Valley County Challenge

Word Problem … Week

Solution

University of Idaho Extension

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The following approach is just one of many ways to tackle the word problem

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Three Farms

According to the 2017 Census of Agriculture, Valley County had 188 farms totaling 50,959 acres. The Smith, Harris, and Washington farms together have 7,500 acres. The Smith farm is twice as large as the Harris farm. The Washington farm is one-fourth the size of the Smith and Harris farms combined. How large is each farm, and what percentage of the total farm acreage in Valley County do these three farms represent?

3

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Three Farms

188 farms totaling 50,959 acres. Smith, Harris, and Washington together have 7,500 Smith is twice Harris Washington is one-fourth Smith and Harris combined.

4

Key Info

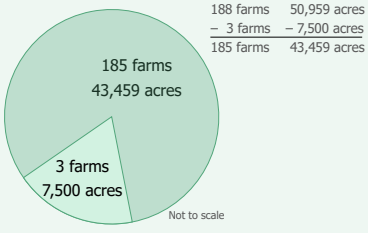
Knowns

- 188 farms totaling 50,959 acres
- Smith, Harris, and Washington together are 7,500

5

Drawing

Preliminary Sketch



188 farms 50,959 acres
– 3 farms – 7,500 acres
185 farms 43,459 acres

6

Key Info

Knowns

- 188 farms totaling 50,959 acres
- Smith, Harris, and Washington together are 7,500
- Smith is twice Harris
- Washington is one-fourth Smith and Harris combined

7

Substitutions

Nicknames

Alvis William Stufflebeam, III

8

Substitutions

Nicknames

Alvis William Stufflebeam, III

Legal Cases

Plaintiffs Defendants

9

Substitutions

Callsigns

"Cuckoo"

Mathematics

Let this be that

e.g., Let x = number of farms

10

Substitutions

Abbreviate

- Smith as S
- Harris as H
- Washington as W

Nouns

11

Rewrite

Knowns

- 188 farms totaling 50,959 acres
- Smith, Harris, and Washington together are 7,500
- Smith is twice Harris
- Washington is one-fourth Smith and Harris combined

12

Rewrite

Knowns

- 188 farms totaling 50,959 acres
- S, H, and W together are 7,500
- S is twice H
- W is one-fourth S and H combined

13

Rewrite

Knowns

- 188 farms totaling 50,959 acres
- S, H, and W together are 7,500
- S is twice H
- W is one-fourth S and H combined

Verbs

14

Rewrite

Knowns

- 188 farms totaling 50,959 acres
- S, H, and W together = 7,500
- S = twice H
- W = one-fourth S and H combined

"equals" or "is equal to"

15

Rewrite

Knowns

- 188 farms totaling 50,959 acres
- S, H, and W together = 7,500
- S = twice H
- W = one-fourth S and H combined

Conjunctions

16

Rewrite

Knowns

- 188 farms totaling 50,959 acres
- S + H + W together = 7,500
- S = twice H
- W = one-fourth S + H combined

17

Rewrite

Knowns

- 188 farms totaling 50,959 acres
- S + H + W together = 7,500
- S = twice H
- W = one-fourth S + H combined

Modifiers

18

Rewrite

Knowns

- 188 farms totaling 50,959 acres
- (S + H + W) = 7,500
- S = twice H
- W = one-fourth (S + H)

19

Rewrite

Knowns

- 188 farms totaling 50,959 acres
- (S + H + W) = 7,500
- S = twice H
- W = one-fourth (S + H)

Numbers with Implied Operations

20

Rewrite

Knowns

- 188 farms totaling 50,959 acres
- (S + H + W) = 7,500
- S = 2×H
- W = ¼×(S + H)

21

Rewrite

Knowns

- 188 farms totaling 50,959 acres
- (S + H + W) = 7,500
- S = 2H
- W = ¼(S + H)

22

Rewrite

Knowns

- 188 farms totaling 50,959 acres
- (S + H + W) = 7,500
- S = 2H
- W = ¼(S + H)

23

Rewrite

Knowns

- 188 farms totaling 50,959 acres
- S + H + W = 7,500
- S = 2H
- W = ¼(S + H)

24

Three Farms

How large is each farm, and what percentage of the total farm acreage in Valley County do these three farms represent?

25

Three Farms

How large is each | what percentage of the total acreage do these three represent?

26

Rewrite

Unknowns

- How large is each?
- What percentage of the total acreage do these three represent?

27

Solution

Unknowns

- How large is each?

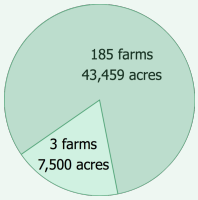
- What percentage of the total acreage do these three represent?

