

PROFICIENCY CHALLENGE 9 ANSWER KEY

AMV = "Answers May Vary"

1	AMV. For example, a number plus 7 can't equal that same number plus 8.
2	AMV. For example, 2 times 3 plus a number is the same the thing as 2 times the number plus 6. Or, the distributive property says that both of these expressions are equivalent.
3	AMV. Check for accuracy.
4	B and D. Explanations may vary. Three consecutive numbers that meet this condition and equal 95 are 8, 9, and 10.
5	<ul style="list-style-type: none">• $30x = 240$ (theater)• $30 + x = 240$ (aquarium)• neither (baseball cards)• $30x = 240$ (sodas)
6	a $m = -3, n = -9$
	b $m = 3, n = 9$
	c $m = 8, n = -1/2$
	d $m = 8, n = 1/2$

PROFICIENCY CHALLENGE 10 ANSWER KEY

AMV = “Answers May Vary”

1	a	$0.38b + 2.79 \leq 5.00$ (or equivalent)
	b	5 bananas
	c	The graph should be a number line showing only the whole numbers 1, 2,3, 4, and 5. It should <u>not</u> be a solid bar/arrow pointing to the left.
	d	Rachel is following the standard long division algorithm too faithfully. $2.21 \div 0.38$ is approximately equivalent to 5.81 or 5.82. However, In the context of the problem, he can only buy whole bananas.

2	a	$2.37 + 1.86 + 2.64p \leq 10$ (or equivalent)
	b	The solution (rounded to two decimal places) to the inequality for part “a” is $p \leq 2.19$. The difference between this solution and the solution to the inequality in problem #1 is that pounds of peanuts (unlike bananas) can be taken in parts. While peanuts are technically still discrete, pounds of peanuts are best represented as a solid graph showing all the rational numbers less that 2.19 (and greater than 0). The solution for problem 1 is more about whole numbers since you can’t buy parts of a banana. The solution for problem 2 includes rational numbers because you can buy parts of pounds of peanuts.
	c	Rachel is incorrect because she doesn’t recognize the accuracy and importance of the reasoning expressed in part “b” of this solution.

3	a	This problem allows student so fully explain in several ways the solution/reasoning expressed in the previous problem (part “b” and “c”).
	b	AMV. For example, a context where whole numbers are useful is talking about how many 12-passenger vans would it take to transport 40 people. A context where rational numbers are more useful could be about how many gallons of gas could a someone buy with \$5 if each gallon cost \$2.24.

4	<ul style="list-style-type: none"> • $2(2x + 4)$ or equivalent. • $2(2x + 2)$ or equivalent. • $2x + 2x + 2 + 2$ or equivalent. • $4(x + 1)$ or equivalent.
	The expressions in the last three bullet points are equivalent to $4x + 4$.

5	a	$8(x + 5) = 96$ and $8x + 40 = 96$ will provide Carlos with the right answer. Reasoning may vary, but both equations accurately model the verbal statement and are mathematically equivalent.
	b	$x = 7$

PROFICIENCY CHALLENGE 11 ANSWER KEY

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1	a	The cost of a small shirt is $2.5(2) + 3 = 8$ dollars. The cost of a medium shirt is $3(2) + 3 = 9$ dollars. The cost of a large shirt is $3.5(2) + 3 = 10$ dollars. The cost of an extra large shirt is $4(2) + 3 = 11$ dollars.
	b	Check graphs for accuracy. They should show a linear pattern.
	c	The relationship is NOT proportional because the graph does not go through the origin.
	d	"Trend lines" or "lines of best fit" are 8 th grade standards so use your judgment in assessing accuracy here. In general, every 1 yard increase of fabric results in a \$2 increase in cost. Therefore, every 1 yard decrease in fabric results in a \$2 decrease in cost. Following this pattern, a 1 yard of fabric shirt would cost \$5 and a "0-yard" shirt would cost \$3. This represents the cost of labor in the context of the problem.
	e	An increase of 1 yard of fabric is equivalent to an increase in \$2 of cost. This is represented by the rate of change (slope) of the line in the graph.
2	a	AMV. In general, larger items require more material to make and are more costly. It's reasonable to assume that larger shoes are more expensive and therefore should cost more.
	b	In reality, this practice is often deemed as unfair since a person can't control how big their feet are. However, children shoes are general cheaper and many smaller adults fit in child-sized shoes and choose to save money by buying those shoes. Furthermore, many websites charge more for XXL and larger sizes in clothing. So proportional pricing does exist on some level in some contexts.

PROFICIENCY CHALLENGE 12 ANSWER KEY

1	<p>Explanations may vary, but in reality, Bruno gave \$500 (10% of \$5000) to his mom, \$450 (10% of the remaining \$4500) to his dad, \$405 (10% of the remaining \$4050) to his sister, \$364.50 (10% of the remaining \$3645) to his brother, and \$328.05 to his nephew (10% of the remaining \$3280.50).</p> <p>In total, Bruno gave away \$2047.55 of his \$5000 because he continually takes 10% of what is left 5 times rather than take 50% of his \$5000 and then dividing that evenly into five parts. In reality, Bruno only gave away about 41% of his money.</p>
2	<p>Her 2010 investment of \$400 will be worth $400(1.05)^{13}$ which is approximately \$754. Her 2013 investment of \$700 will be worth $700(1.06)^{10}$ which is approximately \$1254. In total, her investments will be worth about \$2008 in 2023.</p>
3	<p>a Brain should take the \$12 off coupon because it saves him more money. Nick should take the 12% off coupon because it saves him more money.</p> <p>b In general, if the dollar amount off equals the percentage off, then the customer should take the dollar amount off of products less than \$100 and the percentage amount off of products more than \$100.</p>
4	<p>a Malik needs to consider the total value of all the cars he hopes to sell in a year. If he doesn't think he'll sell many cars, he should take the \$50,000. If he thinks he'll sell a lot, he should take the 5%.</p> <p>b In this scenario, Malik's break-even point is the solution to the equation $50,000 = .05x$ which is $x = \\$1,000,000$. If the flat salary of \$50,000 is equal to 5% of his sales, then he must have sold \$1,000,000 worth of cars.</p>