# Unit B: Student Guide

> 💡 Tip: Set aside time each week to work on this course
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> We know it is tempting to put things off...we do that too! But we highly recommend you set aside a regular time each week to work on this course. Make it part of your schedule!  You are much more likely to succeed if you don't leave everything until the last minute!

## Introduction

**Welcome to Unit B!** There's a lot to cover in this unit, so we want to make sure you feel prepared and are familiar with the process you will be going through as you learn all of the topics.

## Skills

In this module, we'll develop and practice the following skills:

1. Solve equations and inequalities and use them to model real-world situations, including absolute value equations, linear equations and inequalities, radical equations, and rational equations
2. Identify and evaluate functions, including distinguishing between relations and functions, applying the vertical line test for a function, and finding the domain and range of a function
3. Identify, construct, and graph linear functions and use them to model real-world situations
4. Solve systems of linear equations algebraically and graphically and use them to model real-world situations

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## How to improve your skills

1. **In ALEKS, learn 100% of the Unit topics by correctly answering 3 questions in each topic.** Please note: this will be the bulk of your time spent in this unit!
2. **Take the Unit Post Module Knowledge Check (PMKC).** If you missed questions, you will need to relearn those topics so that you once again have 100% of the topics in the Unit to unlock the Unit quiz.
3. **Complete the Unit Quiz in ALEKS.** Try to do this by the due date listed in the **syllabus (https://asuce.instructure.com/courses/6461/assignments/syllabus)** . The Unit Quiz covers only topics from this unit, and you will have multiple attempts to take the Unit Quiz, redo any problems you missed, improve your skills, and increase your score.

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## Quiz Information - Unit B

**Purpose:** The Unit Quiz is an opportunity for you to **test yourself** on select topics from Unit B. The Unit Quiz is **not proctored**. Also, you can **retake the Unit Quiz multiple times and fix just the problems you missed**.

**Questions and topics:** There are 21 questions from the topics in Unit B. These topics, together with an example problem for each one, are listed in the table below.

**Review:** Visit the **ALEKS: In-depth page (https://asuce.instructure.com/courses/6461/pages/aleks-in-depth)** for instructions on how to use the ALEKS system to review topics and get some extra practice.

Table for Unit B Quiz Topics in ALEKS with an Example of Each

| Quiz Topics - Unit B | | |
|---|---|---|
| **Number** | **ALEKS Topic** | **Example** |
| 1 | Finding a solution to a linear equation in two variables | Find an ordered pair (*x,y*) that is a solution to the equation. $-x+3y=6$ |
| 2 | Finding the slope and y-intercept of a line given its equation in the form Ax + By = C | Find the slope and the *y*-intercept of the line. $9x-3y=-4$ |
| 3 | Writing the equations of vertical and horizontal lines through a given point | Write equations for the horizontal and vertical lines passing through the point (0,-9). |
| 4 | Interpreting the parameters of a linear function that models a real-world situation | Owners of a recreation area are filling a small pond with water. Let y represent the total amount of water in the pond (in liters). Let *x* represent the total number of minutes that water has been added. Suppose that x and y are related by the equation $y=300+29x$<br>What is the change per minute in the amount of water in the pond?<br>What was the starting amount of water in the pond? |

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| 5 | Determining whether an equation defines a function: Basic | For each of the following, determine whether the equation defines *y* as a function of *x.*<br>$x = \frac{1}{4}y$ $y = 5x + 4$ $x = -8y^2$ $y^2 = 6x + 4$ |
| 6 | Finding outputs of a one-step function that models a real-world situation: Function notation | Omar tutors history. For each hour that he tutors, he earns<br>25 dollars. His earnings, *E* (in dollars), after tutoring for *h* hours is given by the following function.<br>$E(h) = 25h$<br>How much does Omar earn if he tutors for 5 hours? |
| 7 | Solving a linear equation with several occurrences of the variable: Variables on both sides and distribution | Solve for w. $2w - 39 = -3(w + 3)$ |
| 8 | Variable expressions as inputs of functions: Problem type 1 | The function *g* is defined by $g(x) = x + 5$. Find $g(x + 2)$. |

