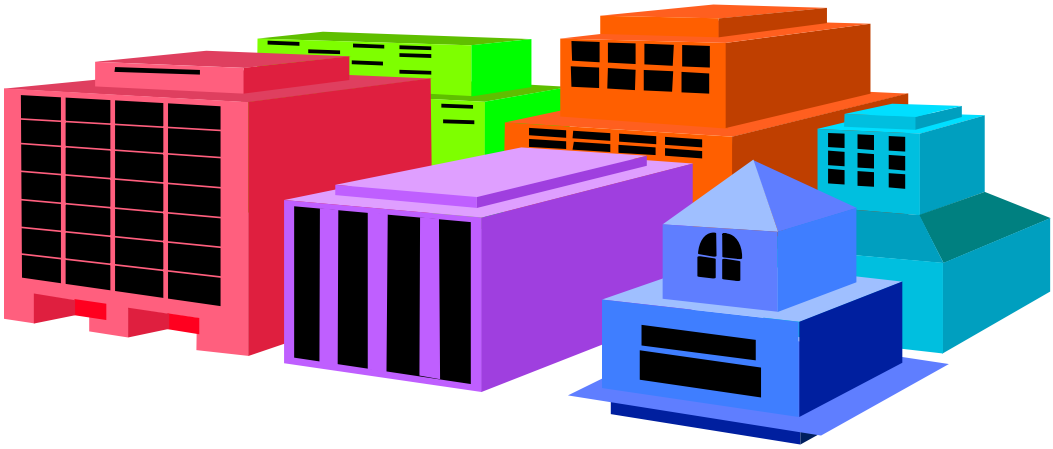
Agri-Business Science Technology

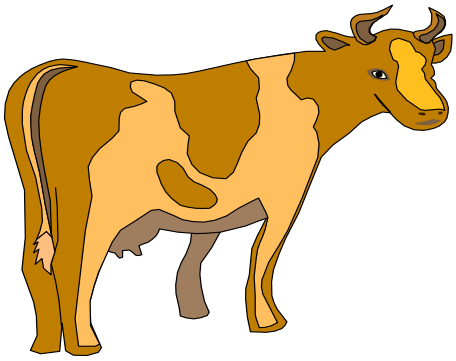
&

Dairy Herd Management

Applied Problem Booklet

General Math





Applied Problems - Fractions

1. In calculating the amount of fencing needed to repair a damaged section, Bill gets an answer of $38\frac{6}{16}$ ft. Reduce this answer to lowest terms.

2. Kim wants to straighten up her workshop. She has several drill bits that need to be put back in order: $\frac{5}{8}$ $\frac{1}{2}$ $\frac{3}{4}$ $\frac{9}{16}$ inches.
How should Kim arrange them in order so that the smallest is on the left and largest is on the right?

3. Which quantity of protein supplement is greater: $2\frac{5}{16}$ lb *or* $2\frac{1}{4}$ lb .

4. While working on his tractor, Ray guessed that the size of the bolt he had to remove was 5/16". He picked that size of wrench, but found it to be one size too small. Assuming his wrench set is in increments of 1/16", what size will he need?

5. How much hay will 12 cows need if each is to receive $27\frac{1}{4}$ lbs?

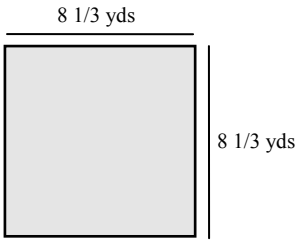
6. A certain herbicide is applied at a rate of 3/5 gallon per acre. How many acres can be treated if the sprayer tank has a capacity of 80 gallons?

7. A dairy cow produces $238\frac{3}{4}$ lbs of milk in five days. How much would you expect this cow to produce in one day?

8. What is the total weight of 3 bushels of soybeans, if each bushel weighs $59\frac{3}{4}$ lbs?

9. If it takes $5\frac{1}{2}$ minutes to plow one row of a field, how long will it take to plow 20 rows?

10. How much rope is needed to completely fence-off a square plot where each side is $8\frac{1}{3}$ yards long?



11. If a three bushel container of barley weighs $141\frac{3}{4}$ lbs, how much does one bushel of barley weigh?

12. A test plot of 1/5 acre produces 1792 lbs of shelled corn. Find the yield in bushels per acre. (Assume 1 bushel of shelled corn weighs 56 lbs.)

13. Determine the total rainfall for the past three weeks:

Week 1: $2\frac{1}{8}$"

Week 2: $\frac{1}{2}$"

Week 3: $1\frac{3}{16}$"

14. Susan is repairing her barn. From a 96 in. board, she has cut pieces of the following lengths: How much of the original board is left after these pieces are cut?

$21\frac{1}{2}$" 35" $30\frac{3}{8}$"

15. Determine the total hours worked by this hired hand:

Monday	$10\frac{1}{2}$ *hrs*
Tuesday	$6\frac{3}{4}$
Wednesday	$8\frac{1}{2}$
Thursday	10
Friday	$5\frac{1}{4}$

16. A full bag of feed weighs $35\frac{1}{2}$ lbs. How much does it weigh after $7\frac{1}{4}$ lbs are removed?

Applied Problems - Decimals

1. Milk weighs about 8 3/5 lbs. per gallon. Convert this to a decimal.

2. A tractor is measured to be 75 7/16 in. wide at its widest point. Could it fit through a gate that is 75.7 in. wide?

3. A tractors' crankcase holds 1.4 gallons of oil. If this oil is to be drained into a container, which of the containers listed below would be large enough?

A. 1 1/4 gal.
B. 1 3/5 gal.
C. 1 5/16 gal

4. Data from a feed ration program states that your cattle need 3/8 lbs. of mineral supplement. Express this amount as a decimal.

5. Mineral supplement is to be added to feed at the rate of 1 1/2 oz. per cow per day. Yet, because of waste and loss, it is necessary to add 1 5/8 oz per cow per day. The dispenser is labeled in decimals. How much is 1 5/8 oz as a decimal?

