


Valley County Challenge

Word Problem Week

Solution



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

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### Airplane Fuel

Bluebird Aviation operates from one of Valley County's general aviation airports, transporting people and supplies to Idaho's backcountry airstrips. Bluebird's pilot must depart from her home airport to drop off supplies at an airstrip that is 40 minutes away in cruise flight, and then return home. To maximize the supplies she can take, the pilot wants only enough fuel on board for the round trip, plus the legally required 30-minute fuel reserve. Airplane performance charts show the following: taxi, takeoff, and climb will use 23 pounds of fuel; cruise will use 78 pounds of fuel per hour; and descent, landing, and taxi will use 11 pounds of fuel. How many gallons of fuel does the pilot need to put in the fuel tanks? Aviation fuel weighs six pounds per gallon.

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3

# Airplane Fuel

an airstrip 40 minutes away in cruise flight, then return home

home airport to

30-minute fuel reserve

taxi, takeoff, and climb will use 23 pounds of fuel

cruise will use 78 pounds of fuel per hour

descent, landing, and taxi will use 11 pounds of fuel.

fuel weighs six pounds per gallon

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## Key Info

### Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home

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## Drawing

### Preliminary Sketch



Not to scale

6

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Key Info

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute fuel reserve
- Taxi, takeoff, and climb will use 23 pounds of fuel
- Cruise will use 78 pounds of fuel per hour
- Descent, landing, and taxi will use 11 pounds of fuel

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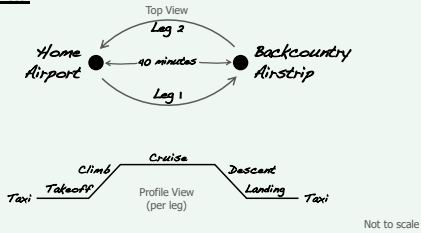
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Drawing

Preliminary Sketch



8

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Key Info

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute fuel reserve
- Taxi, takeoff, and climb will use 23 pounds of fuel
- Cruise will use 78 pounds of fuel per hour
- Descent, landing, and taxi will use 11 pounds of fuel
- Fuel weighs six pounds per gallon

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Key Info

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute fuel reserve
- (Taxi, takeoff, and climb) will use 23 pounds of fuel
- Cruise will use 78 pounds of fuel per hour
- (Descent, landing, and taxi) will use 11 pounds of fuel
- Fuel weighs six pounds per gallon

10

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Substitutions

Combine and Abbreviate

- (Taxi, takeoff, and climb)
- Cruise
- (Descent, landing, and taxi)

11

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Substitutions

Combine and Abbreviate

- Takeoff as T
- Cruise as C
- Landing as L

Nouns

12

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Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute fuel reserve
- (Taxi, takeoff, and climb) will use 23 pounds of fuel
- Cruise will use 78 pounds of fuel per hour
- (Descent, landing, and taxi) will use 11 pounds of fuel
- Fuel weighs six pounds per gallon

13

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Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute fuel reserve
- T will use 23 pounds of fuel
- C will use 78 pounds of fuel per hour
- L will use 11 pounds of fuel
- Fuel weighs six pounds per gallon

14

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Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute fuel reserve
- T will use 23 pounds of fuel
- C will use 78 pounds of fuel per hour
- L will use 11 pounds of fuel
- Fuel weighs six pounds per gallon

Verbs

15

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Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute fuel reserve
- T will use 23 pounds of fuel
- C will use 78 pounds of fuel per hour
- L will use 11 pounds of fuel
- Fuel weighs six pounds per gallon

Verbs

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16

Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute fuel reserve
- T will use 23 pounds of fuel
- C will use 78 pounds of fuel per hour
- L will use 11 pounds of fuel
- Weight of fuel is six pounds per gallon

Verbs

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17

Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute fuel reserve
- T will use 23 pounds of fuel
- C will use 78 pounds of fuel per hour
- L will use 11 pounds of fuel
- Weight of fuel is six pounds per gallon

Verbs

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18

Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute fuel reserve
- $T = 23$  pounds of fuel
- $C = 78$  pounds of fuel per hour
- $L = 11$  pounds of fuel
- Weight of fuel = six pounds per gallon

*"is equal to"*

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19

Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute **fuel** reserve
- $T = 23$  pounds **of fuel**
- $C = 78$  pounds **of fuel** per hour
- $L = 11$  pounds **of fuel**
- Weight **of fuel** = six pounds per gallon

