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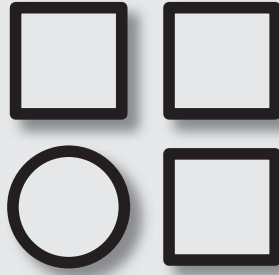
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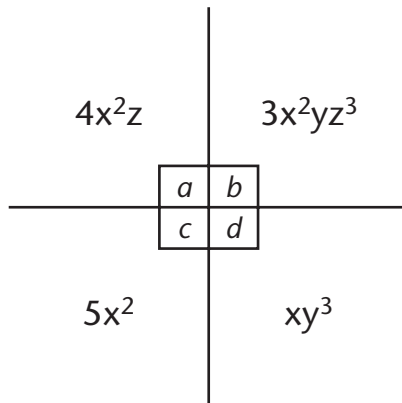
## SECTION ONE

# What Doesn't Belong?

In the activities in this section, students must look for both similarities and differences among the four expressions or equations provided in a problem. Three will be alike in some way and the fourth will differ from the other three. Notation differences may be the focus of a problem, or similarities in mathematical procedures may be observed. Different relationships are possible, depending on which characteristic is noticed first. Students should be encouraged to find as many “solutions” (differences or similarities) as possible for each problem, always stating their reasons for each solution.

## Example 1

Three of the following expressions— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?



**Explanation:** There are at least three possible solutions to this problem. Students may notice that expression  $c$  has only one variable whereas the other three expressions— $a$ ,  $b$ , and  $d$ —have at least two variables. So expression  $c$ , with “only one variable,” would be considered a solution. Another possible solution would be expression  $d$ : it does not contain  $x$  to the second power, but the other three expressions do. Expression  $d$  also provides a third solution: its coefficient is  $+1$  whereas the other expressions have coefficients not equal to  $+1$ . The emphasis in this particular problem is on the differences or similarities in the notations themselves and does not involve a mathematical procedure as such.

The answer key for this section provides several solutions for each problem. Other solutions may be possible, depending on the creativity of the students. These problems are effective in strengthening students’ analytical skills. Reasons for choices should be shared during class discussion of the problems.

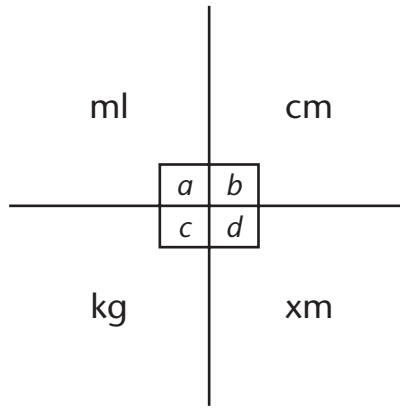


### What Doesn't Belong?

NAME \_\_\_\_\_ DATE \_\_\_\_\_

1.1

Three of the following expressions— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?



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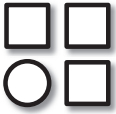
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1.1 What Doesn't Belong?

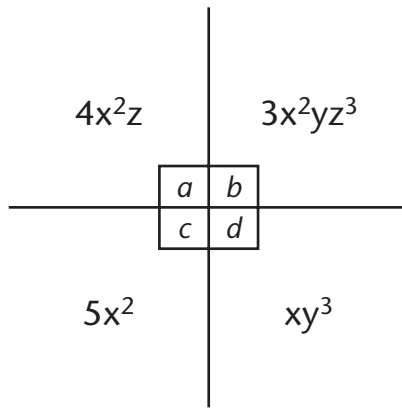


NAME \_\_\_\_\_ DATE \_\_\_\_\_



**1.2**

Three of the following expressions— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?



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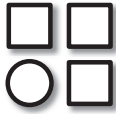
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**What Doesn't Belong? 1.2**

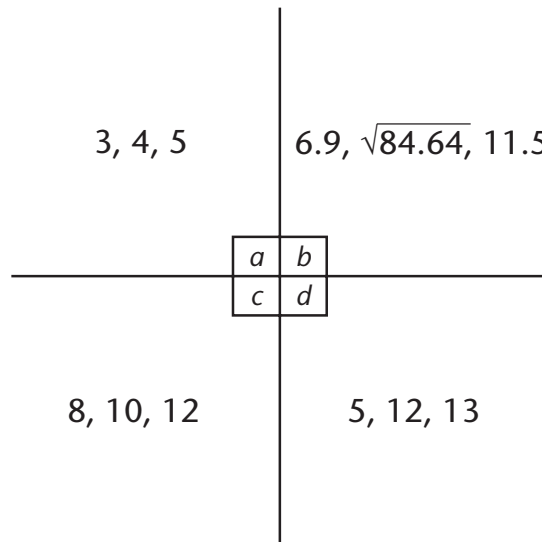
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NAME \_\_\_\_\_ DATE \_\_\_\_\_



### 1.3

Three of the following expressions— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?



