

# Unit 7: Patterns and Relations

## Quiz (Lessons 10, 12–14)

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Complete the table. (12 marks)

Expression	Variable Term	Variable	Coefficient	Constant Term
$24x - 9$				
$97 - 23T$				
$-k + 18$				

2. Solve for the variable by guessing and checking. Use the table. (12 marks)

a)  $5x + 28 = 43$

$x$	$5x + 28$	True?
1		
2		
3		
4		
5		

so  $x =$  \_\_\_\_\_

b)  $25m - 30 = 95$

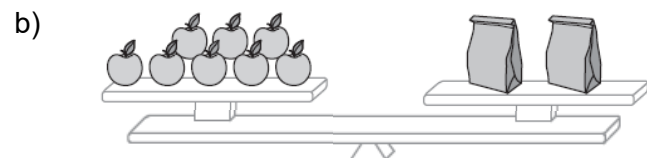
$m$	$25m - 30$	True?
1		
2		
3		
4		
5		

so  $m =$  \_\_\_\_\_

3. The scales are balanced. Let  $m$  represent the number of apples in the bag. Write an equation to represent the total number of apples on each side of the balance. (8 marks)



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## Unit 7: Patterns and Relations

continued

### Quiz (Lessons 10, 12–14)

4. Write the operation and number that make the equation true. (6 + 2 marks)

a)  $49 + 8 \underline{\hspace{1cm}} = 49$

b)  $85 \div 5 \underline{\hspace{1cm}} = 85$

c)  $26 - 50 \underline{\hspace{1cm}} = 26$

**Bonus►**  $(13 + 54m - 96y) \times 31 \underline{\hspace{1cm}} = 13 + 54m - 96y$

5. Isolate the variable by applying the opposite operation. Remember to apply the same operation on both sides of the equation. (8 marks)

a)  $z - 24 = 26$

b)  $96 = 12b$

6. Check your solutions to Question 5 by substituting your solution into the original equation. (8 marks)

a)  $LS = z - 24$      $RS = 26$   
 $LS =$

b)  $LS = 96$      $RS =$

/54 + 2 marks

# Unit 7: Patterns and Relations

## Quiz (Lessons 10, 12–14)

1.  $24x$ ,  $x$ ,  $24$ ,  $-9$   
 $-23T$ ,  $T$ ,  $-23$ ,  $+97$   
 $-k$ ,  $k$ ,  $-1$ ,  $+18$
2. Teacher to check tables.
  - a)  $x = 3$
  - b)  $m = 5$
3.
  - a)  $m + 4 = 7$
  - b)  $8 = 2m$
4.
  - a)  $-8$
  - b)  $\times 5$
  - c)  $+50$

### Bonus

- $\div 31$
5.
  - a)  $z - 24 + 24 = 26 + 24$   
 $z = 50$
  - b)  $96 \div 12 = 12b \div 12$   
 $8 = b$
6. Teacher to check.

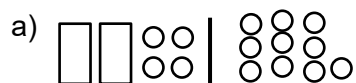
# Unit 7: Patterns and Relations

Name: \_\_\_\_\_

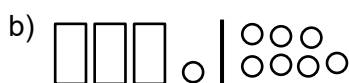
## Quiz (Lessons 15–18)

Date: \_\_\_\_\_

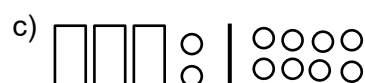
1. The circles represent apples, the rectangles represent bags with the same unknown number of apples, and the line divides two sides of a balance. Write the equation shown by the picture. Use  $b$  for the unknown number of apples in each bag. (6 marks)



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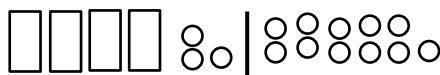
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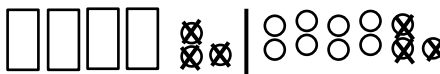
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2. Solve the equation by using a model. Draw the new model and equation for each step of your solution. (12 marks)

$$4x + 3 = 11$$



$$4x + 3 - 3 = 11 - 3$$



3. Solve the equation by applying opposite operations. Show each step. (15 marks)

a)  $9r - 12 = 87$

b)  $\frac{5t}{6} = 10$

c)  $48 + 2x = 100$

## Unit 7: Patterns and Relations

continued

### Quiz (Lessons 15–18)

4. Solve the equation. Show your work. (10 marks)

a)  $s + (-18) = -29$

b)  $w - (-42) = -8$

c)  $-2 + q - (+8) = -73 + (+2)$

5. Translate the sentence into an equation. Solve the equation to find the number. (7 + 10 marks)

a) A number multiplied by 5 then increased by 8 is 43.

