ALBERTA DISTANCE LEARNING CENTRE
Mathematics 30-1
MAT3791
Workbook 3.1

Student's Questions and Comments

FOR STUDENT USE ONLY

(if label is missing or incorrect)
File Number: _____

Please use the pre-printed label for this course and Workbook

Name
Address
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Apply Workbook Label Here

FOR ADLC USE ONLY

Assigned to _____

Marked by _____

Date received _____

Summary

	Marks Earned	Total Marks	Percent
Practice 3.1A	**I have ____ /8 and ____%**		
Practice 3.1B	**I have ____ /8 and ____%**		
Practice 3.1C	**I have ____ /8 and ____%**		
Practice 3.1D	**I have ____ /8 and ____%**		
Explore Your Understanding 3.1			

Teacher's Comments:

Teacher's Signature

REVISED MAY 2019

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Workbook 3.1

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Alberta Distance Learning Centre website:

http://www.adlc.ca

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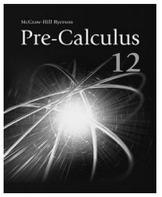

Pre-Calculus 12
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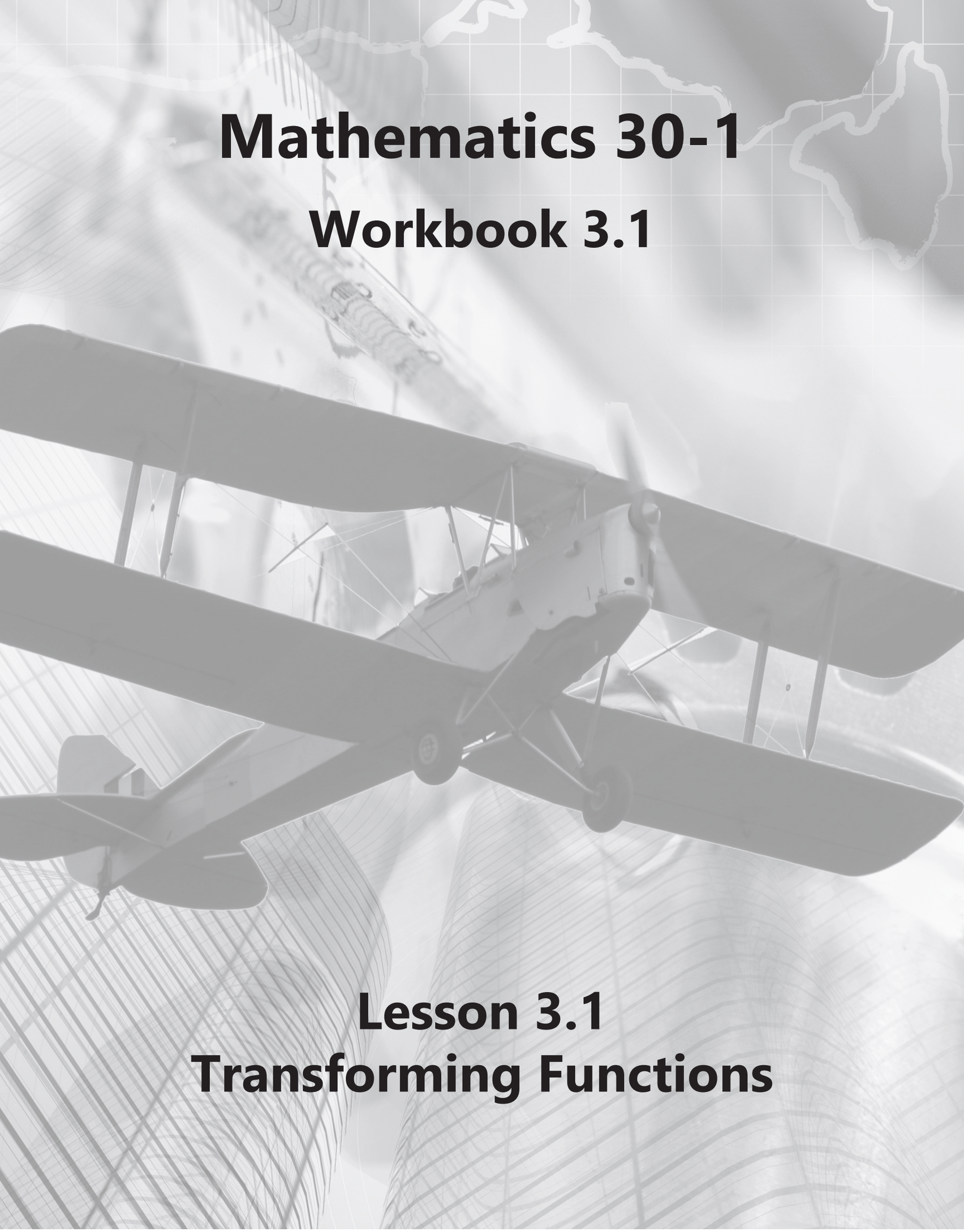
Mathematics 30-1