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### 1.3 What Doesn't Belong?

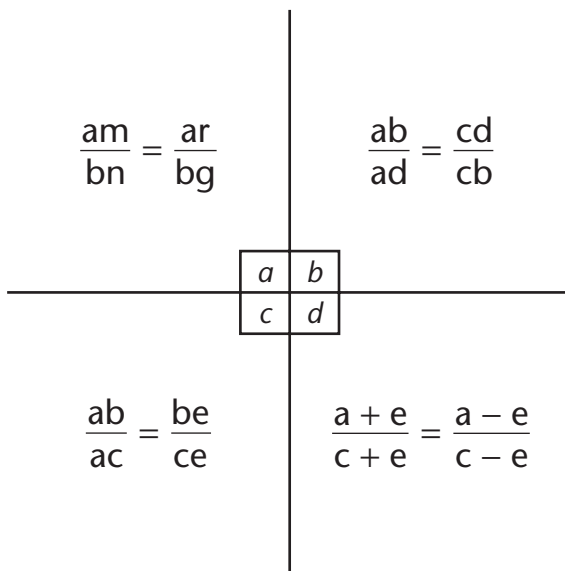


NAME \_\_\_\_\_ DATE \_\_\_\_\_



1.4

Three of the following equations— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?




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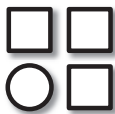
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What Doesn't Belong? 1.4

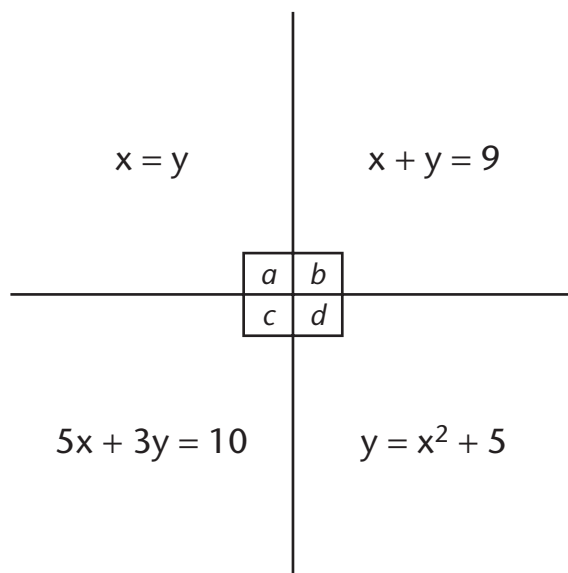


NAME \_\_\_\_\_ DATE \_\_\_\_\_



1.5

Three of the following equations— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?



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1.5 What Doesn't Belong?

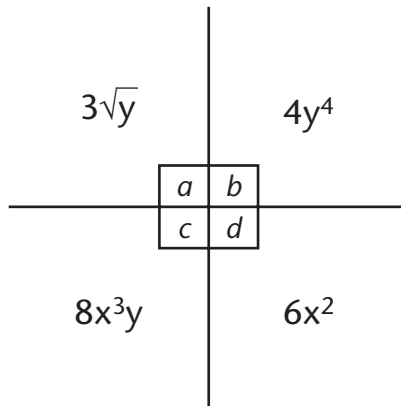


NAME \_\_\_\_\_ DATE \_\_\_\_\_



### 1.6

Three of the following expressions— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?



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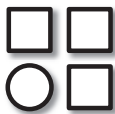
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### What Doesn't Belong? 1.6

NAME \_\_\_\_\_ DATE \_\_\_\_\_



### 1.7

Three of the following equations— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?

Given:  $k, c$  constants  
 $x, y$  variables

$$x = \frac{k}{y}$$

$$x = \frac{y}{c}$$

$a$	$b$
$c$	$d$

$$1 = \frac{c}{xy}$$

$$kx = \frac{c}{y}$$

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### 1.7 What Doesn't Belong?



NAME \_\_\_\_\_ DATE \_\_\_\_\_



**1.8**

Three of the following equations— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?

