

Nature Trail Equations

One- and two-step equations from the park ranger's world

Name: _____ Date: _____

1. The ranger's notebook

Ranger Kim writes quick notes in the field. Each note hides an equation. Write it, solve it, and check that your answer makes the note true.

	Field note	Equation	Solution
1	Ranger Kim keeps pine cones in her bag to throw for her dog, Pepper. She found 14 more on the trail. Now there are 31 in the bag — and Pepper is very excited. <i>pine cones before the walk = n</i>		
2	A flock of geese was floating on the lake. Pepper barked once. 18 geese flew away in a panic; 47 stayed and ignored her. <i>geese before the bark = g</i>		
3	Four trout tanks at the hatchery hold the same number of fish. A heron is sitting on the fence counting them: 60 fish in all. <i>fish in one tank = f</i>		
4	Half of the wolves in the pack wear a tracking collar. On the camera trap Kim counted 9 collars — but the other wolves were hiding behind the trees. <i>wolves in the pack = w</i>		
5	Barney the beaver is building a dam. It was 60 cm tall on Monday. He adds 5 cm every day. Today it is exactly 100 cm tall and Barney is still not finished. <i>days of building = d</i>		
6	Seven nest boxes have the same number of eggs in each. A sneaky squirrel left 4 extra acorns next to them, and Kim counted 32 eggs and acorns together by mistake! <i>eggs in one box = e</i>		

2. Solve the equations

Solve each equation. Show the step that undoes the operation, and check your answer.

$x + 8 = 20$	$x - 5 = 13$	$3x = 27$	$x \div 4 = 6$
$21 - x = 12$	$2x + 1 = 7$	$4x - 3 = 17$	$20 - 2x = 14$
$x \div 2 + 3 = 8$	$5x + 10 = 45$	$30 - 3x = 6$	$(x - 4) \div 2 = 5$

3. The trail chain

Hike the trail by solving one equation at a time. The answer to each step is used in the next equation, so write it in before you continue!

Step	Equation	Answer
Trailhead	$a + 7 = 19$	$a =$
Creek	$3b - a = 30$	$b =$
Ridge	$c \div b = 5$	$c =$
Lookout	$2d + c = 100$	$d =$
Camp	$(e - d) \div 4 = 2$	$e =$

4. Decode the animal

Solve each equation. Use the alphabet code A = 1, B = 2, C = 3, ..., Z = 26 to turn each answer into a letter. The letters, in order, name an animal that lives in a burrow.

	Equation	Solution	Letter
1	$5x = 10$		
2	$9 - x = 8$		
3	$3x + 2 = 14$		
4	$2x - 5 = 9$		
5	$4x + 1 = 21$		
6	$x \div 3 = 6$		

The animal:

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5. The tree race

In the park, an oak and a maple were planted in the same year. The ranger measures their heights in centimetres:

Oak: height = $150 + 4t$ Maple: height = $90 + 7t$ (t = years since planting)

a) How tall was each tree when it was planted ($t = 0$)? Oak _____ cm Maple _____ cm

b) Which tree grows faster? How do you know from the expressions? _____

c) Write and solve an equation to find when the maple reaches 230 cm:

_____ $t =$ _____

d) Write and solve an equation to find when the two trees are the same height:

_____ $t =$ _____ Height then: _____ cm

e) Which tree is taller after 30 years, and by how much? _____

Answer Key (for the teacher)

1. 1) $n + 14 = 31$, $n = 17$. 2) $g - 18 = 47$, $g = 65$. 3) $4f = 60$, $f = 15$. 4) $w \div 2 = 9$, $w = 18$. 5) $60 + 5d = 100$, $d = 8$. 6) $7e + 4 = 32$, $e = 4$.

2. $x = 12, 18, 9, 24$; $x = 9, 3, 5, 3$; $x = 10, 7, 8, 14$.

3. $a = 12$; $3b - 12 = 30 \rightarrow b = 14$; $c \div 14 = 5 \rightarrow c = 70$; $2d + 70 = 100 \rightarrow d = 15$; $(e - 15) \div 4 = 2 \rightarrow e = 23$.

4. 2 B, 1 A, 4 D, 7 G, 5 E, 18 R $\rightarrow$ BADGER.

5. a) 150 cm and 90 cm. b) the maple: 7 cm per year beats 4. c) $90 + 7t = 230$, $t = 20$. d) $150 + 4t = 90 + 7t \rightarrow 60 = 3t$, $t = 20$; both 230 cm. e) oak 270 cm, maple 300 cm: maple by 30 cm.