

All problems are 2 pts unless indicated. Please show work for all of the following problems besides 1-3. Work will be graded on the following basis: Show all work for full credit: 0.5 points for units, 0.5 points for correct unit cancelling, 0.5 points written as fraction/answer with label, 0.5 points for correct answer. Use the following chart for to answer

1. Write 1456% as a decimal. 1 pt

$$\boxed{14.56}$$

2. Write 0.0009 as a percent. 1 pt

~~0.0009~~

$$\boxed{.09\%}$$

$$1 = 100\%$$

$$100$$

3. John sold an 800 pound steer for \$1200. What was the steer's price in \$/cwt? 1 pt

$$\frac{\$1200}{800 \text{ lbs}} = \frac{\$1.50}{1 \text{ lb}} \times \frac{100 \text{ lbs}}{1 \text{ cwt}} = \boxed{\frac{\$150}{1 \text{ cwt}}}$$

Please show work for rest of exam

4. A ton of fertilizer costs \$655 dollars. How much does it cost per pound given 1 ton = 2000 pounds.

$$\frac{\$655}{1 \text{ ton}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} = \boxed{\frac{\$0.3275}{1 \text{ lb}}}$$

5. You are feeding swine. You are feeding 200 pigs. You feed your swine 12 ounces of soy meal per day per pig (written as 12 oz/ (1 day \* 1 pig)). You are feeding them for 3 months and 3 weeks and 3 days. The soy meal is priced at \$400/ 1 ton. Assume 30 days per month. 1 pound per 16 ounces. 1 ton per 2000 pounds. 7 days per 1 week. What is the price to feed ONE PIG for all the time (3 months 3 weeks 3 days). HINT two steps – first figure out total days adding, then do multiplication cancelling.

$$\#1. \frac{3 \text{ mo}}{1} \times \frac{30 \text{ day}}{1 \text{ mo}} = \frac{90 \text{ days}}{1} + \frac{21 \text{ days}}{1} + \frac{3 \text{ days}}{1} = \frac{114 \text{ days}}{1}$$

$$\frac{3 \text{ week}}{1} \times \frac{7 \text{ days}}{1 \text{ week}} = 21 \text{ days}$$

$$\#2. \frac{12 \text{ oz}}{1 \text{ day} \cdot 1 \text{ pig}} \cdot \frac{114 \text{ days}}{1} \cdot \frac{1 \text{ lb}}{16 \text{ oz}} \times \frac{1 \text{ Ton}}{2000 \text{ lbs}} \times \frac{\$400}{1 \text{ Ton}} = \boxed{\frac{\$17.10}{1 \text{ pig}}}$$

6. You are estimating this years yield in lbs per acre. You have two steps to do this.

A. The first step is to find plants per square ft of row (heads/ft<sup>2</sup>). You could 1 foot of row and find there is 31 plants (31 heads/1 ft). Your row spacing is 10 inches. You know there is 12 inches in 1 ft. How many heads/ft<sup>2</sup> do you have?

$$\frac{31 \text{ pl}}{1 \text{ ft}} \cdot \frac{12 \text{ in}}{1 \text{ ft}} \cdot \frac{1}{10 \text{ in}} = \boxed{\frac{\text{heads}}{\text{ft}^2} 37.2}$$

B. You now want to find how many bushels (bu/acre). You know your answer from number 1 (heads/ft<sup>2</sup>). You know there is 20 seeds/ 1 head (on average). You know that 1 acre = 43560 ft<sup>2</sup>. You are raising rollag and estimate there is about 15500 seeds/pound. Rollag typical runs around 59 pounds/bushel.

$$\frac{43560}{\text{ft}^2} \cdot \frac{37.2 \text{ heads}}{1 \text{ ft}^2} \cdot \frac{20 \text{ seeds}}{1 \text{ head}} \cdot \frac{1 \text{ lb}}{15500 \text{ seeds}} \cdot \frac{1 \text{ bu}}{59 \text{ lbs}} = \boxed{35.43 \frac{\text{bu}}{\text{acre}}}$$

7. You want to know how big of a light bulb you need in your house. You know that 1 watt = 1 joule / 1 second (you want to find joule/sec as answer). You measure your volts and find you have 47 joules / one coulombs. You then measure your amps and find you have 8 coulombs/ 1 second. How many watts is needed to run your light bulb?

$$\frac{8 \text{ c}}{1 \text{ sec}} \cdot \frac{47 \text{ j}}{1 \text{ c}} = \boxed{376 \frac{\text{j}}{\text{sec}}} \quad 1 \text{ watt} = \frac{1 \text{ j}}{\text{sec}}$$

8. Stefon Diggs fertilizes 8000 acres. You apply 9 tons per section. The fertilizer costs \$640/ton. How much did you pay per acre? (\$/acre). 1 section/ 640 acres. 1 ton/2000 pounds.

$$\frac{\$640}{1 \text{ ton}} \cdot \frac{1 \text{ ton}}{2000 \text{ lbs}} = \frac{\$9}{\text{acre}}$$

$$\frac{9 \text{ ton}}{1 \text{ sec}} \cdot \frac{\$640}{1 \text{ ton}} \cdot \frac{1 \text{ sec}}{640 \text{ acre}} = \boxed{\frac{\$9}{1 \text{ acre}}}$$