$(x/y^4)^2 = x^2/y^8$	$(m^3/m^2)^2 = m^2$				
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="padding: 5px;"><math>a</math></td> <td style="padding: 5px;"><math>b</math></td> </tr> <tr> <td style="padding: 5px;"><math>c</math></td> <td style="padding: 5px;"><math>d</math></td> </tr> </table>		$a$	$b$	$c$	$d$
$a$	$b$				
$c$	$d$				
$(m^8n^2)/p^6 =$ $[(m^4n)/p^3]^2$	$[(2a^4)/b^3]^3 =$ $(8a^{12})/b^9$				

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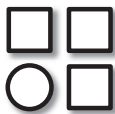
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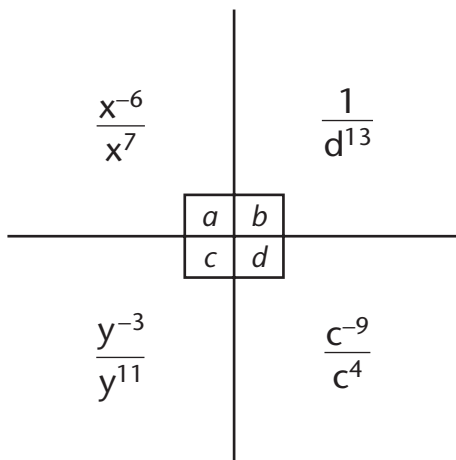
**What Doesn't Belong? 1.8**

NAME \_\_\_\_\_ DATE \_\_\_\_\_



1.9

Three of the following expressions— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?




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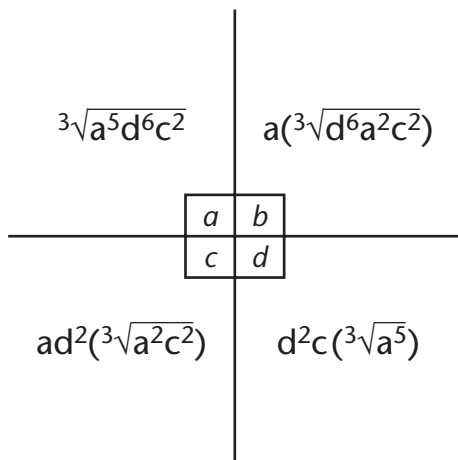


NAME \_\_\_\_\_ DATE \_\_\_\_\_



**1.10**

Three of the following expressions— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?




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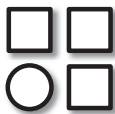
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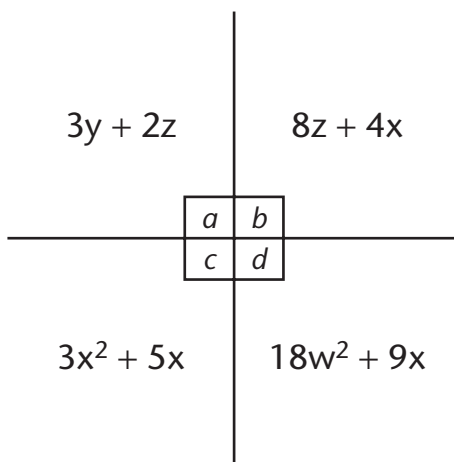
**What Doesn't Belong? 1.10**

NAME \_\_\_\_\_ DATE \_\_\_\_\_



### 1.11

Three of the following expressions— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?



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### 1.11 What Doesn't Belong?

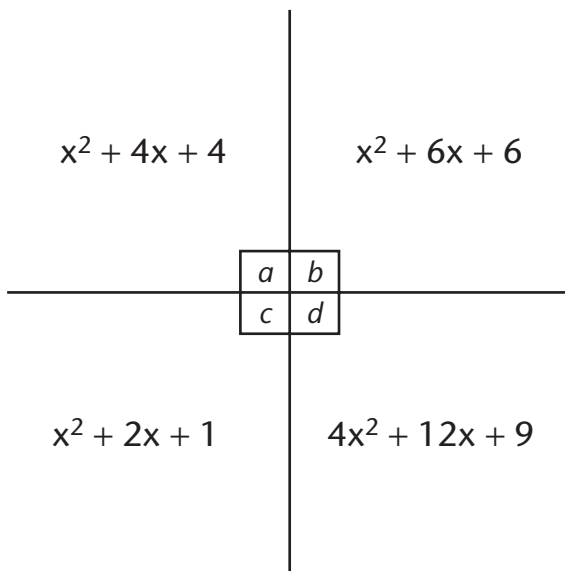


NAME \_\_\_\_\_ DATE \_\_\_\_\_



### 1.12

Three of the following expressions— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?



