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Chapter 2 Test – Linear Equations

Grade	8	Chapter	2	Lessons	2-1 to 2-9	Coursebook Pages	72-149
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Student Name		Class		Date	
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Multiple Choice: CALCULATOR NOT ALLOWED

1	What is the solution of the equation below?	
	$2(2a - 4) - 7a = -3(a - 9)$	
	A	identity
	B	no solution
	C	$a = 5$
D	$a = 19$	

2	Find the value of x that will generate the <u>same area</u> for the figures below.	
	A	$x = -7$
	B	$x = -4$
	C	$x = 0$
D	$x = 9$	



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3	To solve a ___(1)___ using cross products, write an equation that sets the product of the ___(2)___ equal to the product of the ___(3)___.	
	A	(1) ratio (2) extremes (3) means
	B	(1) proportion (2) rate (3) unit rate
	C	(1) proportion (2) extremes (3) means
D	(1) ratio (2) rate (3) unit rate	

4	Your friend is selling 5 tickets to enter IMG Worlds of Adventure for AED 1200. You can buy 3 tickets online for AED 735. Which source offers a better price per ticket? Explain.	
	A	Buying the tickets online is better because AED 735 is cheaper than AED 1200.
	B	Buying the tickets from your friend is better because you get more tickets.
	C	Buying the tickets online is better because you will save AED 5 per ticket.
D	Buying the tickets from your friend is better because you will pay less per ticket.	

5	Evaluate the expression if $h = -7$ and $w = 5$.	
	$-2 4 - h - w$	
	A	-27
	B	-11
	C	-4
D	4	



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6	The average January temperature in a northern Canadian city is $1^{\circ}F$. The actual January temperature for that city may be about $5^{\circ}F$ warmer or colder. In degrees Fahrenheit, the possible temperature t is represented by $ t - 1 = 5$. Find the maximum and minimum temperatures.	
	A	The minimum temperature is $6^{\circ}F$, and the maximum temperature is $11^{\circ}F$.
	B	The minimum temperature is $-6^{\circ}F$, and the maximum temperature is $4^{\circ}F$.
	C	The minimum temperature is $-4^{\circ}F$, and the maximum temperature is $6^{\circ}F$.
	D	The minimum temperature is $-9^{\circ}F$, and the maximum temperature is $-4^{\circ}F$.

7	In 2017, a company went from 7 executives to 15 executives. Find the approximate percent of change in the number of executives.	
	A	1.14% increase
	B	47% increase
	C	53% increase
	D	114% increase

8	The <i>Virgin Mobile</i> store orders sets of mobile phone accessories for AED 54.54 each. The store resells each set for AED 73.09. What is the percent of markup to the nearest percent?	
	A	25% markup
	B	34% markup
	C	75% markup
	D	134% markup

9	For which of the following is the equation solved for the specified variable.	
	$ax - 5 = b$ for a	
	A	$a = \frac{b + 5}{x}$
	B	$a = \frac{b - 5}{x}$
	C	$a = b - x + 5$
D	$a = b - x - 5$	



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10	The monarch butterfly is the only butterfly that migrates annually north and south. A particular group of monarch butterflies travels 2736 kilometers, and it takes about 120 days.	
	(1) Solve the formula $d = rt$ for r .	
	(2) What is the average rate at which the butterflies travel, in kilometers per day? Round to the nearest kilometer per day.	
	A	(1) $\frac{d}{t} = r$ (2) 2616 kilometers per day
	B	(1) $\frac{d}{t} = r$ (2) 23 kilometers per day
C	(1) $d - t = r$ (2) 2616 kilometers per day	
D	(1) $d - t = r$ (2) 23 kilometers per day	

11	How many liters of a 40% acid solution must be added to 12 liters of a 20% solution to obtain a 25% solution?	
	A	1 L
	B	4 L
	C	8 L
	D	16 L

12	Ali begins bicycling west at 30 miles per hour at 11:00 a.m. If Fahd leaves from the same point 20 minutes later bicycling west at 36 miles per hour, when will he catch Ali?	
	A	1:00 p.m.
	B	1:30 p.m.
	C	2:00 p.m.
	D	2:30 p.m.



Chapter 2 Test – Linear Equations

Constructed Response: CALCULATOR ALLOWED

13

Use the absolute value equation $|-2n + 5| = 11$ to do the following:

- a) Solve the equation and determine the solution set.

solution set: _____

- b) In the space below, graph the solution set using correct graphing techniques.