Workbook 3.1



Lesson 3.1
Transforming Functions

Instructions for Submitting Workbooks

1. Submit Workbooks **regularly** for assessment.

2. Submit only **one Workbook at a time.** This allows your teacher to provide feedback that you can apply to subsequent course work and exams.

3. Check that your **Workbook is complete.** Your Workbook will be returned as **incomplete** if a reasonable attempt with relevant work has not been made. Therefore, **do not leave any questions blank.** Contact your teacher for help **prior** to submitting this Workbook.

4. Attach the correct address label or complete the Workbook coversheet.

5. Submission Methods:

Postal Mail – Mail the completed Workbook to an Alberta Distance Learning Centre office. Ensure that you attach sufficient postage by having the envelope weighed at the post office.

Electronically – Scan the completed Workbook. Save the file to your computer as **Math 30-1 Workbook# FirstInitial LastName.** Then, upload the file.

Fax – Fax the completed Workbook to Alberta Distance Learning Centre.

In Person – Drop the completed Workbook at the Alberta Distance Learning Centre office in Barrhead. The address is listed below.

Barrhead
4601 - 63 Avenue
Barrhead, Alberta T7N 1P4
Phone 780-674-5333
Toll-free 1-866-774-5333
Fax 780-674-7593

Mathematics 30-1

Workbook 3.1

Our Pledge to You:

Enrolling in this course is another step toward an Alberta High School Diploma. Everyone at Alberta Distance Learning Centre is committed to helping students achieve their educational goals. We welcome your contact in person or by phone, fax, e-mail, voice mail, or postal mail.

Advice:

Your achievement in this course is determined by your success in the assessments of each unit. Your responses to assignments indicate your understanding of outcomes established by Alberta Education.

- Before responding to the assigned questions, read all relevant directions for the Workbook and instruction in the course materials, including the appropriate Guide for Learning and any other resources provided.

- When you encounter difficulties, re-read the directions for the Workbook and review the relevant instruction in the Guide for Learning.

- If you require further clarification, contact your Alberta Distance Learning Centre teacher for assistance.

Notice:

You have one opportunity to submit each Workbook.

- Only under exceptional circumstances will your ADLC teacher re-assess your work. Therefore, apply significant effort to each Workbook.

- If your final exam mark is vastly different from your Quiz marks, your teacher may apply discretion in determining your course mark.

ADLC Plagiarism Policy (ADLC Administrative Policy 60–1)

Program integrity and academic honesty are very important at ADLC. When students are successful in ADLC courses, we want full confidence that they have clearly met the intended program outcomes.

Plagiarism is the practice of representing someone else's work or ideas as one's own. It is an academically dishonest practice and is detrimental to a student's knowledge & skill development.

ADLC takes a progressive approach to plagiarism to educate and correct the behaviour. If a student is currently enrolled in any ADLC course and found to have plagiarized work, the following steps are taken:

Warning: ADLC Teachers decide if a warning happens instead of calling the first instance. The warning is recorded in SIS Communications.

