

Background Knowledge/Review

Nelson Mathematics 10 offers a number of features that can be used to determine student readiness for chapters and their understanding of skills and concepts at the end of chapters:

- Review of Essential Skills and Knowledge
- Getting Ready
- Chapter Reviews
- Chapter Review Tests
- Cumulative Review Tests
- Answers to all questions are found in the back of the student text

Review of Essential Skills and Knowledge appears at the beginning of the two chapters it supports. It reviews content from previous grades, highlighting the required concepts, procedures and skills needed for the upcoming chapters.

Review of Essential Skills and Knowledge – Part I

Operations with Integers

Set of Integers $I = \{\dots, -3, -2, -1, 0, 1, 2, 3, \dots\}$

Addition

When adding two integers

- if the signs are the same, then the sum has the same sign as well:
 $(-12) + (-5) = -17$
- if the signs are different, then the sum takes the sign of the larger number:
 $18 + (-5) = 13$

Subtraction

Add the opposite:

$$-15 - (-8) = -15 + 8 = -7$$

Multiplication and Division

When multiplying and dividing two integers

- if the two integers have the same sign, then the answer is positive:
 $6 \times 8 = 48, (-36) \div (-9) = -4$
- if the two integers have different signs, then the answer is negative:
 $(-5) \times 9 = -45, 54 \div (-6) = -9$

More than one operation → follow the order of operations.

B Brackets
E Exponents
D Division
M Multiplication
A Addition
S Subtraction

which ever comes first
which ever comes first

Example

Evaluate.

(a) $-10 + (-12)$ (b) $(-12) - 7$ (c) $(-11) + (-4) + 12 + (-7) + 18$

(d) $(-6) \times 9 \div 3$ (e) $\frac{20 + (-12) \div (-3)}{(-4 + 12) \div (-2)}$

Solution

(a) $-10 + (-12) = -22$ (b) $(-12) + 7 = -5$ (c) $(-11) + (-4) + 12 + (-7) + 18 = (-22) + 30 = 8$

(e) $\frac{20 + (-12) \div (-3)}{(-4 + 12) \div (-2)}$
 $= \frac{20 + 4}{8 \div (-2)}$
 $= \frac{24}{-4}$
 $= -6$

REVIEW OF ESSENTIAL SKILLS AND KNOWLEDGE – PART I 15

Getting Ready

In this chapter, you will be working with linear equations, linear graphs, and algebraic expressions.

These exercises will help you warm up for the work ahead.

1. Evaluate for $x = -2$.

(a) $6x - 3$ (b) $\frac{1}{2}x + 5$
 (c) $-12x - 10$ (d) $3.75x + 1.5x$

2. Evaluate for $p = -\frac{1}{8}$, $q = \frac{3}{-4}$, and $r = \frac{3}{8}$.

(a) $p + q + r$ (b) $pq + r$
 (c) $pr - pq$ (d) pqr

3. Find the value of y when $x = -4$.

(a) $y = 3x - 12$ (b) $2x - 4y = 8$
 (c) $2x - 5y - 2 = 0$ (d) $6x - 6y = 16$

4. Solve.

(a) $20 = 7k + 6$
 (b) $3m - 12 = -18$
 (c) $7x + 3 - 2x = 23$
 (d) $8x - 12 = 5x + 9$
 (e) $5(y + 2) = 17$
 (f) $-3 = 3(x + 2)$
 (g) $2y - 5 - (y - 3) = 7$
 (h) $6.5(x - 3) = 2.4(3 - x)$
 (i) $\frac{x}{4} - 1 = \frac{x}{5}$
 (j) $\frac{x}{8} - \frac{3}{2} = -\frac{1}{4}$
 (k) $\frac{2}{3}(p - 2) = p + 5$
 (l) $\frac{1}{3}(6y - 9) = \frac{1}{2}(8y - 4)$

5. Express in the form $y = mx + b$.

(a) $6x + y = 12$
 (b) $2x - 3y - 12 = 0$
 (c) $14 - 7x = 2y$
 (d) $-5y + 6x - 11 = 0$