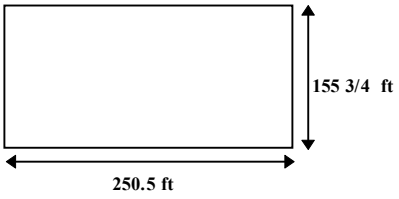
6. What is the total weight and cost of the following feed mix?

Hay		27.7 lbs	$0.90
G.E.C	24.3	0.81	
Protein Sup.	10.6	1.35	
Minerals	0.27	0.08	
Salt	0.26	0.02	
Total		**lbs**	**$**

7. Corn used to sell for $2.05 per bushel. It now goes for $1.70 / bu. How much did the price drop?

8. Pig starter costs $26.30 /100 lbs. Find the cost of 700 lbs. of pig starter.

9. How much fencing is needed to go all the way around this field?

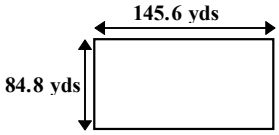


10. The subtotal for an order of various feeds and supplements is $2293.65. A discount of $45.87 is applied to this subtotal. What is the amount to be paid for this order?

11. An auctioneer sold 8 cows for $9804.00. If each cow was sold for the same price, how much did each cow sell for?

12. You are trying to determine if the amount of food consumed by your cows has any impact on the milk production. If a cow consumed the following amounts of feed each day, what was her total intake for the week? 19 1/4 lbs, 18 3/4 lbs, 17.25 lbs, 21 1/2 lbs, 19.75 lbs, 18.75 lbs, 17.50 lbs

13. Find the area of this rectangular field to the nearest tenth square yard.
(***area = length x width***)



14. Over the course of three days, a dairy cow produced; 49.1 lbs, 48.6 lbs, and 49.4 lbs. of milk. What is this cow's average daily milk production?

15. You want to add 1.75 lbs of high protein supplement to each cow's intake per day. You have a herd of 56 cows. How many days will 1 ton of supplement last?

Applied Problems - Percents

1. A silo holds 55 ft of settled silage. On average, 8% is lost due to spoilage. How many feet are lost due to spoilage?

2. An auctioneer makes a 7% commission on total sales. If total sales for a farm auction are $44,600, how much does he earn?

3. Tex owns an 850-acre farm. Of this amount, 615 acres are tillable. What percent of his land is tillable?

4. Feed is mixed so that 10.5 lbs of protein supplement are used for every 65 lbs of feed. What percent of the feed is supplement?

5. A milk tanker carries milk that is 3.8% butterfat. There are 2052 lbs of butterfat in the tanker. How many pounds of milk are in the tanker?

6. A dairy cow has shown a 340 lb increase in milk production this year. If this is a3.5% increase over last year, what was the production last year?

7. The manager at the local co-op decides to give her person in charge of feed sales a raise. His hourly rate then goes from $10.40 to $11.05. Find the percent increase in his hourly wages.

8. Corn used to sell for $2.05 per bushel. It now goes for $1.70. What is the percent decrease in the price of a bushel of corn?

9. The corn yield on a farm was 20,048 bushels after drying. The drying loss was 6%. What was the yield before drying?

10. Ginger wants to get $1300 for a cow that is to be put up for auction. If the auctioneer takes an 11% commission, how much will the cow have to sell for so that Ginger can make $1300?

Applied Problems - Measurement

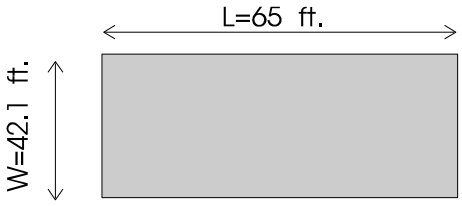
1. None

Applied Problems - Formulas

1. A circular hole has to be cut in the side of a barn so that a tube with a cross sectional area of 95 sq. in. will fit. If the hole to be cut has a diameter of 10" will it be large enough for the tube to pass through? Use the formula: $A = \frac{\pi d^2}{4}$

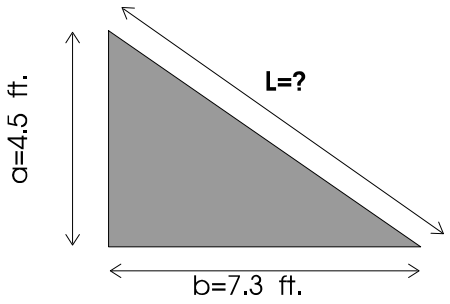
2. A round corn crib has a radius of 6.2 ft. and a height of 7 ft. What is the volume of this crib in cubic feet? (to the nearest tenth) Use the formula: $V = \pi r^2 h$

3. Find the amount of fencing needed to enclose this rectangular plot:
Use formula: $P = 2L + 2W$



4. What is the area of this wall? Use: $A=LW$

5. Find the length of this wooden beam that is used for a brace: (nearest tenth)
Use: $L = \sqrt{a^2 + b^2}$



Technical Applications for Proportions

Let's look at some situations where proportions can be used to solve problems in technically oriented fields.

Direct Relationships
You will recall from your work so far that in direct relationships increasing one quantity results in an increase in the other related quantity. It is also true that decreasing a quantity will result in a decrease in the related quantity.

Some examples of direct relationships include:

- *crop yield & field size*
- *coverage of paint & quantity of paint needed*
- *quantity of product & price*
- *volume of an object & weight*
- *length of an object & weight*
- *length of wire & electrical resistance*
- *concentration of a mixture & amounts of the products in the mixture*
- *tagged animals & population*

Naturally, there are many more examples than this short list shows.

Inverse Relationships
You will also recall from your work in this section that in inverse relationships, an increase in one quantity results in a decrease in the related quantity. It is also true that decreasing one quantity results in an increase in the related quantity.