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20

Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute reserve
- $T = 23$  pounds
- $C = 78$  pounds per hour
- $L = 11$  pounds
- Weight = six pounds per gallon

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21

Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute reserve
- T = 23 pounds
- C = 78 pounds per hour
- L = 11 pounds
- **Weight** = six pounds per gallon

Substitute "W" for "Weight"

22

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Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute reserve
- T = 23 pounds
- C = 78 pounds per hour
- L = 11 pounds
- **W** = six pounds per gallon

23

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Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute reserve
- T = 23 pounds
- C = 78 pounds per hour
- L = 11 pounds
- W = **six** pounds per gallon

24

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**Rewrite**

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute reserve
- T = 23 pounds
- C = 78 pounds per hour
- L = 11 pounds
- W = 6 pounds per gallon

25

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**Rewrite**

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute reserve
- T = 23 **pounds**
- C = 78 **pounds** per hour
- L = 11 **pounds**
- W = 6 **pounds** per gallon

Abbreviate as "lb"  
from the Latin "libra" 

26

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**Rewrite**

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute reserve
- T = 23 **lb**
- C = 78 **lb** per hour
- L = 11 **lb**
- W = 6 **lb** per gallon

27

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**Rewrite**

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute reserve
- T = 23 lb
- C = 78 lb **per** hour
- L = 11 lb
- W = 6 lb **per** gallon

Means "for each" or "for every"

Mathematically  
÷ / —

28

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**Rewrite**

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute reserve
- T = 23 lb
- C = 78 lb / hour
- L = 11 lb
- W = 6 lb / gallon

29

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**Rewrite**

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute reserve
- T = 23 lb
- C = 78 lb / **hour**    Abbreviate as "hr"
- L = 11 lb
- W = 6 lb / **gallon**    Abbreviate as "gal"

30

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Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute reserve
- $T = 23 \text{ lb}$
- $C = 78 \text{ lb / hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb / gal}$

31

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Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute reserve
- $T = 23 \text{ lb}$
- $C = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

32

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Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute reserve
- $T = 23 \text{ lb}$
- $C = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

Different Units of Measurement

33

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Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute reserve
- T = 23 lb
- C = 78 lb/hr
- L = 11 lb
- W = 6 lb/gal

Special Ratios called "Rates"

34

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Rates

Special Ratios

Numerators and denominators of different units

numerator/denominator      $\frac{\text{numerator}}{\text{denominator}}$

35

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Rates

Miles per hour

speed =  $\frac{\text{distance}}{\text{time}}$



"Rate of change of distance with time"

36

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Rates

Sales Tax

$$\% = \frac{\text{tax}}{\text{subtotal}} \times 100$$


"Sales tax rate is 8%"

37

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Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute reserve
- $T = 23 \text{ lb}$
- $C = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

38

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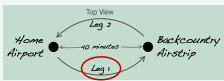
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Rewrite

Knowns

- Home airport to an airstrip 40 minutes away in cruise flight, then return home
- 30-minute reserve
- $T = 23 \text{ lb}$
- $C = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$



39

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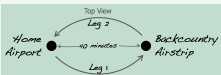
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Rewrite

Knowns

- Leg 1 40 minutes away in cruise flight, then return home
- 30-minute reserve
- $T = 23$  lb
- $C = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal



40

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Rewrite

Knowns

- Leg 1 40 minutes away in cruise flight, then return home
- 30-minute reserve
- $T = 23$  lb
- $C = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal



41

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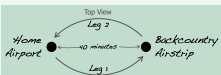
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Rewrite

Knowns

- Leg 1 40 minutes away in cruise flight, Leg 2
- 30-minute reserve
- $T = 23$  lb
- $C = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal



42

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**Rewrite**

Knowns

- Leg 1 **40 minutes away in cruise flight**, Leg 2
- 30-minute reserve
- $T = 23 \text{ lb}$
- $C = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

**Each leg takes 40 minutes!**

43

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**Rewrite**

Knowns

- **40 minutes per leg in cruise flight**
- 30-minute reserve
- $T = 23 \text{ lb}$
- $C = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

44

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**Rewrite**

Knowns

- 40 minutes per leg **in cruise flight**
- 30-minute reserve
- $T = 23 \text{ lb}$
- $C = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