First Instance	Second Instance	Third Instance
Students are assigned a mark of zero and a chance to redo the question or the assignment. It is up to the ADLC teacher's discretion whether or not to assign a mark of zero on the plagiarized question or on the entire assignment. ADLC teachers record a SIS Communication and a 'Student Note'.	The student is assigned a mark of zero with no chance to redo the question or the assignment. It is up to the ADLC teacher's discretion whether or not to assign a mark of zero on the plagiarized question or on the entire assignment. The ADLC Principal, or designate, is notified and the instance is recorded in SIS Communications.	Student is removed from the course in which the third instance occurred. The ADLC Principal, or designate, is notified and the instance is recorded in SIS Communications.

Important

While removal from a course is limited to the course in which the Third Instance has occurred, the preceding steps can occur across different courses. A student who has been found plagiarizing in Course A and held to the First Instance consequences who then plagiarizes in Course B will move to the Second Instance consequences.

Further Instances

After the Third Instance, any further instances of plagiarism in any course will result in immediate removal from that course. Ongoing occurrences may result in removal from all courses and barring of registration with ADLC.

Clean Slate

Students earn a clean slate after one calendar year passes with no instances.

Sharing of ADLC Work (ADLC Administrative Policy 60–4)

Plagiarism is the practice of representing someone else's work or ideas as one's own. It is a dishonest practice and is damaging to a student's knowledge & skill development. Plagiarism is addressed in ADLC Administrative Policy 60-01.

The sharing of school work, especially after having been marked by ADLC, to students for the purposes of submitting plagiarized work (either paraphrasing or directly copying student work) is dishonest, and this sharing goes against the Alberta School Act's expectation of students to respect school rules and co-operate with how schools offer education to their students.

ADLC prefers to take a progressive approach to sharing of work with other students, in order to educate and correct the behaviour.

If a student is currently enrolled in any ADLC course and found to be sharing school work, whether from their current course or another, to others:

First Incidence	Second Incidence
The student is informed that their work has been submitted as plagiarized work by another student; a warning is provided that further submissions of such work, from any course, will be grounds for removal from the current course(s).	The student is removed from all active ADLC courses.

If the student is not currently enrolled in any ADLC course and found to be sharing school work with others, they are informed that their work has been submitted as plagiarized work by another student and, as such, further registrations in any ADLC course will not be permitted. The incident will be recorded on the student's file.

Such actions do not limit ADLC to pursue other remedies (actions), either criminal or civil, for the distribution of its copyrighted materials.

Practice Assessment

Practice provides practice and allows you to self-reflect on your conceptual understanding of the Lesson skills. You will mark your work for *Practice* in each *Workbook* according to the following rubric.

Category	Strategy and Procedures	Response to Questions
	I have…	*I have…*
4	• used efficient and effective strategies to solve the problem(s)	• provided detailed explanations and followed directions appropriately to complete all questions
3	• used effective strategies to solve the problem(s)	• provided clear explanations and followed directions adequately to complete most questions
2	• used effective strategies inconsistently to solve the problem(s)	• provided incomplete explanations and followed some directions to complete a few questions
1	• used ineffective strategies to solve the problem(s)	• provided incomplete explanations and have not followed directions to complete some questions

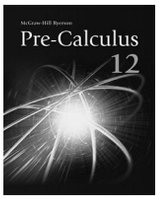
Complete *Practice* exercises using your best work, showing all relevant steps needed to arrive at your solution. Refer to the *Module* to review lesson instructions. Contact your teacher for assistance or clarification as needed, or to investigate the topic further.

Check and correct your work using the solutions provided in *Appendix* in the *Module*.

Practice is worth 8 marks; your mark can help you gauge your understanding of *Lesson* material.

After you have assessed your work, reflect on your understanding of the concepts addressed in the *Practice* exercises in the table provided.

