ f)(x) = \boxed{\sqrt{9 - |x|}}$ with domain $\left[\boxed{-9}, \boxed{9}\right]$

- $(f \circ g)(x) = \boxed{|\sqrt{9-x}|}$ with domain $\left(\boxed{-\infty}, \boxed{9}\right]$
- $(f \circ f)(x) = \boxed{|x|}$ with domain $\left(\boxed{-\infty}, \boxed{\infty}\right)$

D3.tex

Exercise 8 Use the graph of $y = f(x)$ and the table for $g(x)$ below to find the requested function values.



x	$g(x)$
0	0
1	3
2	3
3	0
4	4

$$(f + g)(2) = \boxed{6}$$

$$(g - f)(1) = \boxed{1}$$

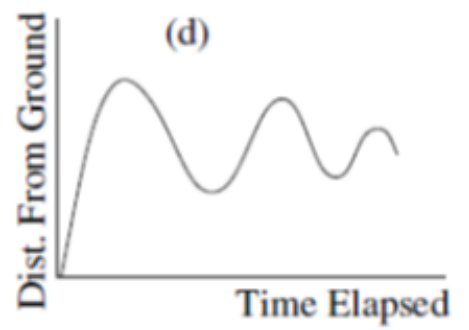
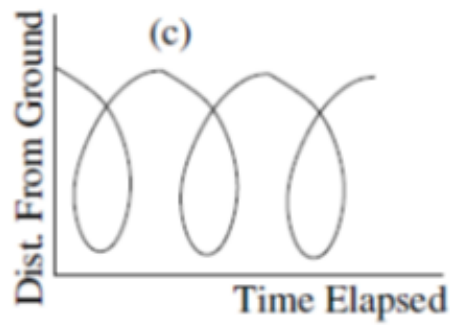
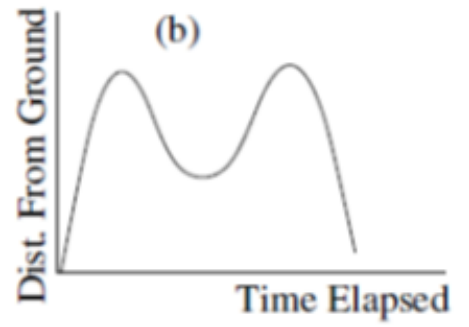
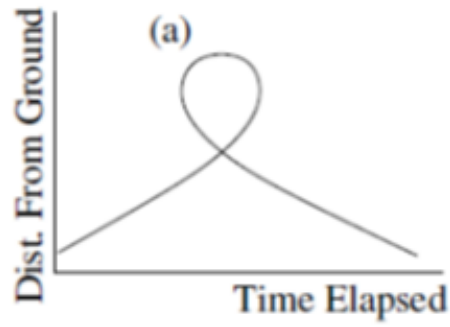
$$\left(\frac{f}{g}\right)(2) = \boxed{1}$$

$$\left(\frac{g}{f}\right)(3) = \boxed{0}$$

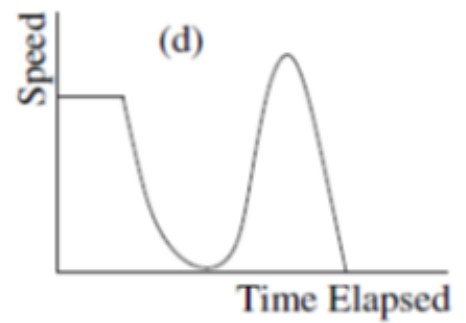
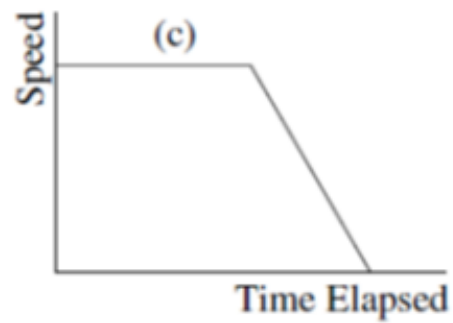
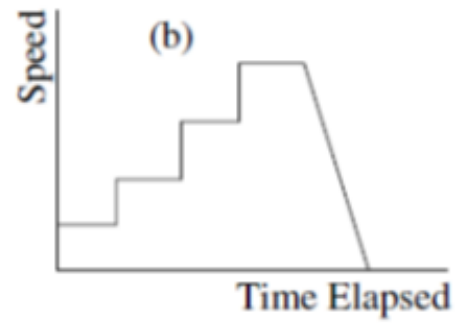
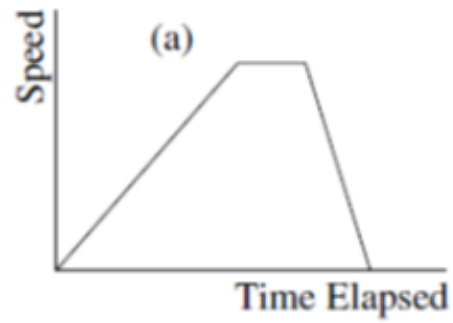
CiT2.tex

Exercise 9 For each of the situations below, pick the graph that most reasonably reflects the situation and the variables involved.