**Substitute "C" for "cruise"**

45

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Rewrite

Knowns

- $C = 40$  minutes per leg
- 30-minute reserve
- $T = 23$  lb
- $C = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

46

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Rewrite

Knowns

- $C = 40$  minutes per leg
- 30-minute reserve
- $T = 23$  lb
- $C = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

Different Units

47

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Rewrite

Knowns

- $C = 40$  minutes per leg Clarify "C" with " $C_t$ "
- 30-minute reserve
- $T = 23$  lb
- $C = 78$  lb/hr Clarify "C" with " $C_f$ "
- $L = 11$  lb
- $W = 6$  lb/gal

48

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Rewrite

Knowns

- $C_t = 40$  minutes / leg
- 30-minute reserve
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

49

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Rewrite

Knowns

- $C_t = 40$  minutes / leg
- 30-minute reserve
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

Abbreviate as "min"

50

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Rewrite

Knowns

- $C_t = 40$  min / leg
- 30 min reserve
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

51

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Rewrite

Knowns

- $C_t = 40$  min/leg → This is also a Rate!
- 30 min reserve
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

52

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Rewrite

Knowns

- $C_t = 40$  min/leg
- 30 min reserve
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

Substitute "R<sub>t</sub>" for fuel "reserve time"

53

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Rewrite

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

54

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Rewrite

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

55

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## Airplane Fuel

How many gallons of fuel does the pilot need to put in the fuel tanks?

56

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## Airplane Fuel

How many gallons of fuel does the pilot need

57

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Rewrite

Unknowns

- How many gallons of fuel does the pilot need?

58

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Rewrite

Unknowns

- How many gallons of fuel does the pilot need?

Final units must be "gal"

59

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Units of Measurement

Modifiers

Units give numbers character

2 abstract

60

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Units of Measurement

2 dollars 

2 guitars 

 2 apples/orange

61

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Units of Measurement

**Caveats**

- Cannot add or subtract different units
- Can treat units like numbers and variables when multiplying or dividing

62

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Units of Measurement

$$6 \frac{\text{lb}}{\text{hr}} \times 2 = (6 \times 2) \frac{\text{lb}}{\text{hr}}$$

63

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Units of Measurement	$6 \frac{\text{lb}}{\text{hr}} \times 2 = 12 \frac{\text{lb}}{\text{hr}}$
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64

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Units of Measurement	$6 \frac{\text{lb}}{\text{hr}} \times 2 = 12 \frac{\text{lb}}{\text{hr}}$ $6 \frac{\text{lb}}{\text{hr}} \times 2 \text{ hr}$
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65

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Units of Measurement	$6 \frac{\text{lb}}{\text{hr}} \times 2 = 12 \frac{\text{lb}}{\text{hr}}$ $6 \frac{\text{lb}}{\text{hr}} \times 2 \text{ hr} = (6 \times 2) \left( \frac{\text{lb}}{\text{hr}} \right) (\text{hr})$
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66

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Units of Measurement	$6 \frac{\text{lb}}{\text{hr}} \times 2 = 12 \frac{\text{lb}}{\text{hr}}$ $6 \frac{\text{lb}}{\text{hr}} \times 2 \text{ hr} = 12 \left( \frac{\text{lb}}{\text{hr}} \right) (\text{hr})$
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67

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Units of Measurement	$6 \frac{\text{lb}}{\text{hr}} \times 2 = 12 \frac{\text{lb}}{\text{hr}}$ $6 \frac{\text{lb}}{\text{hr}} \times 2 \text{ hr} = 12 \left( \frac{\text{lb}}{\text{hr}} \right) \left( \frac{\text{hr}}{1} \right)$
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68

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Units of Measurement	$6 \frac{\text{lb}}{\text{hr}} \times 2 = 12 \frac{\text{lb}}{\text{hr}}$ $6 \frac{\text{lb}}{\text{hr}} \times 2 \text{ hr} = 12 \left( \frac{\text{hr}}{\text{hr}} \right) \left( \frac{\text{lb}}{1} \right)$
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69

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Units of Measurement	$6 \frac{\text{lb}}{\text{hr}} \times 2 = 12 \frac{\text{lb}}{\text{hr}}$ $6 \frac{\text{lb}}{\text{hr}} \times 2 \text{ hr} = 12 \left( \frac{\text{hr}}{\text{hr}} \right) \left( \frac{\text{lb}}{1} \right)$
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70

