

**LESSON 3.6** Skills Practice

Name \_\_\_\_\_ Date \_\_\_\_\_

**Closing Time**  
**The Closure Property**

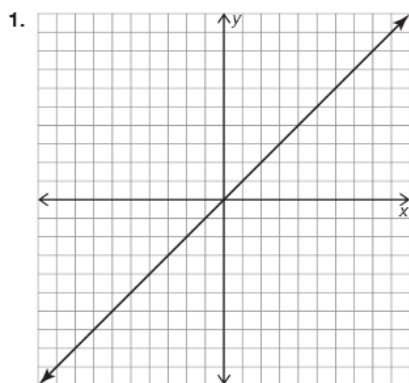
**Vocabulary**

1. Describe in your own words what it means for a set of numbers or expressions to be *closed* under an operation.



**Problem Set**

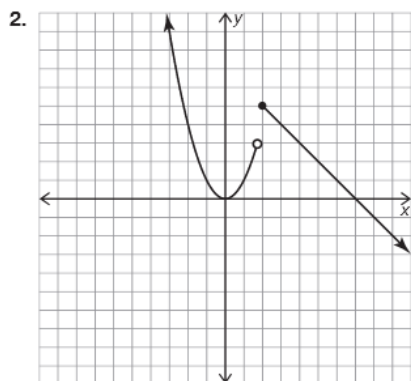
Determine whether each graph represents a polynomial function. Explain your reasoning.



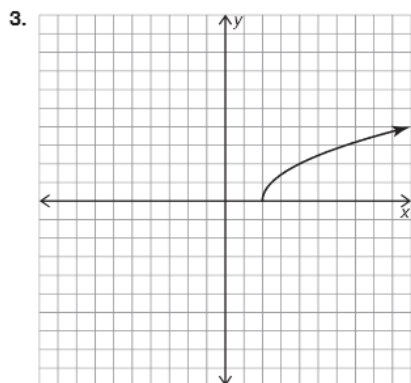
The graph represents a polynomial function because it is continuous and increases to infinity as  $x$  approaches infinity and decreases to infinity as  $x$  approaches negative infinity. This is the graph of a linear function.

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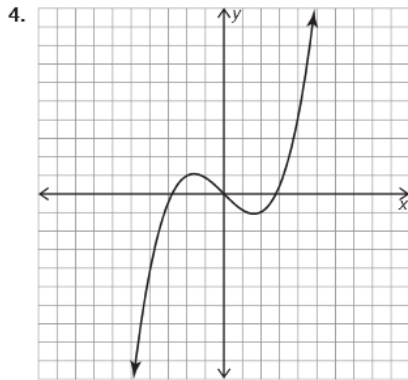


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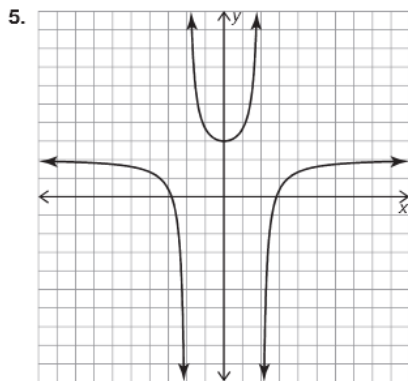
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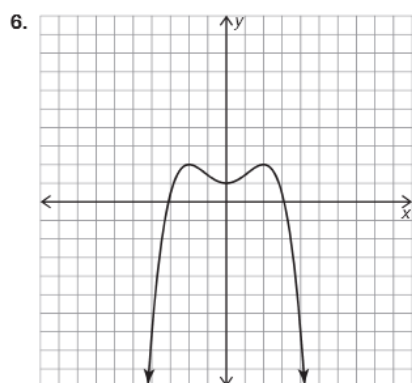
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Determine whether each set is closed under the indicated operation. Then, write an example to support your answer.

7. Is the set {even integers} closed under subtraction?

Yes, the set of even integers is closed under subtraction.

Example:  $6 - 10 = -4$

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8. Is the set {odd whole numbers} closed under addition?

9. Is the set {1, 2, 3, 4, 5, 6} closed under multiplication?

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10. Is the set {rational numbers} closed under multiplication?