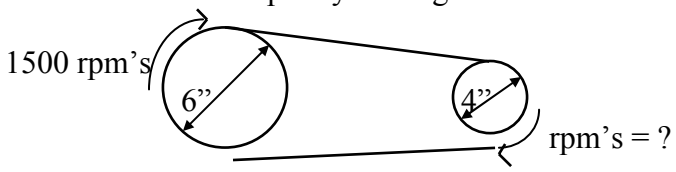
Some examples of inverse relationships include:

- *pulley size (diameter) & rpm's*
- *gear size (# of teeth) & rpm's*
- *force on a lever & distance from the fulcrum (pivot point)*
- *volume of a gas & pressure*
- *# of manufacturing machines & time to complete a given job*
- *etc...*

Listed below are a batch of technically oriented problems that can be solved with proportions. Decide if each situation is a direct or inverse relationship. Refer to the list on the previous page for help if you need it.

1. A 2 ft long heater element wire has a resistance of 1.65 ohms. If the wire were 7 ft long, how much resistance would it have?

2. A pulley that is 6 inches in diameter which rotates at 1500 rpm's is connected to a 4 inch diameter pulley. How fast is the smaller pulley turning?



3. If a 3 ft long piece of angle iron weighs 8.5 lbs, how much would a structure weigh that uses 22 ft of this angle iron?

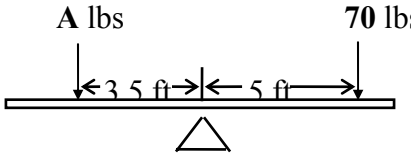
4. A 28 tooth gear that is turning at 300 rpm's is meshed with a gear that want to turn 125 rpm's. How many teeth should be on this gear?

5. A 1/3 acre test plot of corn had a yield of 40 bushels. If you plant 150 acres of this corn, how many bushels of corn should you get?

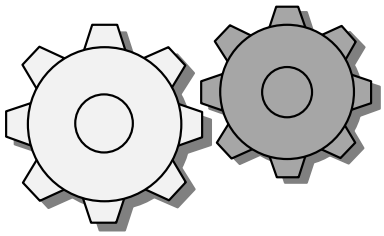
6. If you pour 3 qts of pesticide into a tank of water, you get a 15% concentration mix. If you want a 25% concentration mix, how many quarts of pesticide would have to be added to the tank of water?

7. The coverage of two gallons of paint is supposed to be 575 sq ft. How much would be needed to cover 1200 sq ft?

8. How much weight would have to be placed at "A" in order for this lever to balance?



9. Gears A (40 teeth) and B (70 teeth) mesh together. If Gear A turns at 200 rpm's, how fast will Gear B turn?



10. A metal alloy is made of 95% iron and 5% zinc. If you have 70 lbs of iron on hand, how much zinc do you need to make this alloy?

11. Paint and thinner is to be mixed in the ratio of 2 to 5. If you have 1 gallon of paint, how much thinner do you need?

12. 200 cubic inches of a gas at a pressure of 20 psi is compressed down to 120 cubic inches. What is the pressure of the gas now?

13. If you have an 8-inch diameter pulley that turns at 2000 rpm's and you want to connect it to a pulley that will turn at 3000 rpm's, how big should the other pulley be?

14. Enamel and reducer should be mixed at the rate of 6 to 5. If you have two quarts of enamel, how much reducer is needed?

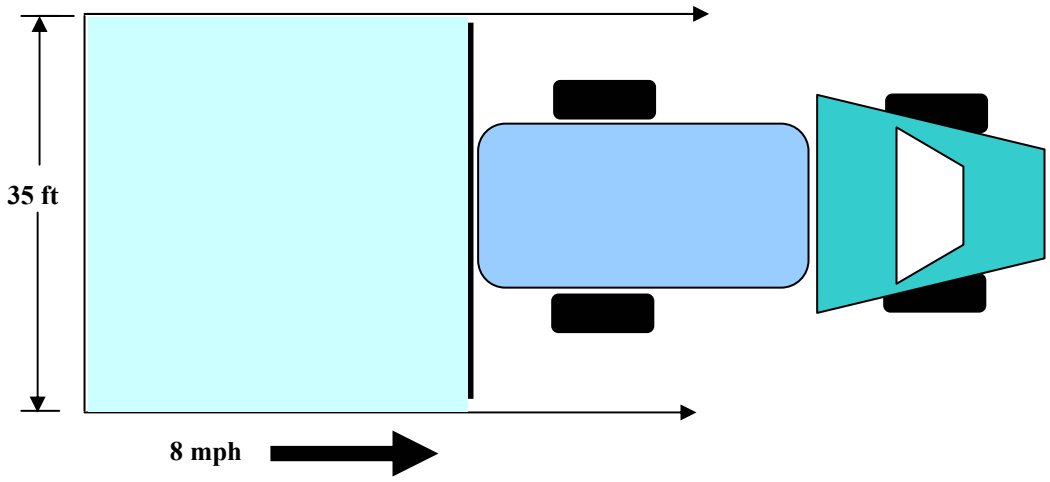
15. At Lila's Pizza Place, a 9" diameter pizza (area of 64 sq in) is priced at $6.50. In order to be consistent in price with the 9" pizza, what should be the price of a 12" (113 sq in) pizza? *(In this problem, consider if you want to work with the diameters of the pizzas or the areas. Does it make any difference which measure you pick?)*

16. With 4 CNC machines, a customer's order for steel hubs can be completed in 6 days. If another CNC machine is added, how long will it take to complete the customer's order?

Machinery Applications

In this section, you will learn how to solve problems involving agricultural machinery, such as combines, disks, fertilizer spreaders, etc. Some of the topics that will be covered include **theoretical field capacity** and **effective field capacity** for field machinery, **field efficiency**, and rates such as **acres per hour**, and **tons per hour**. Let's look at a spray rig and calculate some of these values for it.