Practice 3.1A



Now, try what you have learned so far. Turn to pages 12 to 15 in *Pre-Calculus 12* and do questions 2a, 2c, 4a, 5a to 5d, 9a to 9c, and 17a to 17c.

You may check your practice work by turning to the *Appendix* section of the *Module.*

Questions 2a and 2c, page 12

a.

My solution	My corrections if needed

c.

My solution	My corrections if needed

Question 4a, page 13

a.

My solution	My corrections if needed

Questions 5a to 5d, page 13

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

c.

My solution	My corrections if needed

d.

My solution	My corrections if needed

Questions 9a to 9c, page 13

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

c.

My solution	My corrections if needed

Questions 17a to 17c, page 15

a.

My solution	My corrections if needed

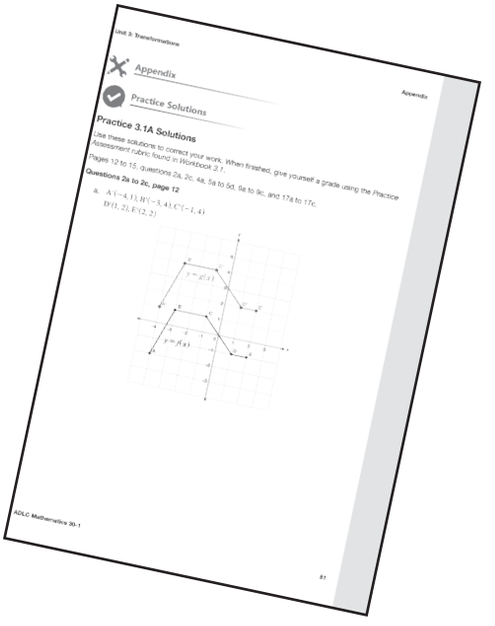
b.

My solution	My corrections if needed

c.

My solution	My corrections if needed

Turn to *Practice 3.1A Solutions* in the *Appendix* in *Unit 3*. Use the solutions to check your work and make corrections. Next, use the Practice Assessment rubric found on page 1 to give yourself a grade. **Record your grade on the cover of this booklet.** When complete, continue in the *Module*.


Unit 3: Transformations

Appendix

Appendix

Practice Solutions

Practice 3.1A Solutions

Use these solutions to correct your work. When finished, give yourself a grade using the Practice Assessment rubric found in Workbook 3.1.

Pages 12 to 15, questions 2a, 2c, 4a, 5a to 5d, 6a to 6c, and 17a to 17c

Questions 2a to 2c, page 12

a. $A(-4,1), B'(-3,4), C'(-1,4)$
$D(1,2), E'(2,2)$

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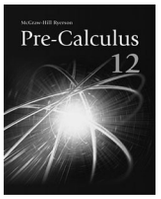
Practice 3.1B



Now, try what you have learned so far. Turn to pages 28 to 30 in *Pre-Calculus 12* and do questions 1a to 1d, 2a to 2d, 3a to 3c, 6a, 6b, 7a to 7d, and 10a to 10c.

You may check your practice work by turning to the *Appendix* section of the *Module.*

Questions 1a to 1d, page 28

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

c.

My solution	My corrections if needed

d.

My solution	My corrections if needed

Questions 2a to 2d, page 28

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

c.

My solution	My corrections if needed

d.

My solution	My corrections if needed

Questions 3a to 3c, page 28

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

c.

My solution	My corrections if needed

Questions 6a and 6b, page 29

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

Questions 7a to 7d, page 29

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

c.

My solution	My corrections if needed

d.

My solution	My corrections if needed

Questions 10a to 10c, page 30

a.