6. Use a table of values to graph.

(a) $y = 3x - 4$ (b) $y = \frac{3}{4}x + 2$
 (c) $2y = 10x - 6$ (d) $2x - 3y = 6$

7. Use the x - and y -intercepts to graph.

(a) $x + y = 5$ (b) $2x - 4y = -8$
 (c) $3x = 12 - 9y$ (d) $6x - 3y + 9 = 0$

8. Use the slope and y -intercept to graph.

(a) $y = 3x + 1$ (b) $y = -\frac{2}{3}x - 2$
 (c) $3y = 4x + 6$ (d) $2x + 5y = 10$

9. Simplify.

(a) $(2x + 5y - 6) + (3x - 4y + 12)$
 (b) $(-3x - 5 + 2y) - (5x - 3 - 4y)$
 (c) $(x + 5) + (2y - 6) - (3x - 2y)$
 (d) $(10x - 4y - 12) - (6y - 5 - 2x) - (3x + 5y)$

10. Add or subtract, as directed.

(a) Add. (b) Add.
 $2x + 3y$ $9x - 3y$
 $3x + 5y$ $-5x - 2y$
 (c) Subtract. (d) Subtract.
 $6x + 5y$ $5x - 3y$
 $3x - 2y$ $4x - 5y$

11. Write each sentence as an equation with two unknowns.

- (a) The sum of two numbers is 12.
 (b) Premium gasoline costs 15% more than regular gasoline.
 (c) It cost \$135 to rent the car, based on \$25 per day, plus \$0.15/km.
 (d) The total number of adults and children at the circus was 1254.
 (e) Benoit invested some money at 8% and some at 10%. He earned a total of \$235 in interest.


Getting Ready reviews the important ideas from previous grades and chapters to ensure students understand skills and concepts, which the chapter will build on. *Getting Ready* pages appear at the beginning of each chapter.

Chapter 1 Review


Using Linear Systems to Solve Problems Check Your Understanding

1. How many equations do you need to solve a linear system with two unknowns?
2. How can you test whether an ordered pair is a solution to a linear system?
3. Describe the graph of a linear system that has many solutions.
4. Graph a linear system with (a) one solution and (b) no solution.
5. Explain what you must do first to solve a linear system using substitution.
6. Substitution and elimination both have one step in common. What is it?
7. What is the best way to solve a linear system when an approximate answer is good enough?
8. A scatter plot gives two linear relationships that do not intersect on your calculator display. For each image, explain how you would find the point of intersection.

(a)



(b)


9. Suppose you have to find an exact solution to a linear system. Explain how you would decide whether to use substitution or elimination.
10. You are using elimination to solve a linear system. Explain how you would decide whether to add or subtract the two equations.
11. A flow chart is a set of steps that describes how to do something. Create a flow chart showing how to solve a linear system using elimination.
12. Can data always be represented by a linear model? Explain.
13. When you use linear regression, how can you decide whether a linear relationship is the best model to use?
14. Rank these methods of solving a linear system, from most effective to least effective. Give your reasons for ranking the first one first and the last one last.
 - (a) graphing by hand
 - (b) elimination
 - (c) graphing with technology
 - (d) substitution
 - (e) guess and test

118 CHAPTER 1 USING LINEAR SYSTEMS TO SOLVE PROBLEMS

Chapter Review summarizes the key concepts and skills developed within the chapter. This section is supported by solved examples and further practice questions, and features, and features a *Check Your Understanding* page, that helps students determine if they understand the main ideas of a chapter.

Chapter Review Tests are designed to help students review the important ideas and concepts of each chapter. Questions tie together several expectations from the curriculum.

Chapter 1 Review Test

Using Linear Systems to Solve Problems

1. (a) Determine graphically the point of intersection between the lines defined by $y = -2x + 6$ and $8 = 5x - y$.
 (b) Verify that you determined the correct point by solving the system of equations in part (a) algebraically.
2. Solve by substitution.

(a) $3x + y = 5$ (b) $5x - 2y = -16$ (c) $4x - 3y = 10$
 $x - 2y = 11$ $-2x + y = 7$ $2x + 3y = 4$
3. Solve by elimination.