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|---|---|---|
| 9 | Solving a 2x2 system of linear equations that is inconsistent or consistent dependent | Two systems of equations are given below. For each system, choose the best description of its solution. If applicable, give the solution.<br>System A: $4x = 8 + y$<br>$-4x + y = -8$<br>System B: $-2x + y = -4$<br>$-2x - y = -4$ |
| 10 | Solving a value mixture problem using a system of linear equations | Suppose that there are two types of tickets to a show: advance and same-day. Advance tickets cost $20 and same-day tickets cost $30. For one performance, there were 65 tickets sold in all, and the total amount paid for them was $1600. How many tickets of each type were sold? |
| 11 | Finding slope given two points on a line | Find the slope of the line passing through the points (-7, -7) and (-3,6). |
| 12 | Solving a tax rate or interest rate problem using a system of linear equations | Charmaine bought a desktop computer and a laptop computer. Before finance charges, the laptop cost $400 less than the desktop. She paid for the computers using two different financing plans. For the desktop the interest rate was 7.5% per year, and for the laptop it was 8% per year. The total finance charges for one year were $371. How much did each computer cost before finance charges? |
| 13 | Vertical line test | For each graph below, state whether it represents a function.<br>[Given graphs] |
| 14 | Table for a linear function | The function *g* is defined by the following rule.<br>$g(x) = -4x - 5$ |

| | | |
|---|---|---|
| | | Complete the function table.<br>[Table with values of *x* given and missing values of *g(x)*] |
| 15 | Finding the average rate of change of a function given its graph | The graph of a function *f* is shown below. Use the graph of the function to find its average rate of change from *x*=1 to x=4.<br>[Graph of non-linear function] |
| 16 | Classifying slopes given graphs of lines | For each line, determine whether the slope is positive, negative, zero, or undefined.<br>[Four (4) graphs of linear functions] |
| 17 | Solving equations with zero, one, or infinitely many solutions | For each equation, choose the statement that describes its solution.<br>$5(y+1)-y=4(y-1)+9$<br>$2(v+1)+7=3(v-2)+2v$ |
| 18 | Solving a linear inequality with multiple occurrences of the variable: Problem type 1 | Solve the inequality for y. $2y+8>-3y-7$ |
| 19 | Writing the equation of a line given the y-intercept and another point | Write an equation of the line below.<br>[Graph of linear function on grid with *y*-intercept and another point] |
| 20 | Evaluating functions: Absolute value, | The function *f*, *g,* and *h* are defined as follows |

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|---|---|---|
| | rational, radical | $f(x) = -5\|x - 10\|$ $g(x) = \dfrac{-4x^2 - 1}{x^2}$ $h(x) = -3 + \sqrt{x + 5}$<br>Find *f*(4), *g*(3), *h*(-1) |
| 21 | Finding the initial amount and rate of change given a graph of a linear function | Scientists are measuring a distant planet's temperature. The graph shows the temperature (in °C) versus the height (in kilometers) above the planet's surface.<br>[Graph of Temperature (in °C) as a function of Height (kilometers)]<br>(a) What is the temperature at 0 kilometers?<br>(b) Choose the statement that best describes how the height and temperature are related. Then give the value requested.<br>As the height increases, the temperature decreases. At what rate is the temperature decreasing?<br>As the height increases, the temperature increases. At what rate is the temperature increasing? |

## All Unit B Topics

The topics in Unit B are listed below. Shaded bands are sets of similar topics.

Table of Unit B Topics with an Example of Each

| Topic | Example |
|---|---|
| Introduction to solving an absolute value equation | Solve for *x*. $\|x\| = 4$ |

| Topic | Example |
|---|---|
| Solving an absolute value equation: Problem type 2 | Solve for w. $\|5w-10\|=5$ |
| Solving a linear equation with several occurrences of the variable: Variables on the same side and distribution | Solve for w. $-8=2(w+2)-6w$ |
| Solving a linear equation with several occurrences of the variable: Variables on both sides and distribution | Solve for w. $2w-39=-3(w+3)$ |
| Solving a linear equation with several occurrences of the variable: Variables on both sides and two distributions | Solve for w. $4(w-2)=2w+3-2(-4w-2)$ |
| Solving equations with zero, one, or infinitely many solutions | For each equation, choose the statement that describes its solution.<br>$5(y+1)-y=4(y-1)+9$<br>$2(v+1)+7=3(v-2)+2v$ |
| Solving a word problem with two unknowns using a linear equation | A total of 544 tickets were sold for the school play. They were either adult tickets or student tickets. The number of student tickets sold was three times the number of adult tickets sold. How many adult tickets were sold? |