My solution	My corrections if needed

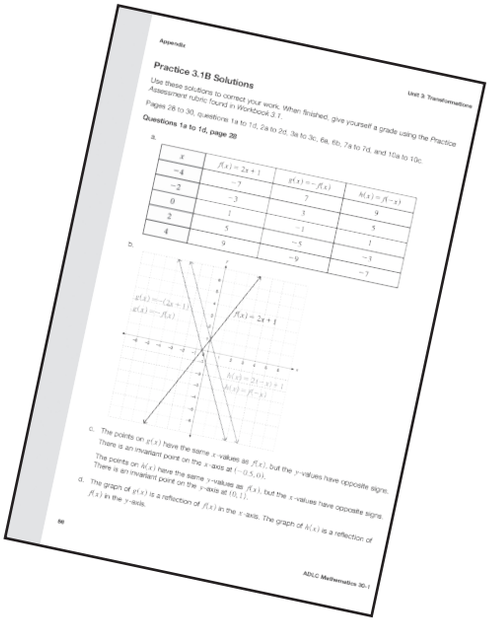
b.

My solution	My corrections if needed

c.

My solution	My corrections if needed

Turn to *Practice 3.1B Solutions* in the *Appendix* in *Unit 3*. Use the solutions to check your work and make corrections. Next, use the Practice Assessment rubric found on page 1 to give yourself a grade. **Record your grade on the cover of this booklet.** When complete, continue in the *Module*.



Appendix

Practice 3.1B Solutions Unit 3: Transformations

Use these solutions to correct your work. When finished, give yourself a grade using the Practice Assessment rubric found in *Workbook 3.1*.

Pages 28 to 30, questions 1a to 1d, 2a to 2d, 3a to 3c, 6a, 6b, 7a to 7d, and 10a to 10c

Questions 1a to 1d, page 28

a.

x	$f(x)=2x+1$	$g(x)=-f(x)$	$h(x)=f(-x)$
-4	-7	7	-7
-2	-3	3	-3
0	1	-1	1
2	5	-5	5
4	9	-9	9

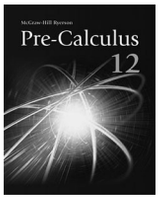
b.

c. The points on $g(x)$ have the same x-values as $f(x)$, but the y-values have opposite signs. There is an invariant point on the x-axis at $(-0.5, 0)$.

The points on $h(x)$ have the same y-values as $f(x)$, but the x-values have opposite signs. There is an invariant point on the y-axis at $(0, 1)$.

d. The graph of $g(x)$ is a reflection of $f(x)$ in the x-axis. The graph of $h(x)$ is a reflection of $f(x)$ in the y-axis.

Practice 3.1C



Now, try what you have learned so far. Turn to pages 38 to 41 in *Pre-Calculus 12* and do questions 1a, 1b, 3, 4a, 4b, 6c, 6d, 6e, 7a, 7c, 7f, 12a, and 12b.

You may check your practice work by turning to the *Appendix* section of the *Module.*

Questions 1a and 1b, page 38

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

Question 3, page 39

My solution	My corrections if needed

Questions 4a and 4b, page 39

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

Questions 6c, 6d, and 6e, page 39

c.

My solution	My corrections if needed

d.

My solution	My corrections if needed

e.

My solution	My corrections if needed

Questions 7a, 7c, and 7f, page 40

a.

My solution	My corrections if needed

c.

My solution	My corrections if needed

f.

My solution	My corrections if needed

Questions 12a and 12b, page 41

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

Turn to *Practice 3.1C* Solutions in the *Appendix* in *Unit 3*. Use the solutions to check your work and make corrections. Next, use the Practice Assessment rubric found on page 1 to give yourself a grade. **Record your grade on the cover of this booklet.** When complete, continue in the *Module*.

Unit 3: Transformations

Appendix

Practice 3.1C Solutions

Use these solutions to correct your work. When finished, give yourself a grade using the *Practice Assessment* rubric found in *Workbook 3.1*.

Pages 38 to 41, questions 1a, 1b, 3, 4a, 4b, 6c, 6d, 6e, 7a, 7c, 7f, 12a and 12b.

Questions 1a to 1b, page 38

a. $y=-f\left(\frac{1}{2}x\right)$ or $y=-\frac{1}{4}x^2$

b. $y=\frac{1}{4}f(-4x)$ or $y=4x^2$

Additional Notes

a. There is no vertical stretch, so $|a|=1$.