Our spray rig covers a width of 35 feet in one pass. If the rig travels across a field at a speed of 8 miles per hour, what is the **theoretical field capacity** of this spray rig in **acres per hour**? **Theoretical field capacity** is the most you can get out of a machine, under **ideal** conditions. This would be without making any turns, so let's use this fact to start with. An aerial view of the sprayer in a **theoretical field** is shown below:



Since **theoretical field capacity** is in **acres per hour**, or **ac/hr**, what we are really talking about is $\frac{area}{hour}$. To get the area covered, we have to take *length x width*, which gives us *area*. In this case, the length of the field covered in one hour is **eight miles**. The width in this case is **35 feet**. The only problem here is that we have two different units, **miles and feet**. We can do a conversion from miles to feet first, just like you learned to do in the Measurement chapter:

$$\frac{8\,\cancel{miles}}{1\,hour} x \frac{5280\,feet}{1\,\cancel{mile}} = \textbf{42,240 } \textbf{\textit{feet / hour}}.$$

Now we can use this and our width to find the area covered per hour.

To get the area covered, take *length x width*:

$$\frac{42{,}240\ feet}{1\ hour} \quad x \quad \frac{35\ feet}{1} \quad = \quad \frac{1{,}478{,}400\ square\ feet}{hour}.$$

This is now in *area/hour*, but we want *acres/hour*. All we need to do now is convert the *square feet* in the numerator to *acres*. We can use the techniques learned in Measurement to do this:

$$\frac{1{,}478{,}400\ \cancel{square\ feet}}{hour} \ x \ \frac{1\ acre}{43{,}560\ \cancel{square\ feet}} \quad = \quad \frac{33.93\ acres}{hour}$$

This tells us that the **theoretical field capacity** of the spray rig is almost 34 acres per hour. This is **theoretical**, and would only be true if the truck did not make any turns. Actually, the **effective field capacity**, which does take into account turns, etc., would be somewhat less than this figure. Actually, the truck can do a 92 acre field in 4 hours. What is the **effective field capacity**? This is fairly easy to find, as the units will be in acres per hour. The way to find this value is to divide the acres, 92, by the hours, 4 :

$$\frac{92\ acres}{4\ hours} \quad = \quad \frac{23\ acres}{hour}$$

The **effective field capacity** of the rig is really 23 acres per hour, not 33.9 ac/hr.

Now that we have this value, we can calculate the **field efficiency** of this unit. **Field efficiency** is the ratio of **effective field capacity** to **theoretical field capacity.** This can be calculated as shown below:

$$Field\ Efficiency \quad = \quad \frac{23\ acres\ per\ hour}{33.9\ acres\ per\ hour} \quad = \quad 67.85\%$$

What this means is that the spray rig can actually cover a bit less than 68% of it's theoretical performance. As you might suspect, this number can vary from field to field. It will be higher in large, long fields, and less in small, short fields.

The last thing we will look at is field capacity in **tons per hour.** While this generally applies to harvesting equipment, we will find the value for this spray rig. Let's say this rig sprays 75 gallons of spray mix per hour. Since a gallon of mix weighs about 8.3 pounds per gallon, this would work out to about 622.5 pounds of spray per acre. Let's convert this to **tons per hour**. Since we know the rig covers 23 acres per hour, we can just take this, times the pounds of spray per hour, converting to **tons per hour** while we do the calculation:

$$\frac{23\ \cancel{acres}}{hour} \ x \ \frac{622.5\ \cancel{pounds}}{\cancel{acres}} \ x \ \frac{1\ ton}{2000\ \cancel{pounds}} \quad = \quad \frac{7.16\ tons}{hour}$$

This means that in one hour, the rig will go through almost **7.2 tons** of spray mix. As I mentioned previously, **tons per hour** is usually calculated for harvesting equipment, but the technique used is the same.

1. What is the *theoretical capacity* (in acres per hour) of a combine with a 20 foot wide head traveling at 3.4 miles per hour?

2. What is the *field efficiency* (nearest tenth %) of the combine in #1 if it harvests 30 acres in 5 hours?

3. What is the *effective field capacity* in acres per hour of the combine in #1&2 in a situation where it's *field efficiency* is only 61%?

4. What is the *theoretical field capacity* of a forage harvester in *tons per hour* of a 2-row (30 inch rows) harvester traveling at 3.5 miles per hour, if the yield is 15 tons per acre?

5. What is the *effective field capacity* in tons per hour of the harvester in #4 if it has a *field efficiency* of 70%?

Fertilizer Applications

In this section, you will learn how to solve problems involving fertilizer, but before we get to that, let's look at a can of mixed nuts:

Imagine this scenario:

At 11 p.m. on Tuesday evening, you get a craving for your favorite nut, cashews. You head for the local Kwik Trip, only to find that the only thing they have is the can to the right. Since the craving is so strong, you decide to go for it, and buy the can, even though you hate filberts, and are allergic to peanuts. Hey, you're worth the 8 bucks! For this reason, the only part of the can that you care about is the cashews. The peanuts and filberts are of no interest to you. This is kind of like most fertilizers; in that, the active ingredient such as nitrogen, phosphorous, or potassium is only part of what comes in the bag. The rest is just filler.

At this point we will focus in on the cashews. While you have bought a six-pound can of nuts, you are not getting 6 pounds of cashews. The question is, how many pounds of cashews **are** you getting? Since the amount of each nut is given as a percentage, we will use this number to get the actual number of pounds of **cashews**. As stated on the can, it holds 40% cashews. That means that 40% of the six pounds of nuts in the can are cashews. To get the actual weight of the cashews, we will use the familiar method from the **Percents** chapter in your book to do the calculations.

$$\frac{Part}{Base} = \frac{Rate}{100}$$

We are looking for the **part** that are cashews. The base in this case is the six pounds. If we fill in the values, we get:

$$\frac{\#\ pounds\ \ of\ cashews}{6\,pounds\ \ total} = \frac{40}{100}$$

If we solve this equation, we find that in the 6-pound can of mixed nuts, we are getting only 2.4 pounds of cashews.