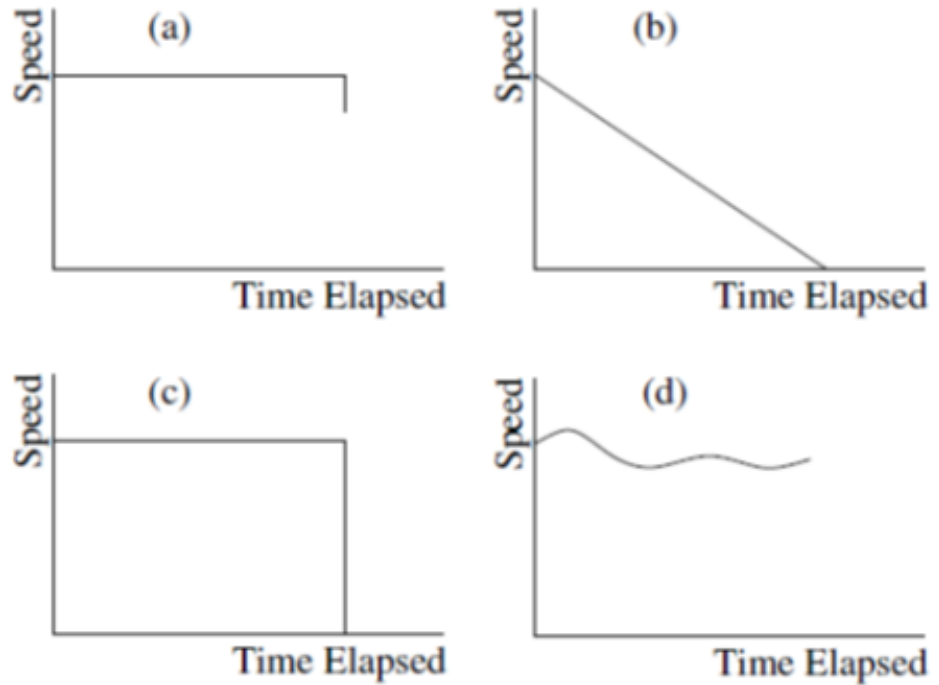
- (a) A girl takes a ride on a Ferris wheel. \boxed{B}



(b) A child climbs up to the top of a slide and then slides down it: D



(c) A bus drives into the bus station and drops off its passengers: B



EF6.tex

A population has 5000 people at time $t = 0$, where t is measured in years.

Exercise 10 If the population increases by 200 people by year, the population $P(t)$ after t years equals $P(t) = \boxed{5000 + 200t}$.

Exercise 11 If the population increases by 7% by year, the population $P(t)$ after t years equals $P(t) = \boxed{5000(1.07)^t}$.

EM13.tex

Exercise 12 Let's say the cost of renting a scooter is as follows: \$1 to unlock the scooter, and then \$0.20 for each minute you have travelled. Fill the following table with prices in terms of time:

<i>minutes</i>	<i>Price</i>
0	\$1
5	\$ <input type="text" value="2"/>
10	\$ <input type="text" value="3"/>
15	\$ <input type="text" value="4"/>
20	\$ <input type="text" value="5"/>

Exercise 12.1 What does seem more adequate to model this situation?

Multiple Choice:

- (a) A linear function ✓
- (b) An exponential function

Exercise 12.1.1 Find a linear formula for the fare f paid in terms of the amount m of miles travelled. Answer: $f(m) = \text{}m + \text{}$.

FP1.tex

Let f be a function defined as follows.

$$f(x) = \begin{cases} -x, & x < 0 \\ x^2, & x \geq 0 \end{cases}$$

Exercise 13 (a) Compute $f(1)$.

$$f(1) = \text{}$$

(b) Compute $f(-1)$.

$$f(-1) = \text{}$$

(c) The calculations in parts (a) and (b) above show that f is

Multiple Choice:

- (i) neither even nor odd.

- (ii) *even but not odd.*
- (iii) *odd but not even.*
- (iv) *both even and odd.*
- (v) *not odd, but f may not be even.* ✓
- (vi) *not even, but f may not be odd.*

Exercise 14 (a) Compute $f(3)$.

$$f(3) = \boxed{9}$$

(b) Compute $f(-3)$.

$$f(-3) = \boxed{3}$$

(c) The calculations in parts (a) and (b) above show that f is

Multiple Choice:

- (i) *neither even nor odd.* ✓
- (ii) *even, but not odd.*
- (iii) *odd, but not even.*
- (iv) *both even and odd.*
- (v) *The calculations do not say anything about whether f is even or odd.*

LE5.tex

Exercise 15 A particular car is known to have a fuel efficiency of 23 miles/-gallon (mpg).

