### Lesson 8 Practice Problems

1. Match each quadratic expression given in factored form with an equivalent expression in standard form. One expression in standard form has no match.
	1. $\left(y+x\right)\left(y−x\right)$
	2. $\left(11+x\right)\left(11−x\right)$
	3. $\left(x−11\right)\left(x+11\right)$
	4. $\left(x−y\right)\left(x−y\right)$
	5. $121−x^{2}$
	6. $x^{2}+2xy−y^{2}$
	7. $y^{2}−x^{2}$
	8. $x^{2}−2xy+y^{2}$
	9. $x^{2}−121$
2. Both $\left(x−3\right)\left(x+3\right)$ and $\left(3−x\right)\left(3+x\right)$ contain a sum and a difference and have only 3 and $x$ in each factor.
* If each expression is rewritten in standard form, will the two expressions be the same? Explain or show your reasoning.
	1. Show that the expressions $\left(5+1\right)\left(5−1\right)$ and $5^{2}−1^{2}$ are equivalent.
	2. The expressions $\left(30−2\right)\left(30+2\right)$ and $30^{2}−2^{2}$ are equivalent and can help us find the product of two numbers. Which two numbers are they?
	3. Write $94⋅106$ as a product of a sum and a difference, and then as a difference of two squares. What is the value of $94⋅106$?
1. Write each expression in factored form. If not possible, write “not possible.”
	1. $x^{2}−144$
	2. $x^{2}+16$
	3. $25−x^{2}$
	4. $b^{2}−a^{2}$
	5. $100+y^{2}$
2. What are the solutions to the equation $\left(x−a\right)\left(x+b\right)=0$?
	1. $a$ and $b$
	2. $-a$ and $-b$
	3. $a$ and $-b$
	4. $-a$ and $b$
* (From Unit 7, Lesson 4.)
1. Create a diagram to show that $\left(x−3\right)\left(x−7\right)$ is equivalent to $x^{2}−10x+21$.
* (From Unit 7, Lesson 6.)
1. Select **all** the expressions that are equivalent to $8−x$.
	1. $x−8$
	2. $8+\left(-x\right)$
	3. $-x−\left(-8\right)$
	4. $-8+x$
	5. $x−\left(-8\right)$
	6. $x+\left(-8\right)$
	7. $-x+8$
* (From Unit 7, Lesson 6.)
1. Mai fills a tall cup with hot cocoa, 12 centimeters in height. She waits 5 minutes for it to cool. Then, she starts drinking in sips, at an average rate of 2 centimeters of height every 2 minutes, until the cup is empty.
* The function $C$ gives the height of hot cocoa in Mai’s cup, in centimeters, as a function of time, in minutes.
	1. Sketch a possible graph of $C$. Be sure to include a label and a scale for each axis.
	2. What quantities do the domain and range represent in this situation?
	3. Describe the domain and range of $C$.
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* (From Unit 4, Lesson 11.)
1. Two bacteria populations are measured at the same time. One bacteria population, $p$, is modeled by the equation $p=250,​000⋅\left(\frac{1}{2}\right)^{d}$, where $d$ is the number of days since it was first measured. The second bacteria population, $q$, is modeled by the equation $q=500,​000⋅\left(\frac{1}{3}\right)^{d}$.
* Which statement is true about the two populations?
	1. The second population will always be larger than the first.
	2. Both populations are increasing.
	3. The second bacteria population decreases more rapidly than the first.
	4. When initially measured, the first population is larger than the second.
* (From Unit 5, Lesson 7.)



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