Since we are going to throw away the peanuts and filberts, it might be interesting to see how much you are paying per pound for the **cashews**. Your answer will be in ***dollars per pound, or $ / lb.***, so the way to calculate this is to take the amount of dollars you paid for the 6 pound can of nuts, divided by the number of pounds of cashews you got in the can.

$$\frac{\$8.00}{2.4\ \ pounds} = \$3.33 \text{ per pound for the cashews}$$

Well, now that we have the idea of the concepts involved, lets go to the subject at hand, fertilizer problems. The information given will be similar, although usually the weights discussed are in **tons**, not pounds. As long as you know that there are 2000 pounds in one ton, you'll be fine. Let's look at an example:

Calculate how many pounds of nitrogen there are in a ton (2000 pounds), and the cost of a ton and a pound of <u>pure nitrogen</u> for Urea:

		Per Ton of Material		Cost Per …	
Material	**% Nitrogen**	**Cost**	**# of Nitrogen**	**Ton of N**	**Pound of N**
Urea	55%	$255.00			(3 dec places)

The first blank asks us how many pounds of **N** (actual, or pure nitrogen) there is in a ton of Urea, which contains 55% **N**. This is similar to the question "how many pounds of cashews are there in a six pound can of mixed nuts with 40% cashews?". We use exactly the same technique to solve:

$$\frac{\#\ pounds\ of\ N}{2000\ pounds\ of\ Urea} = \frac{55}{100}$$

If we solve this, we find that there are 1100 pounds of pure nitrogen in a ton of Urea that is 55% nitrogen.

Let's look at the next blank:

<u>Cost Per:</u>
Ton of Nitrogen
$_____

This we can solve using a proportion, which was covered in **<u>Formulas</u>**. The cost per ton of **N** is directly proportional to the weight. The question is:

If 1100 pounds of nitrogen costs $255, how much does it cost **per ton**?

The proportion will look like this:

$$\frac{\$\ per\ pound\ of\ N}{pounds\ of\ N} = \frac{255}{1100} = \frac{?}{2000}$$

If we solve this proportion, we find that a ton (or 2000 pounds) of **N** costs us **$463.64**

The last blank asks us the **cost per pound** of **N.** This is going to be pretty easy. Since we know that 2000 pounds costs us $463.64, we can get the $/lb just using division:

$$\frac{\$463.64}{2000\ pounds\ of\ N} = \$0.232\ per\ pound\ of\ N$$

We list 3 decimal places, since fertilizer is usually sold by the ton.

Now try the following practice problems.

1. Calculate how many pounds of nitrogen there is in a ton (2000 pounds), and the cost of a ton and a pound of **pure nitrogen** for each of the three sources of nitrogen listed below:

		Per Ton of Material		Cost Per …	
Material	**% Nitrogen**	**Cost**	**# of Nitrogen**	**Ton of N**	**Pound of N**
Urea	46%	$260.00			
UAN (liquid)	28%	$235.00			
NH_3 (anhydrous)	82%	$320.00			

2. DAP (di ammonium phosphate) is a source of both nitrogen and phosphorous. It is 18% nitrogen and 46% phosphorous. How many pounds of each ingredient do you get in a ton of DAP?

1 ton DAP contains _____ pounds of nitrogen

and _____ pounds of phosphorous

3. TSP (triple super phosphate) is 46% phosphorous. If it costs $208 per ton, what is the cost per ton of actual phosphorous from TSP?

$_____ per ton of phosphorous.

4. Potash costs $165 for a ton of material containing 60% potassium. How many pounds of potash must you spread to get one ton of potassium?

Applied Problems - Geometry

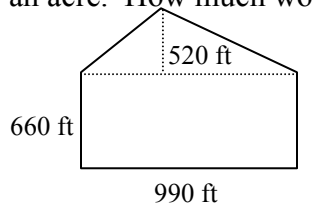
1. You are pricing bids on machine sheds. Mort's Buildings offers a 20' x 42' shed and Goliath Lumber offers a 22' x 45'. Mort's charges $20/sq. ft. for all sheds they build, while Goliath charges a rate of $18/sq. ft.

Find the cost of having :

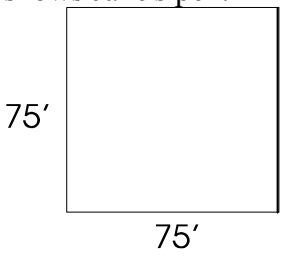
Mort's build your shed_____

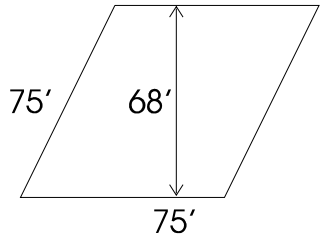
Goliath build your shed_____

2. Nicole has a neighbor who offers to sell her a piece of property that would allow her to increase her pasture land. A diagram of the lot is shown below. The asking price is $575 an acre. How much would it cost to buy it.



3. Jane and Alice got in an argument over the area of their cattle pens. This diagram shows Jane's pen: and this is Alice's pen:





Jane claims her pen covers more area than Alice's. Alice says that is not true since each side of her pen is 75' just like Jane's. Who is correct?

For problems 4-7, calculate the area (in acres).

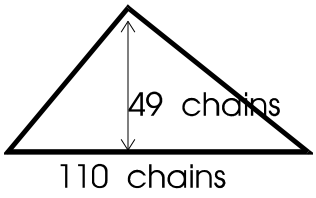
Use these conversion formulas to get your answers into acres:

$$\#\ acres = \frac{area\ in\ sq.\ ft.}{43,560} \qquad \#\ acres = \frac{area\ in\ sq.\ yds.}{4840} \qquad \#\ acres = \frac{area\ in\ sq.\ rods}{160}$$

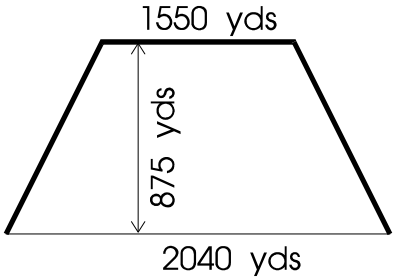
$$\#\ acres = \frac{area\ in\ sq.\ chains}{10} \qquad \#\ \text{of acres} = \text{area in sq. miles} \times 640$$

4.