28

Solution

Knowns

- 188 farms totaling 50,959 acres
- S + H + W = 7,500
- S = 2H
- W = ¼(S + H)



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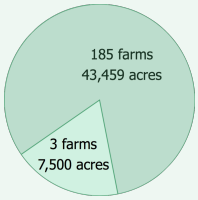
Solution

Knowns

- 188 farms totaling 50,959 acres
- S + H + W = 7,500
- S = 2H
- W = ¼(S + H)



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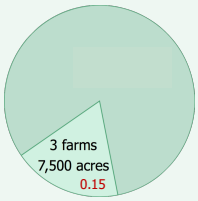
Solution

Knowns

7,500 ÷ 50,959 ≈ 0.15



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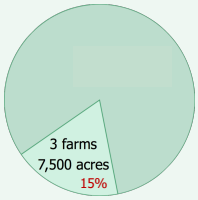
Solution

Knowns

7,500 ÷ 50,959 = 0.15

0.15 × 100% = 15%



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Solution

Unknowns

- How large is each?

- What percentage of the total acreage do these three represent? 15%

33

Solution

Unknowns

- How large is each?
- What percentage of the total acreage do these three represent? 15%

34

Solution

Knowns

- 188 farms totaling 50,959 acres
- S + H + W = 7,500
- S = 2H
- W = ¼(S + H)

3 Equations
3 Unknowns

35

Solution

Knowns

- 188 farms totaling 50,959 acres
- S + H + W = 7,500
- S = 2H
- W = ¼(S + H)

36

Solution

Knowns

- 188 farms totaling 50,959 acres
- S + H + W = 7,500
- S = 2H
- W = ¼(S + H)

37

Solution

Knowns

- 188 farms totaling 50,959 acres
- S + H + W = 7,500
- S = 2H
- W = ¼(2H + H)

38

Solution

Knowns

- 188 farms totaling 50,959 acres
- S + H + W = 7,500
- S = 2H
- W = ¼(3H)

39

Solution

Knowns

- 188 farms totaling 50,959 acres
- S + H + W = 7,500
- S = 2H
- W = ¾H

40

Solution

Knowns

- 188 farms totaling 50,959 acres
- S + H + W = 7,500
- S = 2H
- W = ¾H

41

Solution

Knowns

- 188 farms totaling 50,959 acres
- S + H + W = 7,500
- S = 2H
- W = ¾H

42

Solution

Knowns

- 188 farms totaling 50,959 acres
- 2H + H + ¾H = 7,500
- S = 2H
- W = ¾H

43

Solution

Knowns

- 188 farms totaling 50,959 acres
- 3H + ¾H = 7,500
- S = 2H
- W = ¾H

44

Solution

Knowns

- 188 farms totaling 50,959 acres
- 3¾H = 7,500
- S = 2H
- W = ¾H

45

Solution

Knowns

- 188 farms totaling 50,959 acres
- 3.75H = 7,500
- S = 2H
- W = ¾H

Whatever you do to one side you MUST do to the other side!

46

Solution

Knowns

- 188 farms totaling 50,959 acres
- $\frac{3.75}{3.75}H = \frac{7,500}{3.75}$
- S = 2H
- W = ¾H

Whatever you do to one side you MUST do to the other side!

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Solution

Knowns

- 188 farms totaling 50,959 acres
- H = 2,000
- S = 2H
- W = ¾H

48

Solution

Knowns

- 188 farms totaling 50,959 acres
- H = 2,000
- S = 2H
- W = ¾H

49

Solution

Knowns

- 188 farms totaling 50,959 acres
- H = 2,000
- S = 2×2,000
- W = ¾H

50

Solution

Knowns

- 188 farms totaling 50,959 acres
- H = 2,000
- S = 4,000
- W = ¾H

51

Solution

Knowns

- 188 farms totaling 50,959 acres
- H = 2,000
- S = 4,000
- W = ¾H

52

Solution

Knowns

- 188 farms totaling 50,959 acres
- H = 2,000
- S = 4,000
- W = 0.75H

53

Solution

Knowns

- 188 farms totaling 50,959 acres
- H = 2,000
- S = 4,000
- W = 0.75×2,000

54

Solution

Knowns

- 188 farms totaling 50,959 acres
- H = 2,000
- S = 4,000
- W = 1,500

55

Solution

Unknowns

- How large is each?
  - Harris is 2,000 acres
  - Smith is 4,000 acres
  - Washington is 1,500 acres

  } 7,500 acres ✓
- What percentage of the total acreage do these three represent? 15%

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Report

Three Farms

According to the 2017 Census of Agriculture, Valley County had 188 farms totaling 50,959 acres. The Smith farm was 4,000 acres, the Harris farm was 2,000 acres, and the Washington farm was 1,500 acres. These three farms represented 15 percent of the farm acreage in Valley County.

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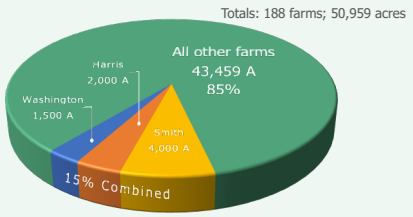
Drawing

Final Diagram



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This was one of many ways to work through the word problem

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Word Problem of the Week

Stay tuned!

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