| Topic | Example |
|---|---|
| Solving a decimal word problem using a linear equation of the form Ax + B = C | Jessica got a prepaid debit card with $30 on it. For her first purchase with the card, she bought some bulk ribbon at a craft store. The price of the ribbon was 19 cents per yard. If after that purchase there was $25.44 left on the card, how many yards of ribbon did Jessica buy? |
| Solving a decimal word problem using a linear equation with the variable on both sides | Greg will rent a car for the weekend He can choose one of two plans. The first plan has an initial fee of $55.98 and costs an additional $0.12 per mile driven. The second plan has an initial fee of $59.98and costs an additional $0.10 per mile driven. How many miles would Greg need to drive for the two plans to cost the same? |
| Solving a value mixture problem using a linear equation | Laura's Coffee Shop makes a blend that is a mixture of two types of coffee. Type A coffee costs Laura $5.50 per pound, and type B coffee costs $4.10 per pound. This month, Laura made 142 pounds of the blend, for a total cost of $706.80. How many pounds of type A coffee did she use? |
| Solving a percent mixture problem using a linear equation | Two factory plants are making TV panels. Yesterday, Plant A produced 12,000 panels. One percent of the panels from Plant A and 4% of the panels from Plant B were defective. How many panels did Plant B produce, if the overall percentage of defective panels from the two plants was 2%? |
| Writing an inequality for a real-world situation | Write inequalities to represent the situations below.<br>**To ride a roller coaster, a visitor must not be less than 54 inches tall.** Use **h** to represent the height (in inches) of a visitor able to ride.<br>**The distance to the nearest exit door is less than 100 feet.** Use **d** to represent the distance (in feet) to the nearest exit door. |
| Graphing a linear inequality on the number line | Graph the inequality on the number line. $b > 8$ |

| Topic | Example |
|---|---|
| Set-builder notation | Rewrite the set *U* by listing its elements. Make sure to use the appropriate set notation.<br>$U = \{z \mid z \text{ is an integer and } 0 \leq z < 3\}$ |
| Solving a two-step linear inequality: Problem type 1 | Solve the inequality for *x*. $\frac{x}{5} - 1 < -4$ |
| Solving a two-step linear inequality: Problem type 2 | Solve the inequality for y. $13 < 3 - 2y$ |
| Solving a linear inequality with multiple occurrences of the variable: Problem type 1 | Solve the inequality for y. $2y + 8 > -3y - 7$ |
| Solving a decimal word problem using a two-step linear inequality | To rent a certain meeting room, a college charges a reservation fee of $42 and an additional fee of $9.40 per hour. The film club wants to spend at most $79.60 on renting the meeting room.<br>What are the possible amounts of time for which they could rent the meeting room? Use *t* for the number of hours the meeting room is rented, and solve your inequality for *t.* |
| Solving a decimal word problem using a linear inequality with the variable on both sides | Greg is going to rent a truck for one day. There are two companies he can choose from, and they have the following prices.<br>Company A has no initial fee but charges 90 cents for every mile driven.<br>Company B charges an initial fee of $60 and an additional 40 cents for every mile driven.<br>For what mileages will Company A charge more than Company B?<br>Use *m* for the number of miles driven, and solve your inequality for *m*. |