$y=af(x)$

$y=f(x)$

There is a horizontal stretch by a factor of 2, so $|b|=\frac{1}{2}$.

$y=f(bx)$

$y=f\left(\frac{1}{2}x\right)$

There is a reflection in the x-axis, so all of the y-values change to the opposite sign.

$y=-f\left(\frac{1}{2}x\right)$

Because the original function was $y=x^2$ or $f(x)=x^2$, the x is replaced with $\frac{1}{2}x$ and a negative sign is placed in front.

$y=-\left(\frac{1}{2}x\right)^2$

$y=-\frac{1}{4}x^2$

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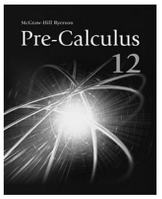
Practice 3.1D



Now, try what you have learned so far. Turn to pages 51 to 55 in *Pre-Calculus 12* and do questions 2a, 2b, 3a to 3c, 4a, 5b, 5d, 5f, 6a to 6e, 15a to 15d, 19a, and 19b.

You may check your practice work by turning to the *Appendix* section of the *Module.*

Questions 2a and 2b page 51

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

Questions 3a to 3c, page 52

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

c.

My solution	My corrections if needed

Question 4a, page 52

a.

My solution	My corrections if needed

Questions 5b, 5d, and 5f, page 52

b.

My solution	My corrections if needed

d.

My solution	My corrections if needed

f.

My solution	My corrections if needed

Questions 6a to 6e, page 52

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

c.

My solution	My corrections if needed

d.

My solution	My corrections if needed

e.

My solution	My corrections if needed

Questions 15a to 15d, page 54

a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

c.

My solution	My corrections if needed

d.

My solution	My corrections if needed

Questions 19a and 19b, page 55

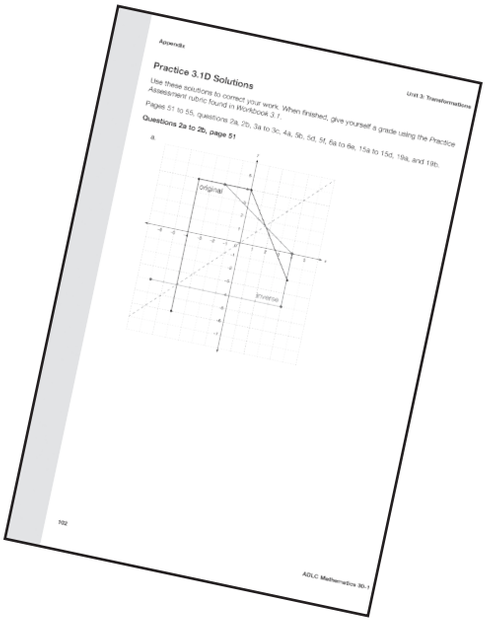
a.

My solution	My corrections if needed

b.

My solution	My corrections if needed

Turn to *Practice 3.1D Solutions* in the *Appendix* in *Unit 3*. Use the solutions to check your work and make corrections. Next, use the Practice Assessment rubric found on page 1 to give yourself a grade. **Record your grade on the cover of this booklet.** When complete, continue in the *Module*. When complete, continue to *Explore Your Understanding Assignment 3.1.*


Appendix

Practice 3.1D Solutions

Unit 3: Transformations

Use these solutions to correct your work. When finished, give yourself a grade using the *Practice Assessment* rubric found in *Workbook 3.1*.

Pages 51 to 55, questions 2a, 2b, 3a to 3c, 4a, 5b, 5d, 5f, 6a to 6e, 15a to 15d, 19a, and 19b.

Questions 2a to 2b, page 51

a.

original

inverse

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Explore Your Understanding Assignment 3.1

This assignment includes 17 marks. You are expected to complete **14 marks** worth of work. If you complete more than this, all completed questions will be used to assign a grade. For example, if you complete all 17 marks worth of work, your assignment total will be 17 instead of 14. You can also complete a question and label it "DO NOT MARK" if you are not confident in your work. Your teacher will then give feedback on your response, which will help clarify any misconceptions, but will not count it towards your required mark total. Please contact your teacher if you have any questions.