- (a) If this car is driven 23 miles, it uses $\boxed{1}$ gallons of fuel.
- (b) If this car is driven 115 miles, it uses $\boxed{5}$ gallons of fuel.
- (c) Call x the number of miles driven and y the gallons of fuel used. Then x and y have a linear relationship.
 - (i) The slope of this linear relationship is $\boxed{1/23}$ gallons/mile.
 - (ii) The equation of this line in slope-intercept form is given by $y = \boxed{\frac{x}{23}}$.

LM5.tex

Exercise 16 A shoe salesperson is paid \$250 per week plus 3% commission on her weekly sales of x dollars.

- (a) A linear function that represents her total weekly pay, W (in dollars) in terms of x is $W(x) = \boxed{.03x + 250}$.
- (b) In order for her to earn \$445 for the week, her weekly sales must be \$ $\boxed{6500}$.
- (c) The drapery department at her store has an open sales position that only pays \$200 per week, but pays out 5% commission on sales. What is the minimum amount of sales she would have to sell in a week to make more money at the drapery sales job than the shoe sales job? \$ $\boxed{2500}$

LOG2.tex

Exercise 17 Which of the following equations or statements are equivalent to $\log_5 7 = x$

Select All Correct Answers:

- (a) 5 to what power is 7? ✓
- (b) $7^x = 5$
- (c) 7 to what power is 5?
- (d) $5^x = 7$ ✓
- (e) $5^7 = x$
- (f) $\log 5^x = \log 7$ ✓
- (g) $\log_7 5 = x$

LOG5.tex

Exercise 18 Evaluate the following logarithmic expressions.

$$\log_b b^{\frac{7}{9}} = \boxed{\frac{7}{9}}$$

$$\log_{b^3} b^{\frac{3}{4}} = \boxed{\frac{1}{4}}$$

$$\log_{b^{\frac{2}{3}}} b^{\frac{8}{3}} = \boxed{4}$$

POLY2.tex

For $g(x) = \frac{1}{2}(x+2)^2 - 7$, determine the following properties:

Exercise 19 Does the graph open upwards or downwards?

Multiple Choice:

- (a) upward ✓
- (b) downward

Exercise 20 Identify the vertex:

$$(\boxed{-2}, \boxed{-7})$$

Exercise 21 Determine the x-intercepts

smaller x-intercept larger x intercept

$$(\boxed{-2 - \sqrt{14}}, 0) \quad (\boxed{-2 + \sqrt{14}}, 0)$$

Exercise 22 Determine the y-intercepts

$$(0, \boxed{-5})$$

Exercise 23 Determine the maximum or minimum value of the function.

Multiple Choice:

- (a) maximum
- (b) minimum ✓

Max or Min Value: $\boxed{-7}$

R1.tex

In each part, an invertible function f will be defined. For each function, find its inverse.

Exercise 24 $f(x) = 4x - 7$

$$f^{-1}(x) = \boxed{\frac{x+7}{4}}$$

Exercise 25 $f(x) = \frac{x+2}{9} - 1$

$$f^{-1}(x) = \boxed{9(x+1) - 2}$$

Exercise 26 $f(x) = \sqrt[3]{x+4} - 7$

$$f^{-1}(x) = \boxed{(x+7)^3 - 4}$$

ZoF10.tex

Exercise 27 *Feel free to use Desmos or another graphing calculator for the following problems.*

(a) Let f be a function defined by $f(x) = e^x - 1$.

The function f has $\boxed{1}$ zero(s).

(b) Let g be a function defined by $g(x) = e^x + 1$.

The function g has $\boxed{0}$ zero(s).

(c) Let h be a function defined by $h(x) = x^3 - 4x^2 + x - 6$.

The function g has $\boxed{3}$ zero(s).

ZoFF4.tex

Exercise 28 The following is a rational function.

$$g(x) = \frac{1}{x+5} + \frac{1}{x-5} + \frac{x^2-35}{x^2-25}.$$

How many zeros does this function have?

Exercise 28.1 It is at $x =$.

Exercise 28.1.1 Why is $x = 5$ NOT a zero of g ?

Multiple Choice:

- (a) Because $g(5)$ is a nonzero number.
- (b) Because $g(5) = 0$.
- (c) Because $x = 5$ is not in the domain of g . ✓

Hint: Make sure to check your possible solutions are actually solutions.

Exercise 29 The following is a rational function.

$$h(x) = 1 - \frac{x^2 - 2x + 1}{x^3 + x^2 - 2x}.$$

How many zeros does this function have?

ZOP5.tex

Exercise 30 Find the zeros of the following function.

$$z(x) = 7x(3x-2)(x+8)(x-\sqrt{7})(x+\sqrt{7})$$

Enter the x values from smallest to largest:

$x_1 =$

$$x_2 = \boxed{-\sqrt{7}}$$

$$x_3 = \boxed{0}$$

$$x_4 = \boxed{\frac{2}{3}}$$

$$x_5 = \boxed{\sqrt{7}}$$