| Topic | Example |
|---|---|
| Solving a rational equation that simplifies to linear: Denominator x | Solve for *x*. $-\frac{7}{x}=2$ |
| Solving a rational equation that simplifies to linear: Denominator x+a | Solve for *x*. $-8=\frac{5}{x-1}$ |
| Solving for a variable in terms of other variables in a rational equation: Problem type 1 | Solve for a. $\frac{9}{a}=\frac{m}{F}$ |
| Solving for a variable in terms of other variables in a rational equation: Problem type 2 | Solve for f. $h=\frac{k-g}{f-7}$ |
| Solving a distance, rate, time problem using a rational equation | A cyclist traveled 9 kilometers per hour faster than an in-line skater. In the time it took the cyclist to travel 45 kilometers, the skater had gone 30 kilometers. Find the speed of the skater. |
| Solving an equation written in factored form | Solve. $(5+z)(5z-3)=0$ |
| Finding the roots of a quadratic equation with leading coefficient 1 | Solve for *v*. $v^2-8v+16=0$ |

| Topic | Example |
|---|---|
| Restriction on a variable in a denominator: Quadratic | Find all values *w* for which the expression is undefined. $\frac{w^2 - 13w + 40}{w^2 - 9w + 8}$ |
| Introduction to solving a radical equation | Solve for *y,* where *y* is a real number. $\sqrt{y} = 16$ |
| Solving a radical equation that simplifies to a linear equation: One radical, basic | Solve for *x,* where *x* is a real number. $12 + \sqrt{x + 4} = 9$ |
| Solving a radical equation that simplifies to a linear equation: Two radicals | Solve for *u,* where *u* is a real number. $\sqrt{5u + 12} = \sqrt{7u + 16}$ |
| Finding a solution to a linear equation in two variables | Find an ordered pair (*x,y*) that is a solution to the equation. $-x + 3y = 6$ |
| Graphing a linear equation of the form y = mx | Graph the line. $y = \frac{1}{3}x$ |
| Graphing a line given its equation in slope-intercept form: Integer slope | Graph the line. $y = 3x - 7$ |

| Topic | Example |
|---|---|
| Graphing a line given its equation in slope-intercept form: Fractional slope | Graph the line. $y = -\frac{1}{3}x + 6$ |
| Graphing a line given its equation in standard form | Graph the line. $y = 4x + y = 8$ |
| Graphing a vertical or horizontal line | Graph the line $y = 3$. |
| Finding x- and y-intercepts given the graph of a line on a grid | Find the *x*-intercept and the *y*-intercept of the line below. Click on "None" if applicable.<br>[Graph of linear function] |
| Finding x- and y-intercepts of a line given the equation: Basic | Find the x-intercept and *y*-intercept of the line.<br>$4x + 2y = -4$ |
| Finding x- and y-intercepts of a line given the equation: Advanced | Find the x-intercept and *y*-intercept of the line.<br>$6x - 3y = -14$ |
| Graphing a line by first finding its x- and y-intercepts | The equation of a line is given below.<br>$3x - 2y = 6$<br>Find the *x*-intercept and the *y*-intercept. Then use them to graph the line. |

| Topic | Example |
|---|---|
| Classifying slopes given graphs of lines | For each line, determine whether the slope is positive, negative, zero, or undefined.<br>[Four (4) graphs of linear functions] |
| Finding slope given the graph of a line on a grid | Find the slope of the line graphed below.<br>[Graph of linear function on grid] |
| Finding slope given two points on the line | Find the slope of the line passing through the points (-7, -7) and (-3,6). |
| Finding the slope of horizontal and vertical lines | Find the slope of the line passing through the points (9,-5) and (-9,-5).<br>Find the slope of the line passing through the points (-8,5) and (9,5). |
| Identifying linear functions given ordered pairs | For each function, state whether it is linear.<br>Function 1: {(5,1), (7,-2), (9,-5), (11,0)} Function 2: {(-1,-5), (2,-7), (5,-9), (8, -11)} |
| Determining whether an equation defines a function: Basic | For each of the following, determine whether the equation defines *y* as a function of *x*.<br>$x = \frac{1}{4}y$ $y = 5x + 4$ $x = -8y^2$ $y^2 = 6x + 4$ |
| Determining whether an equation defines a function: Advanced | For each of the following, determine whether the equation defines *y* as a function of *x*.<br>$y = \sqrt{x - 2}$ $x^2 + 7y = 4$ $x^2 + y^2 = 16$ $6x + \lvert y \rvert = 0$ |