(2) 1. a. Complete the following table by describing the how each replacement will change the graph of $y = f(x)$.

Change in $y = f(x)$	**Change(s) to the graph of $y = f(x)$**
Replace x with $x - h$	
Replace y with $y - k$	
Replace y with $\frac{1}{a}y$	
Replace x with bx	

(2) b. Starting with $y = f(x)$, show that $y = af(b(x - h)) + k$ can be derived from the information in the table in part a. (Hint: If your brackets don't match exactly, try reading part c.)

(1) c. Use the response to part b. to explain why the statement "stretch and reflect before translating" applies to $y = af(b(x-h))+k$.

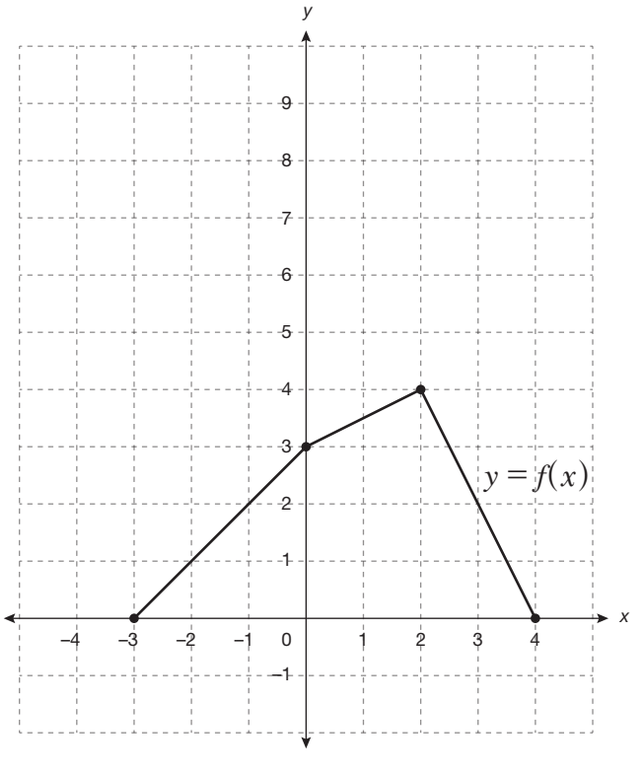
2. The graph of $f(x)=(x-2)^2$ is transformed to $y=f(x+5)-4$.

(1) a. Determine the vertex of the graph of $y=f(x)$ and the vertex of the graph of the transformed function.

(1) b. The point $(6,16)$ lies on the graph of $y=f(x)$. Determine the corresponding point on the graph of the transformed function.

(1) c. The point $(-1,0)$ lies on the graph of the transformed function. What is the corresponding point on the graph of the original function $y=f(x)$?