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Units of Measurement	$6 \frac{\text{lb}}{\text{hr}} \times 2 = 12 \frac{\text{lb}}{\text{hr}}$ $6 \frac{\text{lb}}{\text{hr}} \times 2 \text{ hr} = 12(1) \left( \frac{\text{lb}}{1} \right)$
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71

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Units of Measurement	$6 \frac{\text{lb}}{\text{hr}} \times 2 = 12 \frac{\text{lb}}{\text{hr}}$ $6 \frac{\text{lb}}{\text{hr}} \times 2 \text{ hr} = 12 \text{ lb}$
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72

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Units of Measurement

$$6 \frac{\text{lb}}{\text{hr}} \times 2 = 12 \frac{\text{lb}}{\text{hr}}$$

$$6 \frac{\text{lb}}{\text{hr}} \times 2 \text{ hr} = 12 \text{ lb}$$

$$6 \frac{\text{lb}}{\text{hr}} \times 2 \text{ hr}$$

73

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Units of Measurement

$$6 \frac{\text{lb}}{\text{hr}} \times 2 = 12 \frac{\text{lb}}{\text{hr}}$$

$$6 \frac{\text{lb}}{\text{hr}} \times 2 \text{ hr} = 12 \text{ lb}$$

$$6 \frac{\text{lb}}{\text{hr}} \times 2 \text{ hr} = 12 \text{ lb}$$

74

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Solution

Knowns

- $C_t = 40 \text{ min/leg}$
- $R_t = 30 \text{ min}$
- $T = 23 \text{ lb}$
- $C_f = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

**Mindful of Units**

75

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**Solution**

Knowns

- $C_t = 40 \text{ min/leg}$
- $R_t = 30 \text{ min}$
- $T = 23 \text{ lb}$
- $C_f = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$





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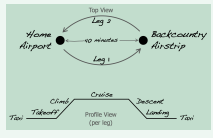
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76

**Solution**

Knowns

- $C_t = 40 \text{ min/leg}$
- $R_t = 30 \text{ min}$
- $T = 23 \text{ lb}$
- $C_f = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$


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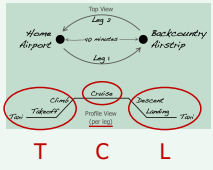
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77

**Solution**

Knowns

- $C_t = 40 \text{ min/leg}$
- $R_t = 30 \text{ min}$
- $T = 23 \text{ lb}$
- $C_f = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$




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78

**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

$(T + C + L) \times 2$  legs

79

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

$2(T + C + L)$

80

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

$2(T + C + L)$

81

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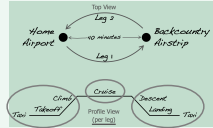
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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- **$T = 23$  lb**
- $C_f = 78$  lb/hr
- **$L = 11$  lb**
- $W = 6$  lb/gal



$2(23 \text{ lb} + C + 11 \text{ lb})$

82

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal



$2(34 \text{ lb} + C)$

83

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal



$2(34 \text{ lb} + C)$

84

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**Solution**

Knowns

- $C_t = 40 \text{ min/leg}$
- $R_t = 30 \text{ min}$
- $T = 23 \text{ lb}$
- $C_f = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

$2(34 \text{ lb} + C)$

Units of C must be in "lb"

85

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**Solution**

Knowns

- $C_t = 40 \text{ min/leg}$
- $R_t = 30 \text{ min}$
- $T = 23 \text{ lb}$
- $C_f = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

$2(34 \text{ lb} + C)$

86

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**Solution**

Knowns

- $C_t = 40 \text{ min/leg}$
- $R_t = 30 \text{ min}$
- $T = 23 \text{ lb}$
- $C_f = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

$2(34 \text{ lb} + C)$

$C_t$  and  $C_f$  are parts of  $C$

87

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**Solution**

Knowns

- $C_t = 40 \text{ min/leg}$
- $R_t = 30 \text{ min}$
- $T = 23 \text{ lb}$
- $C_f = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

$2(34 \text{ lb} + C)$   
 $40 \frac{\text{min}}{\text{leg}}$  and  $78 \frac{\text{lb}}{\text{hr}}$  get us to  $C$  in  $\text{lb}$