| Topic | Example |
|---|---|
| Finding the slope and y-intercept of a line given its equation in the form y = mx + b | Find the slope and the *y*-intercept of the line. $y = 6 - 7x$ |
| Finding the slope and y-intercept of a line given its equation in the form Ax + By = C | Find the slope and the *y*-intercept of the line. $9x - 3y = -4$ |
| Writing an equation of a line given its slope and y-intercept | Write an equation in slope-intercept form for the line with *y*-intercept -1 and slope -4. |
| Writing an equation and graphing a line given its slope and y-intercept | Write an equation in slope-intercept form for the line with slope 3 and *y*-intercept 1. Then graph the line. |
| Writing an equation in slope-intercept form given the slope and a point | A line passes through the point (2,4) and has a slope of -7. Write an equation in slope-intercept form for this line. |
| Writing the equation of a line given the y-intercept and another point | Write an equation of the line below.<br>[Graph of linear function on grid with *y*-intercept and another point] |
| Writing the equation of the line through two given points | Find an equation for the line below.<br>[Graph of linear function on grid with two points] |

| Topic | Example |
|---|---|
| Writing the equations of vertical and horizontal lines through a given point | Write equations for the horizontal and vertical lines passing through the point (0,-9). |
| Finding the initial amount and rate of change given a graph of a linear function | Scientists are measuring a distant planet's temperature. The graph shows the temperature (in °C) versus the height (in kilometers) above the planet's surface.<br>[Graph of Temperature (in °C) as a function of Height (kilometers)]<br>(a) What is the temperature at 0 kilometers?<br>(b) Choose the statement that best describes how the height and temperature are related. Then give the value requested.<br>As the height increases, the temperature decreases. At what rate is the temperature decreasing?<br>As the height increases, the temperature increases. At what rate is the temperature increasing? |
| Writing an equation and drawing its graph to model a real-world situation: Advanced | Alan is a software salesman. His monthly salary is $1600 plus an additional $110 for every copy of *English is Fun* he sells. Let S represent his total salary this month (in dollars), and let N represent the number of copies of *English is Fun* he sells. Write an equation relating S to N, and then graph your equation using the axes below. |
| Interpreting the parameters of a linear function that models a real-world situation | Owners of a recreation area are filling a small pond with water. Let y represent the total amount of water in the pond (in liters). Let *x* represent the total number of minutes that water has been added. Suppose that x and y are related by the equation $y = 300 + 29x$<br>What is the change per minute in the amount of water in the pond?<br>What was the starting amount of water in the pond? |

| Topic | Example |
|---|---|
| Application problem with a linear function: Finding a coordinate given two points | Scott is driving to Los Angeles. Suppose that the distance to his destination (in miles) is a linear function of his total driving time (in minutes). Scott has 46 miles to his destination after 16 minutes of driving, and he has 23.2 miles to his destination after 40 minutes of driving. How many miles will he have to his destination after 58 minutes of driving?<br>[Graph of Remaining distance (in miles) as a function of Driving time (in minutes)] |
| Identifying functions from relations | For each relation, decide whether or not it is a function.<br>Type 1: Tables of Domain and Range pairs<br>Type 2: {(2,-9), (7,2), (-9,-9),(5,-9)} or {(w,-4), (c,-4), (k,-4), (k, -7)} |
| Vertical line test | For each graph below, state whether it represents a function.<br>[Given graphs] |
| Table for a linear function | The function *g* is defined by the following rule.<br>$g(x) = -4x - 5$<br>Complete the function table.<br>[Table with values of *x* given and missing values of *g(x)*] |
| Evaluating functions: Linear and quadratic or cubic | The functions *f* and *g* are defined as follows.<br>$f(x) = 2x^3 + 2 \qquad g(x) = -5x + 2$<br>Find *f*(-2) and *g*(4). |