3. The graph of $y = f(x)$ is shown below.



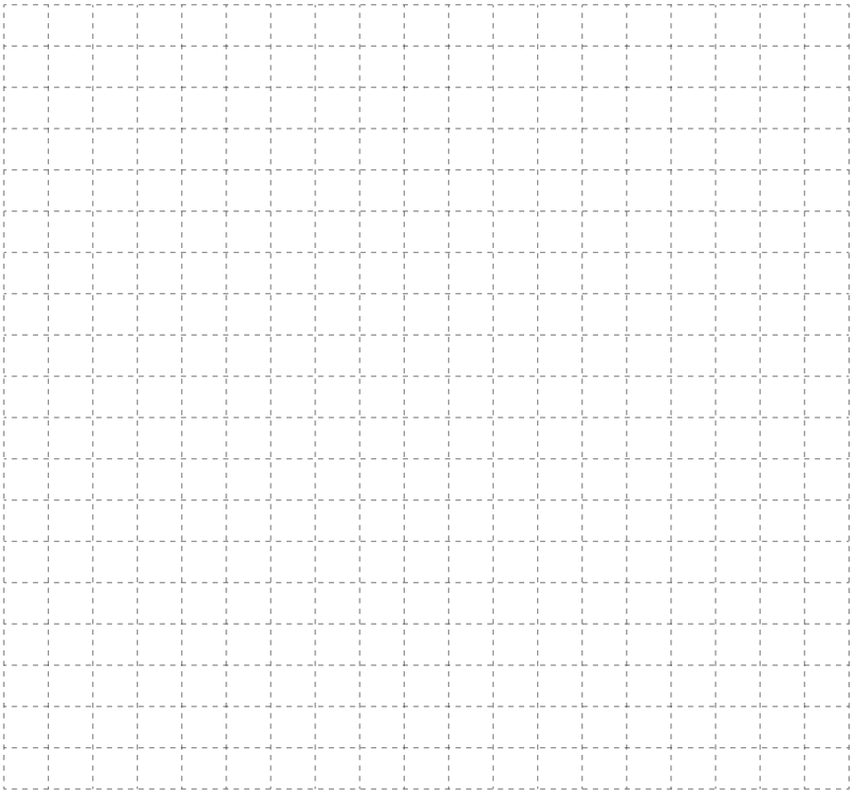
(1) a. Determine the domain and range of $y = f(x)$.

(1) b. On the grid, sketch the graph of $y = 2f(-x)$.

(1) c. Determine the domain and range of $y = 2f(-x)$.

4. The graph of $f(x) = x^2$ has been transformed so it has a vertex at $(4, -1)$, opens down, and passes through the point $(5, -3)$.

(1) a. Sketch both parabolas on the grid provided.

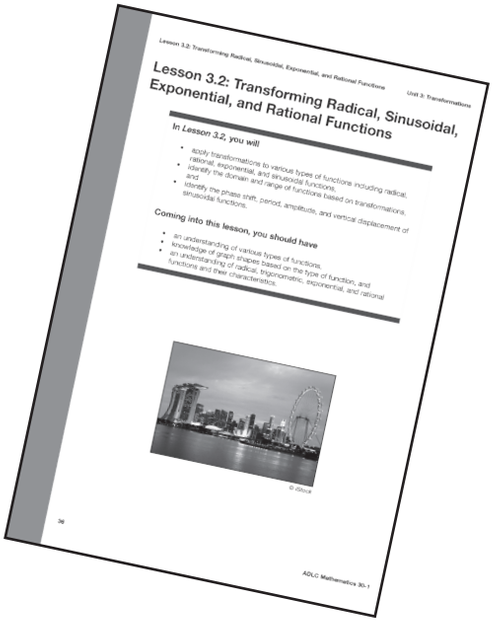


(2) b. Determine an equation of the transformed function.

(1) c. In words, describe the transformations that occurred.

(2) 5. If the point $(4,7)$ lies on the graph of $2y+2=f\left(\frac{1}{5}(x-1)\right)$, what is the corresponding point on the graph of $y=f(x)$?

When this workbook is complete, submit it using a method described at the beginning of this *Workbook*. Next, complete *Test Your Understanding Quiz 3.1* online in Moodle. When complete, return to the Module and begin *Lesson 3.2*.


Lesson 3.2: Transforming Radical, Sinusoidal, Exponential, and Rational Functions Unit 3: Transformations

Lesson 3.2: Transforming Radical, Sinusoidal, Exponential, and Rational Functions

In *Lesson 3.2*, you will

- apply transformations to various types of functions including radical, rational, exponential, and sinusoidal functions,
- identify the domain and range of functions based on transformations, and
- identify the phase shift, period, amplitude, and vertical displacement of sinusoidal functions.

Coming into this lesson, you should have

- an understanding of various types of functions,
- knowledge of graph shapes based on the type of function, and
- an understanding of radical, trigonometric, exponential, and rational functions and their characteristics

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