5.



6.



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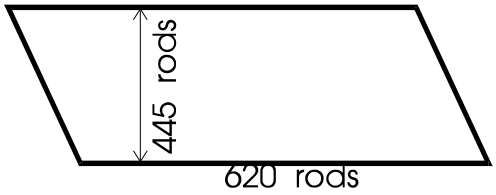
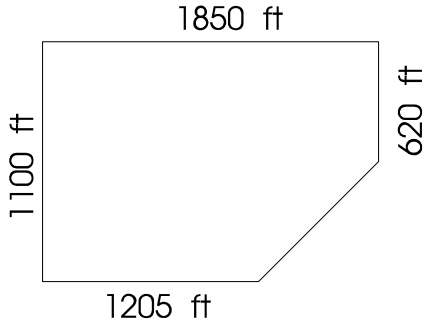


8. Find the area of this piece of property and its total purchase price if it goes for $650/acre.



For questions 9 – 15, use these formulas to calculate crib and bin capacities. Note: All dimensions must be converted to feet before using the formulas.

SHELLED CORN

Rectangular Bin: # bushels=0.8 × length × width × depth of corn

Round Bin: # bushels=0.6263 × diameter^2 × depth of corn

EAR CORN

Rectangular Crib: # bushels=0.4 × length × width × depth of corn

Round Crib: # bushels=0.31416 × diameter^2 × depth of corn

PILED GRAIN

Shelled Corn: # bushels=0.20944 × height × (diameter of base)^2

Ear Corn: # bushels=0.10472 × height × (diameter of base)^2

9. Find the capacity, in bushels, of a round bin with a diameter of 35 ft and an depth of shelled corn of 14 ft.

10. How many bushels of ear corn are in a rectangular bin with these measurements?
Length= 25 ft, Width=21 ft, Depth=11 ft

11. How many bushels of ear corn are in a pile with these measurements?
Diameter=4 ft, Heigth=5 ft

12. Find the capacity, in bushels, for this round crib of ear corn.
Diameter=20.5 ft, Height=16.4 ft

13. Find the capacity, in bushels, for this rectangular crib of shelled corn.
Length=25 ft, Width=25 ft, Depth=10.5 ft

14. A pile of shelled corn is found to have a diameter of 7.5 ft and a height of 4 ft. How much is this worth if the corn is $2.20 per bushel?

15. How many bushels of ear corn are in a pile 7 ft high, and 16 ft in circumference.
(Hint: Use the formula, $d = \frac{C}{\pi}$)

16. A wheel that has a diameter of 3.6 ft is used to find the dimensions of a field. The wheel rotates 236 times while going the length of the field. How long is the field?

17. If a field is found to be 750 ft long after measuring it with a wheel of diameter 2 ft, how many revolutions did the wheel turn to get that measurement? (nearest whole number)

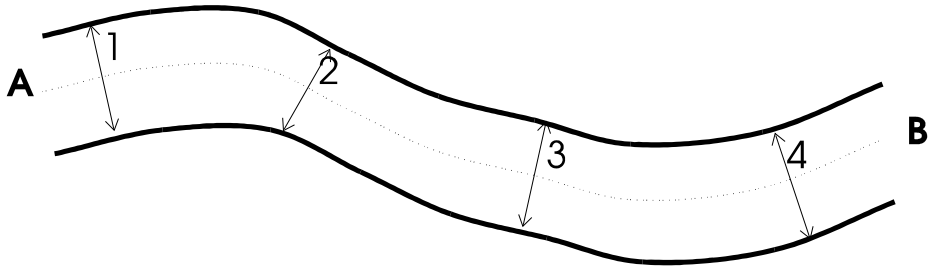
18. What is the diameter of a silo that has a circumference of 52 ft.? You may use the formula: $d = \frac{C}{\pi}$

19. A pipe has a 3.5" outside diameter and a 3.25" inside diameter. What is the cross-sectional area of water that can flow through the pipe?

Calculating Area of Curved Boundaries

Measuring fields where contour farming is used is a bit more involved. The best way to get a good estimate is to first measure off a center line that goes through the strip lengthwise. Then at equal intervals, find the width of the field. Be sure to make these width measurements at 90 degree angles (perpendicular) to the centerline. Next, find the average of these width measurements and multiply this by the length of the center line. This will give you a good approximation of the true area of the field.

EXAMPLE: Find the acreage of this field.



Length of Centerline **AB** is 428 chains

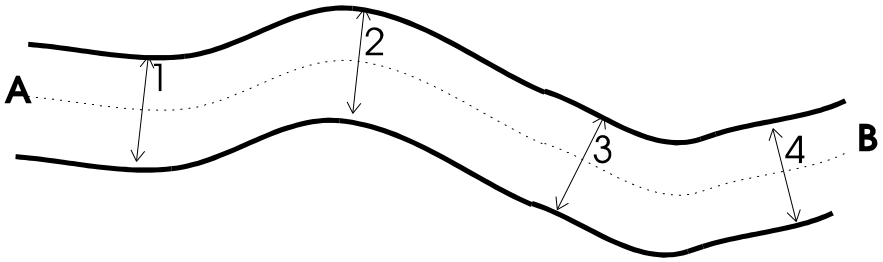
Width at 1: 1.4 chains
Width at 2: 1.25 chains
Width at 3: 1.3 chains
Width at 4: 1.45 chains

Solution: $\left(\frac{1.4 + 1.25 + 1.3 + 1.45}{4}\right) \times 428 = 577.8$ sq. chains

Converting this to acres gives us a measurement of **57.8 acres**

Find the area of each strip in ACRES:

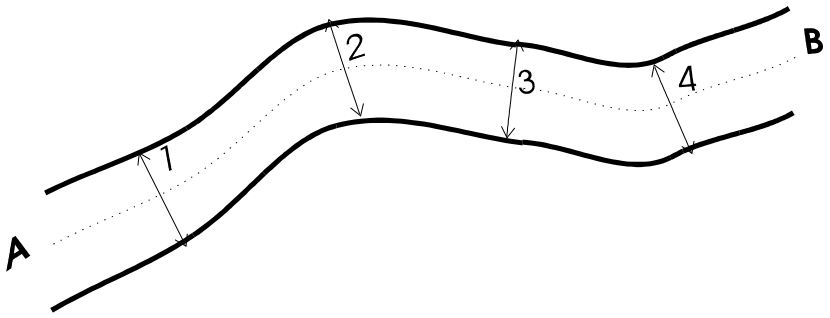
1.