| Topic | Example |
|---|---|
| Table for a square root function | Fill in the table using this function rule.<br>$f(x) = \sqrt{x} + 5$<br>Complete the function table.<br>[Table with values of *x* given and missing values of *f(x)*] |
| Evaluating a rational function: Problem type 1 | The function *f* is defined as follows.<br>$f(x) = \frac{x - 13}{2x - 14}$<br>Find *f*(7). |
| Evaluating a rational function: Problem type 2 | The function *h* is defined as follows.<br>$h(x) = \frac{x - 4}{x^2 + 5x - 24}$<br>Find *h*(-6). |
| Evaluating functions: Absolute value, rational, radical | The function *f*, *g,* and *h* are defined as follows<br>$f(x) = -5\|x - 10\| \qquad g(x) = \frac{-4x^2 - 1}{x^2} \qquad h(x) = -3 + \sqrt{x + 5}$<br>Find *f*(4), *g*(3), *h*(-1) |
| Domain and range from ordered pairs | Suppose that the relation *H* is defined as follows.<br>*H* = {(5,-4), (-7,2), (-7,-9), (0,5)} |

| Topic | Example |
|---|---|
| | Give the domain and range of *H.* Write your answers using set notation. |
| Domain of a rational function: Excluded values | The function *g* is defined below.<br>$g(x) = \frac{x^2 - 3x - 18}{x^2 + 8x + 15}$<br>Find all values of *x* that are NOT in the domain of *g.* |
| Domain of a rational function: Interval notation | The functions *f* and *g* are defined as follows.<br>$f(x) = \frac{x}{x^2 + 16} \qquad g(x) = \frac{x + 5}{x^2 - 25}$<br>For each function, find the domain. Write each answer as an interval or union of intervals. |
| Domain of a square root function: Basic | Find the domain of the function.<br>$u(x) = \sqrt{x + 7}$ |
| Domain of a square root function: Advanced | Find the domain of the function.<br>$h(x) = \sqrt{24 - 6x}$<br>Write your answer using interval notation. |
| Finding the domain of a fractional function involving radicals | Find the domain of the function.<br>$f(x) = \frac{\sqrt{5 + x}}{-8 + 2x}$ |

| Topic | Example |
|---|---|
| | Write your answer as an interval or union of intervals. |
| Finding outputs of a one-step function that models a real-world situation: Function notation | Omar tutors history. For each hour that he tutors, he earns<br>25 dollars. His earnings, *E* (in dollars), after tutoring for *h* hours is given by the following function.<br>$E(h) = 25h$<br>How much does Omar earn if he tutors for 5 hours? |
| Finding outputs of a two-step function with decimals that models a real-world situation: Function notation | Chau received a $40.50 gift card for a photo center. He used it to buy prints that cost 9 cents each. The remaining balance, *B* (in dollars), on the card after buying *x* prints is given by the following function.<br>$B(x) = 40.50 - 0.09x$<br>What is the remaining balance on the card if Chau bought 50 prints? |
| Finding inputs and outputs of a two-step function that models a real-world situation: Function notation | A railroad crew can lay 7 miles of track each day. They need to lay 189 miles of track. The length, *L* (in miles), that is left to lay after *d* days is given by the following function.<br>$L(d) = 189 - 7d$<br>(a) How many miles of track does the crew have left to lay after 19 days?<br>(b) How many days will it take the crew to lay all the track? |
| Finding an output of a function from its graph | The graph of a function *h* is shown below. Find *h*(-2).<br>[graph of function] |

| Topic | Example |
|---|---|
| Finding inputs and outputs of a function from its graph | The graph of a function *h* is shown below. Find *h*(-2) and find one value of *x* for which *h*(x) = 3.<br>[graph of function] |
| Domain and range from the graph of a discrete relation | The entire graph of the relation *H* is shown below. Give the domain and range of *H.* Write your answers using set notation.<br>[graph of discrete relation] |
| Domain and range from the graph of a continuous function | The entire graph of the function *g* is shown in the figure below. Write the domain and range of *g* using interval notation.<br>[graph of continuous function] |
| Graphing a function of the form f(x) = ax + b: Integer slope | Graph the function $h(x) = -5x + 6.$ |
| Graphing a function of the form f(x) = ax + b: Fractional slope | Graph the function $g(x) = \frac{4}{3}x + 1.$ |
| Identifying solutions to a linear equation in two variables | For each ordered pair, determine whether it is a solution to $x = 6$<br>(-8,-2) (6,4) (6,-1) (0,6) |
| Variable expressions as inputs of functions: Problem type 1 | The function *g* is defined by $g(x) = x + 5$. Find $g(x + 2).$ |