11. Is the set {irrational numbers} closed under division?

12. Is the set  $\{2\sqrt{3}, 3\sqrt{3}, 5\sqrt{3}\}$  closed under addition?

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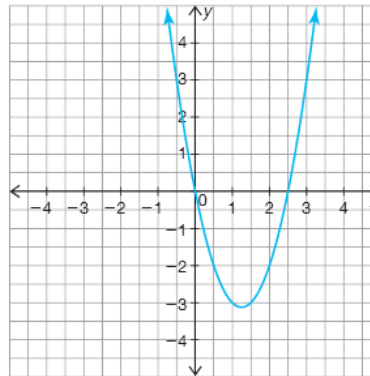
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Add, subtract, multiply, or divide each set of polynomials to show whether they are closed under the indicated operation. Use a graphing calculator to sketch the graph of the resulting polynomial to verify your answer.

13. Are the polynomials  $y_1 = 3x^2 - 5x - 3$  and  $y_2 = -x^2 + 3$  closed under addition?

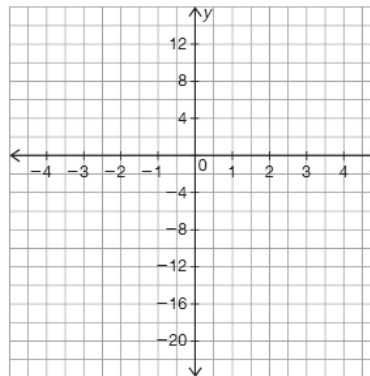
$$\begin{array}{r} 3x^2 - 5x - 3 \\ + -x^2 + 3 \\ \hline 2x^2 - 5x \end{array}$$

Polynomials are closed under addition because the sum is a polynomial.



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14. Are the polynomials  $y_1 = x^3 + 3x^2 - 4x + 12$  and  $y_2 = -3x^3 + 2x^2 - 4x + 22$  closed under subtraction?



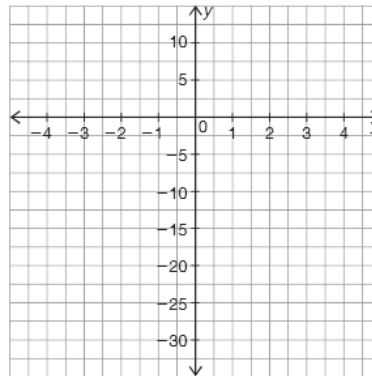
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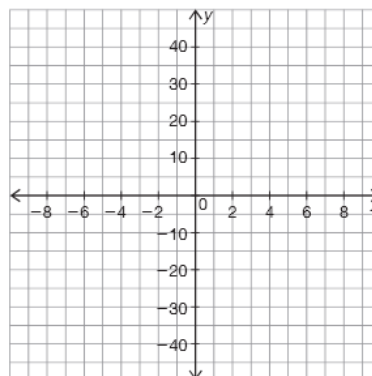
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15. Are the polynomials  $y_1 = x^2 + 3x + 2$  and  $y_2 = x^2 - 3x$  closed under multiplication?



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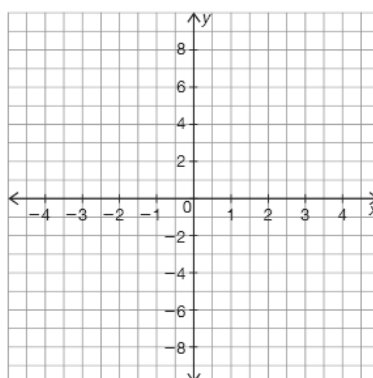
16. Are the polynomials  $y_1 = 3x + 6$  and  $y_2 = x - 1$  closed under division?



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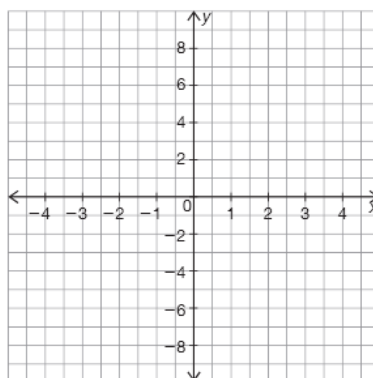
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17. Are the polynomials  $y_1 = -x$ ,  $y_2 = -2x$ , and  $y_3 = -1.5x$  closed under multiplication?



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18. Are the polynomials  $y_1 = 2x^4 - 5x^3 + 3x^2 - x + 6$  and  $y_2 = 3x^4 - 6x^3 + 2x^2 + x + 4$  closed under subtraction?



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