(a) $a - 15b = 3$ (b) $2x + 5y = 19$ (c) $3x - 2y = -8$
 $3b + a = 21$ $3x - y = 3$ $3y - 21 = 9x$
4. Confirm or deny: The ordered pair $(3, -5)$ is the solution to the linear system defined by $2x + 5y = -19$ and $6y - 8x = -54$. Justify your answer.
5. Jeff is a cashier at the grocery store. He has a total of \$580 in bills. He has 76 bills, consisting of \$5 bills and \$10 bills. How many of each type does he have?
6. A traffic helicopter pilot finds that with a tailwind her 120 km trip away from the airport takes 30 min. On her return trip to the airport, into the wind, she finds that her trip is 10 min longer. What is the speed of the helicopter? What is the speed of the wind?
7. Rani is comparing the monthly costs from two Internet service providers. Netaxes charges a flat monthly fee of \$10, plus \$0.75 per hour spent on-line. Webz charges a flat monthly fee of \$5, plus \$1 per hour.
 - (a) Determine when the monthly costs are the same.
 - (b) Rani plans to use the Internet for at least 30 h each month. Which provider should she choose? Explain.
8. Premium gasoline sells for 78.9¢/L. Regular gas sells for 71.9¢/L. To boost sales, a middle octane gasoline is formed by mixing premium and regular. If 1000 L of this middle octane gas is produced, and is sold at 73.9¢/L, then how much of each type of gasoline can you assume was used in the mixture?
9. Graph a linear system with no solution. Determine two possible equations that could represent both lines in your graph.
10. Solve.

(a) $12(x - 2) - (2y - 1) = 14$ (b) $\frac{x - 2}{3} - \frac{y + 5}{2} = -3$
 $5(x - 1) + 2(1 - 2y) = 14$ $3x - \frac{2y}{3} = 13$

CHAPTER 1 REVIEW TEST 137

Cumulative Review Test

Three cumulative tests are provided in the student text. These tests are intended for student self-assessment and combine the important ideas and concepts from two related chapters.

Cumulative Review Test 1

1. Solve using the elimination method.

$$\begin{aligned} 3x + 4y &= -10 \\ 5x - 2y &= 18 \end{aligned}$$
2. Solve using the substitution method.

$$\begin{aligned} x &= -2y + 3 \\ y &= -3x + 4 \end{aligned}$$
3. Raj needs to rent a car to drive to Woodstock and back. Cars-To-Go rents cars for \$42 per day, plus \$0.12/km. Cheapo Rentals rents cars for \$30 per day, plus \$0.15/km.
 - (a) Write linear equations to represent the prices of a one-day rental from each company.
 - (b) Use a graph, or a table of values, or both, to locate the point where the graphs of the two equations cross.
 - (c) Interpret the coordinates of the point of intersection in terms of the problem situation.
 - (d) Suppose Raj lives 220 km from Woodstock. Write a detailed explanation that shows how much he will save each day if he chooses the cheaper rental option.
4. The Sweet Tooth candy store sells hard candy for \$6/kg and soft candy for \$12/kg. The store manager mixes the two kinds of candy to create a 60 kg mixture that sells for \$8/kg. How much of each type of candy is in the mixture?
5. Melanie saved \$1200 from working last summer. She invested some of the money in a guaranteed investment certificate that paid 4.5% interest. Melanie deposited the rest in a savings account that paid only 2% interest. The total interest for the year was \$40. How much money did Melanie invest in each?
6. This table shows how much Canadians spent on furniture and clothing from 1995 to 1999.

Year	Clothing (millions \$)	Furniture (millions \$)
1995	4.9	5.4
1996	5.1	5.6
1997	5.3	5.8
1998	5.5	6.0
1999	5.5	6.0

Source: Statistics Canada, CANSIM, Matrix 2400

 - (a) Create a scatter plot and the graph of best fit that compares both sets of data.
 - (b) When will Canadians spend equal amounts of money on furniture and clothing?
 - (c) Suppose you are planning to open a new retail business and are considering these two areas. Which type of store would you open based on this data? Explain.

CUMULATIVE REVIEW TEST 1 219

The overall design and organization of *Nelson Mathematics 10* lends itself to student accessibility and use of use.