88

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**Solution**

Knowns

- $C_t = 40 \text{ min/leg}$
- $R_t = 30 \text{ min}$
- $T = 23 \text{ lb}$
- $C_f = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

$2(34 \text{ lb} + C)$   
 $40 \frac{\text{min}}{\text{leg}} \times 78 \frac{\text{lb}}{\text{hr}}$

89

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**Solution**

Knowns

- $C_t = 40 \text{ min/leg}$
- $R_t = 30 \text{ min}$
- $T = 23 \text{ lb}$
- $C_f = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

$2(34 \text{ lb} + C)$   
 $(40 \times 78) \frac{\text{min}}{\text{leg}} \frac{\text{lb}}{\text{hr}}$

90

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

$2(34 \text{ lb} + C)$   
 $3,120 \frac{\text{min lb}}{\text{leg hr}}$

91

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

$2(34 \text{ lb} + C)$   
 $3,120 \frac{\text{min lb}}{\text{leg hr}}$   
**60 min = 1 hr or 60 min/hr or hr/60 min**

92

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

$2(34 \text{ lb} + C)$   
 $3,120 \frac{\text{min lb}}{\text{leg hr } 60 \text{ min}}$

93

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

$2(34 \text{ lb} + C)$   
 $3,120 \frac{\text{min}}{\text{leg}} \times \frac{\text{lb}}{60 \text{ min}}$

94

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

$2(34 \text{ lb} + C)$   
 $\frac{3,120 \text{ lb}}{60 \text{ leg}}$

95

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

$2(34 \text{ lb} + C)$   
 $52 \frac{\text{lb}}{\text{leg}}$

96

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**Solution**

Knowns

- $C_t = 40 \text{ min/leg}$
- $R_t = 30 \text{ min}$
- $T = 23 \text{ lb}$
- $C_f = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

$2(34 \text{ lb} + C)$   
 $52 \frac{\text{lb}}{\text{leg}} = C$

97

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**Solution**

Knowns

- $C_t = 40 \text{ min/leg}$
- $R_t = 30 \text{ min}$
- $T = 23 \text{ lb}$
- $C_f = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

$2(34 \text{ lb} + C)$   
 $52 \frac{\text{lb}}{\text{leg}} = C$

98

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**Solution**

Knowns

- $C_t = 40 \text{ min/leg}$
- $R_t = 30 \text{ min}$
- $T = 23 \text{ lb}$
- $C_f = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

$2(34 \text{ lb} + 52 \text{ lb})$   
 $52 \frac{\text{lb}}{\text{leg}} = C$

99

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

**2(86 lb)**

100

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

**2(86 lb)**

101

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

**172 lb = Fuel used on round trip**

102

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

172 lb = Fuel used on round trip  
**+ Fuel Reserve**

103

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

172 lb = Fuel used on round trip  
 **$R_t$  and  $C_f$  are part of Fuel Reserve**

104

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

172 lb = Fuel used on round trip  
**30 min and  $78 \frac{\text{lb}}{\text{hr}}$  get us to Fuel Reserve**

105

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**Solution**

Knowns

- $C_t = 40 \text{ min/leg}$
- $R_t = 30 \text{ min}$
- $T = 23 \text{ lb}$
- $C_f = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

172 lb = Fuel used on round trip

$30 \text{ min} \times 78 \frac{\text{lb}}{\text{hr}}$

106

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**Solution**

Knowns

- $C_t = 40 \text{ min/leg}$
- $R_t = 30 \text{ min}$
- $T = 23 \text{ lb}$
- $C_f = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

172 lb = Fuel used on round trip

$(30 \times 78) \text{ min} \frac{\text{lb}}{\text{hr}}$

107

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**Solution**

Knowns

- $C_t = 40 \text{ min/leg}$
- $R_t = 30 \text{ min}$
- $T = 23 \text{ lb}$
- $C_f = 78 \text{ lb/hr}$
- $L = 11 \text{ lb}$
- $W = 6 \text{ lb/gal}$

172 lb = Fuel used on round trip

$2,340 \text{ min} \frac{\text{lb}}{\text{hr}}$

108

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

172 lb = Fuel used on round trip

$$2,340 \text{ min} \frac{\text{lb}}{\text{hr}} \frac{\text{hr}}{60 \text{ min}}$$