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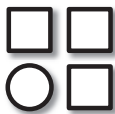
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### What Doesn't Belong? 1.12

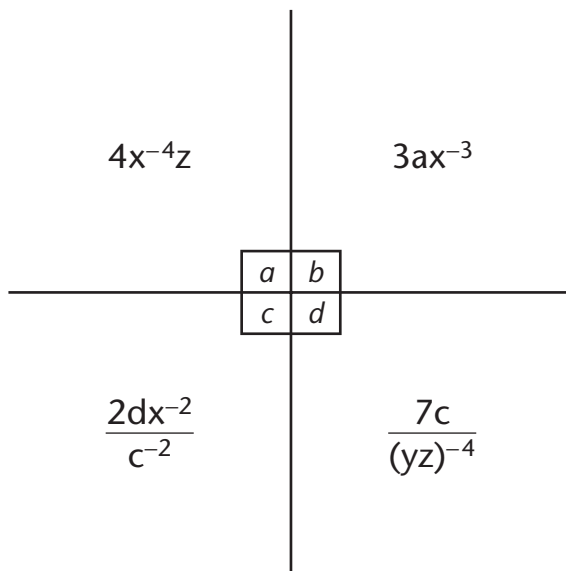


NAME \_\_\_\_\_ DATE \_\_\_\_\_



**1.13**

Three of the following expressions— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?




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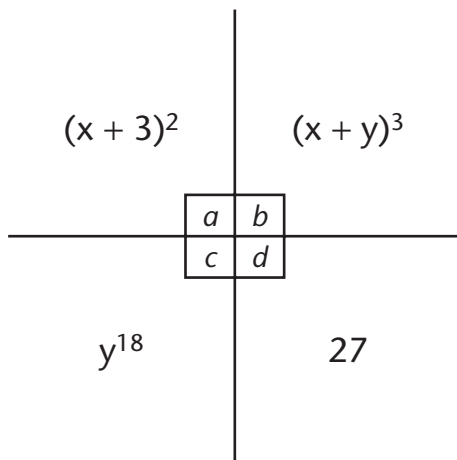


NAME \_\_\_\_\_ DATE \_\_\_\_\_



### 1.14

Three of the following expressions— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?



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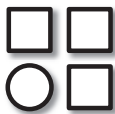
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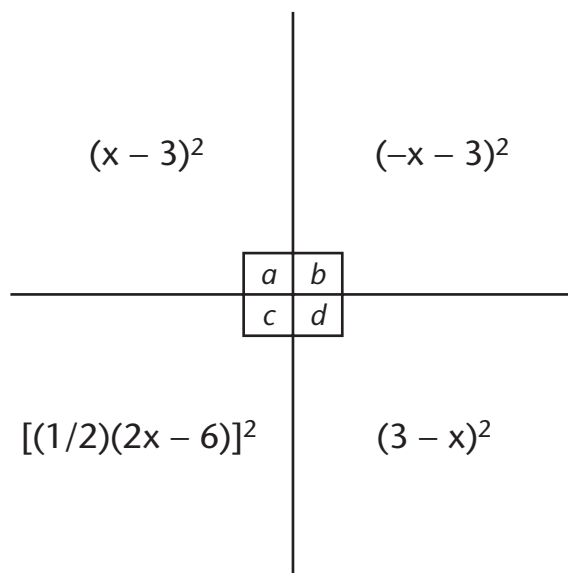
### What Doesn't Belong? 1.14

NAME \_\_\_\_\_ DATE \_\_\_\_\_



### 1.15

Three of the following expressions— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?



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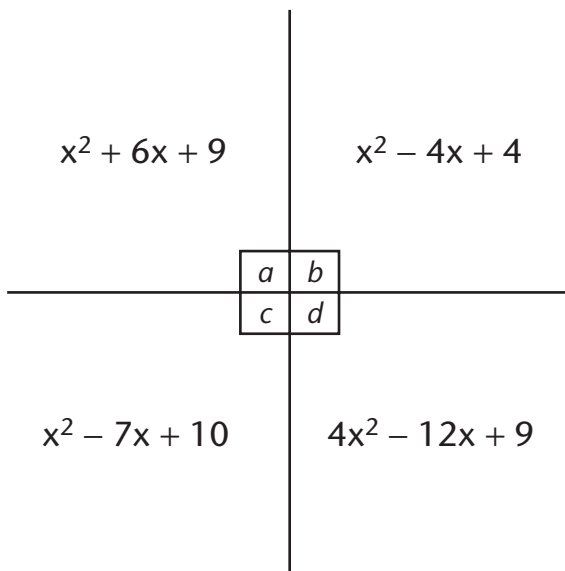


NAME \_\_\_\_\_ DATE \_\_\_\_\_



### 1.16

Three of the following expressions— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?