Length of the Centerline AB: 950 yds

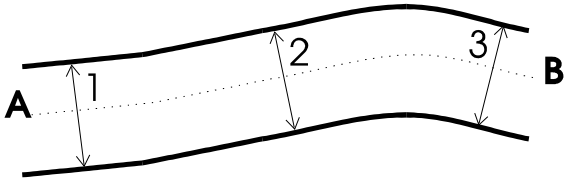
Width of strip 1: 26 yds
Width of strip 2: 26.5 yds
Width of strip 3: 25.5 yds
Width of strip 4: 26.3 yds

2.



Length of the Centerline AB: 250 chains
Width of strip 1: 1.5 chains
Width of strip 2: 1.45 chains
Width of strip 3: 1.25 chains
Width of strip 4: 1.3 chains

3.



Length of the Centerline AB: 480 ft.
Width of strip 1: 77 ft
Width of strip 2: 79.5 ft
Width of strip 3: 78.2 ft

Applied Problems – Answer Key

Fractions

1.) 38 3/8 ft
2.) 1/2, 9/16, 5/8, 3/4
3.) 2 5/16 lb
4.) 6/16 which reduces to 3/8”
5.) 327 lbs
6.) 133 1/3 acres
7.) 47 3/4 lbs
8.) 179 1/4 lbs
9.) 110 minutes
10.) 33 1/3 yds
11.) 47 1/4 lbs
12.) 160 bushels
13.) 3 13/16”
14.) 9 1/8”
15.) 41 hrs
16.) 28 1/4 lbs

Decimals

1.) 8.6 lbs
2.) yes
3.) 1 3/5 gallons (same as 1.6 gal)
4.) 0.375 lbs
5.) 1.625 oz
6.) 63.13 lbs, $3.16
7.) $0.35
8.) $184.10
9.) 812.5 ft
10.) $2247.78
11.) $1225.50
12.) 132.75 lbs
13.) 12346.9 square yards
14.) 49.03 lbs
15.) about 20 days

Percents

1.) 4.4 ft
2.) $3122
3.) 72.4%
4.) 16.2%
5.) 54,000 lbs
6.) 9714.3 lbs
7.) 6.25% increase
8.) 17.1% decrease
9.) 21,328 bushels
10.) $1460.67

Measurement

None

Formulas

1.) No, 78.5 sq in. is less than 95 sq in.
2.) 844.9 cubic ft
3.) 214.2 ft
4.) 160 sq ft.
5.) 8.6 ft

Technical Proportions

1.) 5.8 ohms
2.) 2250 rpms
3.) 62.3 lbs
4.) 67 teeth (nearest whole)
5.) 18,000 bushels
6.) 5 qts
7.) 4.2 gal
8.) 100 lbs
9.) 114 rpm’s
10.) 3.7 lbs zinc
11.) 2.5 gal of thinner
12.) 33.3 psi 13.) 5.3” diameter
14.) 1.6 qts of reducer
15.) $11.48 You need to use AREA in your comutations, not diameter.
16.) 4.8 days

Machinery Applications

1.) 8.24 acres/hour
2.) 72.8% efficient
3.) 5.03 acres/hour
4.) 31.82 tons/hour
5.) 22.27 tons/hour

Fertilizer Applications

1.) Urea 920 lb, $437.91/ton, $0.237/lb
UAN 560 lb, $696.43/ton, $0.348/lb
NH_3 1640 lb, $195.12/ton, $0.098/lb
2.) 360 lb of Nitrogen, 920 lb of Phosphorous
3.) $406.52/ton
4.) 3333 lb of potash

Geometry

1.) Mort's: $16,800 Goliath's: $17,820
2.) The acreage is about 20.9 acres so the land should cost $12,017.50
3.) John's pen is larger by 525 sq ft.
4.) P=2430 ft, A=8.2 acres
5.) A=269.5 acres
6.) A=324.5 acres
7.) A=2085.9 acres
8.) about 43.2 acres, $28,080
9.) 10741 bushels
10.) 2310 bushels
11.) 8.4 bushels
12.) 2165.2 bushels
13.) 5250 bushels
14.) $103.67
15.) 19 bushels
16.) 2666.7 ft long
17.) 119 revolutions
18.) 16.6 ft
19.) 8.3 sq in

Acreage of Strips:
1.) 5.1 acres
2.) 34.4 acres
3.) 0.9 acres

Applied Problems - Quiz

Fractions

1. Jonesdale Farm has a herd of 80 milk cows and 25 young stock for a total of 105 animals. What fraction of the herd is young stock? (reduce to lowest terms)

2. Four of the seven heifers Joanne owns are registered. Stephanie has 5 registered heifers out of the eight that she owns. Which has a greater fraction of registered heifers?

3. One fourth of Kevin's herd makes over 22,000 pounds of milk per lactation. One third makes over 20,000 pounds and up to 22,000 pounds per lactation. What fraction of Kevin's herd makes ***less than*** 20,000 pounds of milk per lactation?

4. Five-eighths of the Duggandale Herd is registered. Smithknoll Farms has half that fraction of registered cows. What fraction of the Smithknoll Farms herd is registered?

5. Dave spent 1 1/2 hours Tuesday and 3/4 hours Wednesday chopping bedding. What was his total time on this job?

6. Cranmoor Farms has 1/3 of its assets in machinery, 1/2 in property, and the rest in cattle. What fraction of Cranmoors assets are in cattle?