109

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

172 lb = Fuel used on round trip

$$2,340 \text{ min} \frac{\text{lb}}{\text{hr}} \frac{\text{hr}}{60 \text{ min}}$$

110

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

172 lb = Fuel used on round trip

$$\frac{2,340}{60} \text{ lb}$$

111

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

172 lb = Fuel used on round trip  
**39 lb = Fuel reserve**

112

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

172 lb Fuel used on round trip  
**+ 39 lb Fuel reserve**

113

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**Solution**

Knowns

- $C_t = 40$  min/leg
- $R_t = 30$  min
- $T = 23$  lb
- $C_f = 78$  lb/hr
- $L = 11$  lb
- $W = 6$  lb/gal

172 lb Fuel used on round trip  
 + 39 lb Fuel reserve  
**211 lb Total fuel needed**

114

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**Solution**

Unknowns

- How many **gallons** of fuel does the pilot need?

Fuel needed = **211 lb**

W = **6 lb/gal**

115

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**Solution**

Unknowns

- How many **gallons** of fuel does the pilot need?

Fuel needed = **211 lb**

W = 6 lb/gal = **gal/6 lb**

116

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**Solution**

Unknowns

- How many **gallons** of fuel does the pilot need?

Fuel needed = **211 lb** ×  $\frac{\text{gal}}{6 \text{ lb}}$

W = 6 lb/gal = gal/6 lb

117

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**Solution**

Unknowns

- How many gallons of fuel does the pilot need?

Fuel needed =  $\frac{211}{6}$  gal

W = 6 lb/gal = gal/6 lb

118

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**Solution**

Unknowns

- How many gallons of fuel does the pilot need?

Fuel needed = 35.2 gal

119

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**Report**

### Airplane Fuel

Bluebird Aviation operates from one of Valley County's general aviation airports, transporting people and supplies to Idaho's backcountry airstrips. With 35.2 gallons of fuel in the tanks, the weight of supplies that can be flown to an airstrip 40 minutes from Bluebird's home base can be maximized, while providing a 30-minute fuel reserve for safety.

120

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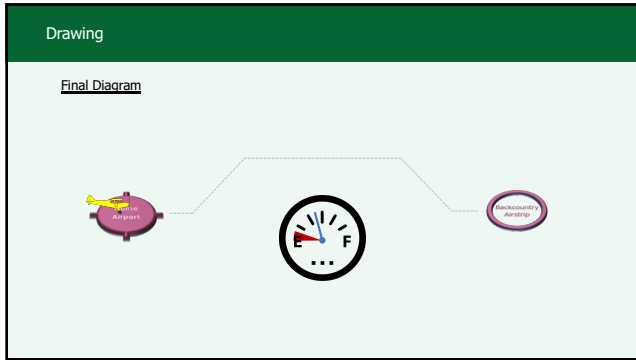
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121

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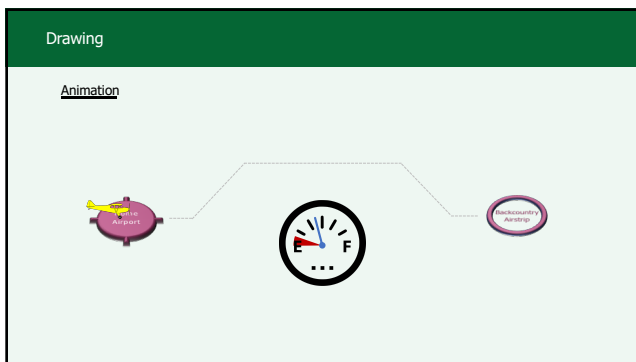
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122

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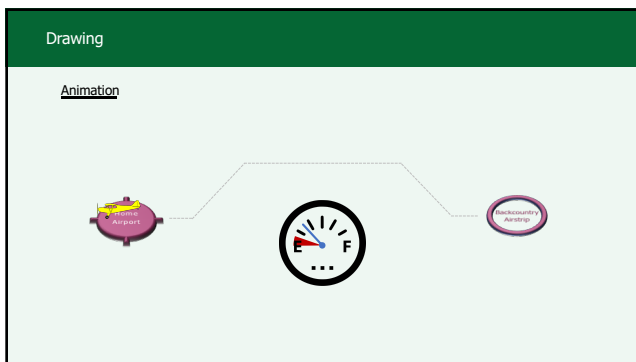
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123

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

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124