(/5 marks)

14

A freight train leaves a station traveling 60 miles per hour. A half an hour later, a passenger train leaves the station in the same direction on a parallel track at a speed of 72 miles per hour. Use the formula $d = rt$ to complete the following:

- a. Complete the table below to organize the information.

The "Time (hr.)" column should be completed in terms of t , and the "Distance (miles)" column should be completed as a product of the rate and time for each train.

	Rate (mph)	Time (hr.)	Distance (miles)
Freight Train			
Passenger Train			

- b. Write and solve an equation to find how long after the passenger train leaves will it catch the freight train.

(/8 marks)

Multiple Choice	/12
Constructed Response	/13
Total Marks	/25
Percentage	/100%



Chapter 2 Test – Linear Equations

Grade	8	Lesson(s)	<p>Lesson 2-1: Writing Equations (assessed with 2-4)</p> <p>Lesson 2-2: Solving One-Step Equations (assessed with 2-4)</p> <p>Lesson 2-3: Solving Multi-Step Equations (assessed with 2-4)</p> <p>Lesson 2-4: Solving Equations with the Variable on Each Side</p> <p>Lesson 2-5: Solving Equations Involving Absolute Value</p> <p>Lesson 2-6: Ratios and Proportions</p> <p>Lesson 2-7: Percent of Change</p> <p>Lesson 2-8: Literal Equations and Dimensional Analysis</p> <p>Lesson 2-9: Weighted Averages</p>
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Chapter 2 Test – Linear Equations

Answer Key

Multiple Choice

Q1	B
Q2	D
Q3	C
Q4	D
Q5	A
Q6	C
Q7	D
Q8	B
Q9	A
Q10	B
Q11	B
Q12	A

Constructed Response

13

- a) One mark should be awarded if the student considers both cases, explicitly writing the two equations that satisfy each case.

$$-2n + 5 = 11 \text{ and } -2n + 5 = -11$$

One mark should be awarded if the student gives the correct solution set.

$$\{-3, 8\}$$

If the student shows $n = -3$ and $n = 8$, still award the mark.

- b) One mark should be awarded for a number line showing the numbers in the correct order.

One mark should be awarded for a closed circle on -3.

One mark should be awarded for a closed circle on 8.

If the student shades to the right, left, or in between the closed circles, only one out of the three marks should be given for the correct number line.

5 marks



Chapter 2 Test – Linear Equations

- a. One mark should be given for each correct cell.
The chosen letter to use as the variable is not truly a factor in awarding marks.

	Rate (mph)	Time (hr.)	Distance (miles)
Freight Train	60	t	$60t$
Passenger Train	72	$t - 0.5$	$72(t - 0.5)$ OR $72t - 36$

ALTERNATE SOLUTION

	Rate (mph)	Time (hr.)	Distance (miles)
Freight Train	60	$t + 0.5$	$60(t + 0.5)$ OR $60t + 30$
Passenger Train	72	t	$72t$

- b. One mark should be awarded for a correct equation.
 $60t = 72(t - 0.5)$ **OR** $60t = 72t - 36$

One mark should be awarded for the correct time of 2.5 hours.
If the student stops at 3 hours, the mark should not be awarded.

ALTERNATE SOLUTION

One mark should be awarded for a correct equation.
 $60(t + 0.5) = 72t$ **OR** $60t + 30 = 72t$

One mark should be awarded for the correct time of 2.5 hours.

8 marks



Chapter 2 Test – Linear Equations

Data Analysis Information

Use the information below to help you determine which student learning outcomes are not being met by the majority of your students. This will help you make determinations about re-teaching, spiraling content not mastered, and implementing other interventions without interrupting the scheme of work.

Question	Lesson	Student Learning Outcome(s)
1	2-4	Solve equations with the variable on each side. Solve equations involving grouping symbols.
2	2-4	Solve equations with the variable on each side. Solve equations involving grouping symbols.
3	2-6	Solve proportions.
4	2-6	Compare ratios.
5	2-5	Evaluate absolute value expressions.
6	2-5	Solve absolute value equations.
7	2-7	Find the percent of change.
8	2-7	Solve problems involving percent of change.
9	2-8	Solve equations for given variables.
10	2-8	Use formulas to solve real-world problems.
11	2-9	Solve mixture problems.
12	2-9	Solve uniform motion problems.
13	2-5	Solve absolute value equations.
14	2-9	Solve uniform motion problems.