| Topic | Example |
|---|---|
| Variable expressions as inputs of functions: Problem type 2 | The function h is defined by $h(x) = \frac{8}{-4x^2 + 5}$. Find $h(x - 3)$. |
| Variable expressions as inputs of functions: Problem type 3 | The functions *f* and *g* are defined by $f(x) = x^2 - 2x - 1$ and $g(x) = \frac{5x - 1}{7x - 3}$. Find $f(x + 8)$ and $g\left(\frac{x}{4}\right)$. |
| Finding the average rate of change of a function | Find the average rate of change of $f(x) = -3x^2 + 6$ from *x*=4 to *x*=8. |
| Finding the average rate of change of a function given its graph | The graph of a function *f* is shown below. Use the graph of the function to find its average rate of change from *x*=1 to x=4.<br>[Graph of non-linear function] |
| Writing the equation of a secant line | Given $g(x) = x^2 - 2x$, find the equation of the secant line passing through (-4, *g*(-4)) and (1, *g*(1)). Write your answer in the form *y*=m*x*+b. |
| Identifying solutions to a system of linear equations | For each ordered pair, determine whether it is a solution to the system of equations.<br>$5x - 3y = 8$<br>$y = 4x + 2$<br>(-8, 10) (-1, -4) (9,0) (2,1) |
| Graphically solving a system of linear equations | Graph the system below and write its solution. |

| Topic | Example |
|---|---|
| | $y = -\frac{-1}{4}x - 2$<br>$-x - 4y = 4$<br>(-2, -6) (4, 4) (0, 2) (7, -1) |
| Solving a system of linear equations using substitution | Use substitution to solve the system.<br>$3x + 2y = 1$<br>$3y - 7 = x$ |
| Solving a system of linear equations using elimination with addition | Solve the following system of equations.<br>$-6x + y = 14$<br>$8x + y = -14$ |
| Solving a system of linear equations using elimination with multiplication and addition | Solve the following system of equations.<br>$-5x + 3y = -25$<br>$3x - 5y = 15$ |
| Solving a 2x2 system of linear equations that is inconsistent or consistent dependent | Two systems of equations are given below. For each system, choose the best description of its solution. If applicable, give the solution.<br>System A: $4x = 8 + y$<br>$-4x + y = -8$<br>System B: $-2x + y = -4$<br>$-2x - y = -4$ |

| Topic | Example |
|---|---|
| Solving a word problem involving a sum and another basic relationship using a system of linear equations | A couch and coffee table cost a total of $1280. The cost of the couch is three times the cost of the coffee table. Find the cost of each item. |
| Solving a word problem using a system of linear equations of the form Ax + By = C | One month Lashonda rented 5 movies and 3 video games for a total of $39. The next month she rented 2 movies and 12 video games for a total of $75. Find the rental cost for each movie and each video game. |
| Solving a value mixture problem using a system of linear equations | Suppose that there are two types of tickets to a show: advance and same-day. Advance tickets cost $20 and same-day tickets cost $30. For one performance, there were 65 tickets sold in all, and the total amount paid for them was $1600. How many tickets of each type were sold? |
| Solving a percent mixture problem using a system of linear equations | The Royal Fruit Company produces two types of fruit drinks. The first type is 35% pure fruit juice, and the second type is 60% pure fruit juice. The company is attempting to produce a fruit drink that contains 55% pure fruit juice. How many pints of each of the two existing types of drink must be used to make 70 pints of a mixture that is 55% pure fruit juice? |
| Solving a distance, rate, time problem using a system of linear equations | Flying against the jetstream, a jet travels 4050 miles in 5 hours. Flying with the jetstream, the same jet travels 4920 miles in 4 hours. What is the rate of the jet in still air and what is the rate of the jetstream? |
| Solving a tax rate or interest rate problem using a system of linear equations | Charmaine bought a desktop computer and a laptop computer. Before finance charges, the laptop cost $400 less than the desktop. She paid for the computers using two different financing plans. For the desktop the interest rate was 7.5% per year, and for the laptop it was 8% per year. The total finance charges for one year were $371. How much did each computer cost before finance charges? |