7. Highhead Farm has 1/3 of its assets in cattle, and 5/8 of its assets in property. The property is how many times the cattle value?

Decimals

1. This month Wapsie Valley Creamery has a $0.18 per pound competitive premium for protein. Grande's is
$ 3/16 per pound, and Foremost's is 18.13 cents per pound. Which pays the highest premium per pound of protein?

2. Tom has a new pipeline washer system with digital keypad entry. If he used to put in 2 3/8 cup of washing solution, what decimal number of cups must he enter into the keypad?

3. Given these decimal crop moisture content values, arrange them from highest to lowest:

0.125 0.1 0.010 0.086

4. Dellwood's electric bill is calculated as follows:

> There is a basic monthly charge of $18.75 whether any electricity is used or not Dellwood is charged $0.0963 per kilowatt hour used.

What will the total bill be in a month in which Dellwood uses 1186 kwh of electricity? (nearest cent)

5. Dave has 3 batches of hay for sale. His prices are $3.25 per bale for one batch, $2.85 for another, and $2.75 for the third type. What is the average price for the three types of hay? (nearest cent)

6. Carandale ships 6600 pounds of milk every other day. If they get $13.6987 per 100 pounds, what is their gross receipts for milk every other day? (nearest cent)

7. Dobar Farms gets $1.1436 per pound of fat, and $.4989 per pound for other solids (solids not fat). How much more do they get per pound for fat than for other solids? (nearest cent)

Percents

1. In a bale of hay, 3/16 of the weight is protein. What percent protein is the bale of hay? (nearest tenth percent)

2. Tom has ordered a new milking system for his barn. The bill comes to $12,687.43 without tax. If the state sales tax rate is 5%, and the county gets 0.5%, what will the total sales tax be on the new milking system?

3. Of 87 cows in Steve's herd, 26 make over 22,000 pounds of milk per lactation. What percent of his herd is this? (nearest whole percent)

4. Kevin gets a bonus of 10% of all milk sales per year over $200,000. If this years milk sales are $203,687.53, how much is Kevin's bonus?

5. Eldon has a mixed herd, with 24% of his 93 cows being Ayrshires. How many Ayrshires are there in his herd? (nearest whole cow)

6. Carl's herd average went from 21,653 pounds last year, to 22,261 pounds this year. What is the percent increase in his herd average? (nearest tenth percent)

7. Due to the volume of feed supplements he buys, Jim gets a 3 1/2 percent discount off the regular price. What are his savings in a month when he buys $1261.83 worth of feed supplements? (nearest cent)

Measurement

1. Amy has a pasture that is 230 feet by 380 feet. To get a price on having it fenced, she needs to know the dimensions in rods. What are the dimensions in rods? (nearest whole)

2. Ed is going to put cement in an area by the barn. He needs 4000 cubic feet of concrete. How many cubic yards is this? (nearest whole)

3. Some hay for sale costs $140 per ton. How much is this per pound?

4. Alan has a 320-acre farm. How many hectares is this? (nearest whole)

5. Tami's favorite cow, Serena, needs an injection of 1.5 fluid ounces of antibiotic. How many milliliters will be injected? (round to nearest five ml)

6. One square mile of area is 640 acres. How many square kilometers are there in 640 acres?

7. Koreene, a second calf heifer, gave 55 liters of milk on the latest test day. How many gallons is this? (nearest tenth)

Formulas

1. Tom has 57 cows and produces 1,220,000 pounds of milk per year. If Dave has 121 cows that produce milk at the same rate as Tom's, how many pounds of milk per year will Dave's herd produce? (Nearest thousand pounds)

2. Bob can plow one of his fields with a 4 bottom x 16" plow in 7.6 hours. How long should it take him to plow the same field with a 5 bottom x 16" plow traveling at the same speed? (Nearest tenth hour)

3. A Hesston StackHand makes a stack for bedding that is 7 feet wide by 8 feet long by 6 1/2 feet tall. How much area will it take to put 10 of these stacks right by the barn? (Nearest whole square foot)

4. What is the theoretical capacity (in acres per hour) of a 12-foot wide disk traveling 5.7 miles per hour?

5. What is the field efficiency (nearest tenth %) of the disk in #1 if it covers 34 acres in 5 hours?

6. What is the theoretical field capacity of a cotton harvester in tons per hour of a 4-row (40 inch rows) harvester traveling at 2.1 miles per hour, if the yield is-22 tons per acre?

7. What is the effective field capacity in tons per hour of the harvester in #6 if it has a field efficiency of 70%?

8. Calculate how many pounds of nitrogen there is in a ton (2000 pounds), and the cost of a ton and a pound of **pure nitrogen** for each of the three sources of nitrogen listed below:

		Per Ton of Material		**Cost Per …**	
Material	**% Nitrogen**	**Cost**	**# of Nitrogen**	**Ton of N**	**Pound of N**
Urea	28%	$176.00			(3 dec places)
UAB	66%	$275.00			
Googol	55%	$225.00			

9. **Glory Granules** is a source of both nitrogen and phosphorous. It is 38% nitrogen and 13%
Phosphorous. How many pounds of each ingredient do you get in a ton of Glory Granules?

pounds of nitrogen = pounds phosphorous =

10. **Potash** costs $215 for a ton of material containing 44% potassium. How many pounds of potash must you spread to get one ton of potassium?

Geometry

1. A big square hay bale measures 31.5 inches by 34.5 inches by 96 inches. How many **cubic feet** of hay is there in the bale? (nearest whole)

2. Steve is going to pour concrete in his new pole barn. If the building dimensions are 60 feet by 36 feet, how many square feet of floor space will he have?

3. Steve is cutting a piece of siding to fit into the peak of his barn. If the top angle is 100 degrees, how many degrees will the two equal angles in the lower corners be?

4. A round bale has a diameter of 6 feet and a length of 5 feet. How many cubic feet of hay is there in a round bale with these dimensions? (nearest whole)