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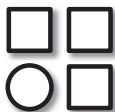
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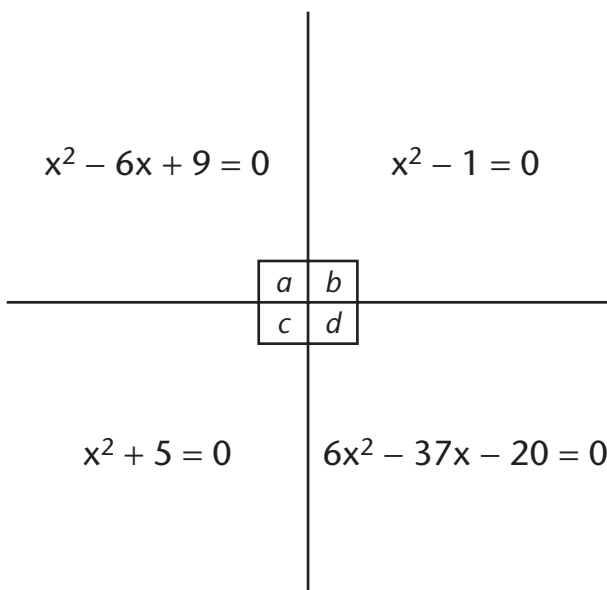
### What Doesn't Belong? 1.16

NAME \_\_\_\_\_ DATE \_\_\_\_\_



**1.17**

Three of the following equations— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?




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**1.17 What Doesn't Belong?**

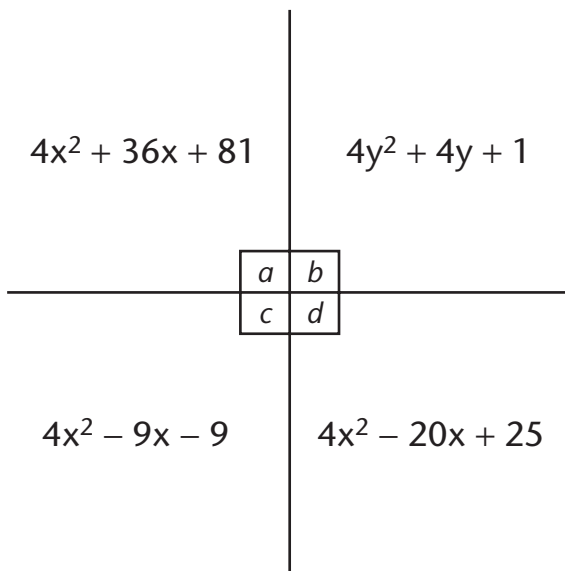


NAME \_\_\_\_\_ DATE \_\_\_\_\_



### 1.18

Three of the following expressions— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?



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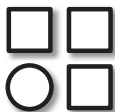
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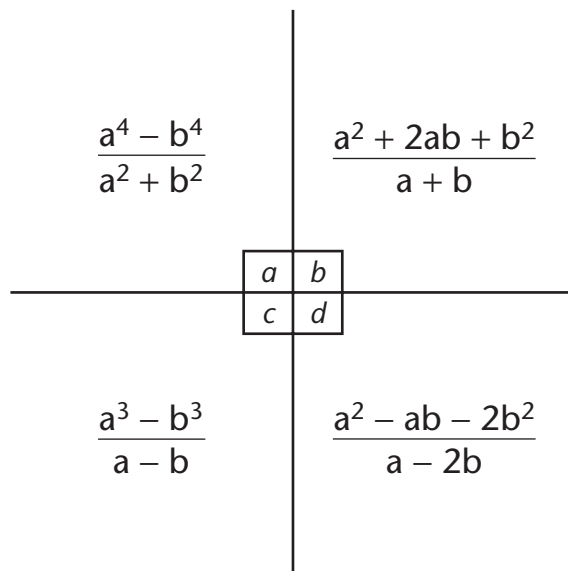
### What Doesn't Belong? 1.18

NAME \_\_\_\_\_ DATE \_\_\_\_\_



**1.19**

Three of the following expressions— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?




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NAME \_\_\_\_\_ DATE \_\_\_\_\_



1.20

Three of the following equations— $a$ ,  $b$ ,  $c$ , and  $d$ —have something in common. The other one differs from them in some way. Which one does not belong? Give a reason. Several answers may be possible, but for different reasons. Can you find more than one possible choice?

$$\frac{x^2}{4} - \frac{y^2}{15} = 1$$

$$16x^2 - 9y^2 + 144 = 0$$

$a$	$b$
$c$	$d$

$$\frac{x^2}{25} + \frac{y^2}{16} = 1$$

$$\frac{x^2}{4} - \frac{y^2}{9} = 1$$

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What Doesn't Belong? 1.20