**Bonus►** A number multiplied by seven then decreased by twenty is ten more than the product of eleven and three.

/50 + 10 marks

# Unit 7: Patterns and Relations

Answer Key

## Quiz (Lessons 15–18)

1.   a)    $2b + 4 = 10$   
     b)    $3b + 1 = 7$   
     c)    $3b + 2 = 8$
2.   Teacher to check steps  
     and model.  
      $x = 2$
3.   a)    $r = 11$   
     b)    $t = 12$   
     c)    $x = 26$
4.   a)    $s = -11$   
     b)    $w = -50$   
     c)    $q = -61$
5.   a)    $5x + 8 = 43$   
      $x = 7$

### Bonus

$$7n - 20 = 11 \times 3 + 10$$
$$n = 9$$

## Unit 7: Patterns and Relations

Name: \_\_\_\_\_

### Test (Lessons 10, 12–18)

Date: \_\_\_\_\_

1. Explain how equations and expressions are similar and how they are different. (4 marks)

2. Explain what the solution to an equation means. (2 marks)

3. Solve for  $x$  by guessing, checking, and revising. Use test values between 0 and 10. (4 marks)

$$14x + 17 = 143$$

4. Isolate the variable by applying the opposite operation. Remember to apply the same operation on both sides of the equation. (8 marks)

a)  $t - 27 = 112$

b)  $180 = 9b$

5. Check your solutions to Question 4 by substituting your solution into the original equation. (8 marks)

a)  $LS = t - 27$       $RS = 112$

b)  $LS =$       $RS =$

# Unit 7: Patterns and Relations

continued

## Test (Lessons 10, 12–18)

6. The circles represent apples, the rectangles represent bags with the same unknown number of apples, and the line divides two sides of a balance. Solve the equation by using a model. Draw the new model and equation for each step of your solution. (12 marks)

$$3x + 2 = 14$$



$$3x + 2 - 2 = 14 - \underline{\hspace{2cm}}$$



7. Solve the equation by applying opposite operations. Describe each step in words. (12 marks)

a)  $3x + 19 = 40$

b)  $\frac{n}{7} = 25$

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8. Solve the equation. Show your work. (10 + 5 points)

a)  $w - (-12) = -35$

b)  $x - (+25) = -65$

c)  $-5 + (-9) = -41 - (+7) + q$

**Bonus** ►  $(-55) - 4 + r - (-16) = -400 - (-20) - (+45)$

9. Mariko's dad is four times as old as she is, and 11 years younger than Mariko's aunt. Mariko's aunt is 59. How old is Mariko? (8 marks)

/68 + 5 marks



# Unit 7: Patterns and Relations

## Test (Lessons 10, 12–18)

1. Answers may vary. Teacher to check.
2. A solution to an equation is a value for the variable that makes the equation true.
3.  $x = 9$
4. a)  $t = 139$   
b)  $20 = b$
5. Teacher to check.
6. Teacher to check steps and model.  
 $x = 4$
7. a)  $3x + 19 - 19 = 40 - 19$   
subtract 19  
 $3x = 21$   
simplify  
 $3x \div 3 = 21 \div 3$   
divide by 3  
 $x = 7$   
simplify  
b)  $\frac{n}{7} \times 7 = 25 \times 7$   
multiply by 7  
 $n = 175$   
simplify
8. a)  $w = -47$   
b)  $x = -40$   
c)  $+34 = q$  or  $q = 34$

### Bonus

- $r = -382$
9. Mariko is 12.