9. A. A 600 pound heifer needs 5.16 Mcal/1 day (Mcal = megacalories) for maintaining body weight. You are feeding oat hay. It has a kilocalorie (kcal) maintenance value of 570 kilocalories/ 1 pound of feed. How many pounds of oat hay do you need to feed? (Want lbs of oat hay). Given: 1000 cal per 1 kcal.

$$\frac{5.16 \text{ Mcal}}{1 \text{ day}} \cdot \frac{1000 \text{ kcal}}{1 \text{ Mcal}} \cdot \frac{1 \text{ lb}}{570 \text{ kcal}} = \boxed{\frac{9 \text{ lbs oat}}{1 \text{ day}}}$$

$$\begin{aligned} & \times \frac{1 \text{ lb}}{0.33 \text{ Mcal}} = \\ & \times \frac{1000 \text{ kcal}}{1 \text{ Mcal}} \times \frac{1 \text{ lb}}{570 \text{ kcal}} = \\ & \underline{9.28 \text{ Mcal}} \\ & \text{1 day} \end{aligned}$$

$$\begin{aligned} & \frac{9.05 \text{ lbs 1 day}}{1 \text{ day}} \cdot \frac{1 \text{ lb}}{0.33 \text{ Mcal}} \cdot \frac{4.12 \text{ Mcal}}{1 \text{ day}} \\ & = \underline{6.28 \text{ lbs}} \\ & \text{1 day} \end{aligned}$$

- B. The same heifer needs an additional 4.12 Mcal to gain 2 pounds/ 1 day. You are feeding the heifers 18 pounds of hay per 1 day. The energy value of oat hay for gaining weight is 0.33 Mcal/1 pound of feed. Are you feeding the heifer enough to maintain weight and gain 2 pounds? Prove your answer using the information from number six and finding the POUNDS OF OAT HAY NEEDED to gain 2 pounds (want lbs of oat hay)

$$\frac{4.12 \text{ Mcal}}{1 \text{ day}} \cdot \frac{1 \text{ lbs feed}}{0.33 \text{ Mcal}} = \boxed{\frac{12.48 \text{ lbs OAT hay}}{1 \text{ day}}}$$

$$\begin{aligned} & \frac{18 \text{ lbs hay}}{1 \text{ day}} \cdot \frac{0.33 \text{ Mcal}}{1 \text{ lbs}} = \\ & \underline{5.94 \text{ Mcal}} \\ & \text{1 day} \end{aligned}$$

Total Need 21.5 lbs  
~ 21.6 lbs Feed more!

24.83

10. You remove 3 tons of alfalfa from 1 acre of land (3tons/1acre). How much P2O5 is removed per acre (lbs P2O5/ 1 acre)? Given: 0.006 lbs P2O5/ 1 pound of alfalfa removed 2000 pounds/ 1 ton

$$\frac{3 \text{ tons}}{1 \text{ acre}} \times \frac{2000 \text{ lbs}}{1 \text{ ton}} \times \frac{0.006 \text{ lbs P}_{205}}{1 \text{ lb}} = \boxed{\frac{36 \text{ lbs P}_{205}}{1 \text{ acre}}}$$

11. You read a label of herbicide. It tells you to apply 24 oz/acre. How much would you need to spray 2500 acres? Give your answer in gallons. Given 128 oz / 1 gal

$$\frac{24 \text{ oz}}{1 \text{ acre}} \cdot \frac{2500 \text{ acres}}{1} \cdot \frac{1 \text{ gal}}{128 \text{ oz}} = \boxed{\frac{468.75 \text{ gal}}{1}}$$

12. You are reading a label of chemical. You find that you need to spray 15 gallons of liquid per acre. The recommended rate of herbicide is 20 oz/acre. The spray tank you have is 1000 gallons. How much chemical in gallons do you add to your tank?

$$\frac{128 \text{ oz}}{1 \text{ gal}} \cdot \frac{1000 \text{ gal}}{1 \text{ tank}} = \frac{128000 \text{ oz}}{1 \text{ tank}}$$

~~1000 gal~~

$$\frac{67 \text{ gal}^{\text{acres}}}{1 \text{ tank}} \cdot \frac{20 \text{ oz}}{1 \text{ acre}} \times \frac{1 \text{ gal}}{128 \text{ oz}} = \boxed{\frac{10.5 \text{ gal}}{1 \text{ tank}}}$$

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B. The same heifer needs an additional 4.12 Mcal/ 1 day to gain 2 pounds/ 1 day. You are feeding the heifers 18 pounds of hay per 1 day. The energy value of oat hay for gaining weight is 0.33 Mcal/1 pound of feed. Are you feeding the heifer enough to maintain weight and gain 2 pounds? Prove your answer using the information from number six and finding the POUNDS OF OAT HAY NEEDED to gain 2 pounds (want lbs of oat hay)

10. You remove 3 tons of alfalfa from 1 acre of land (3tons/1acre). How much P<sub>2</sub>O<sub>5</sub> is removed per acre (lbs P<sub>2</sub>O<sub>5</sub>/ 1 acre)? Given: 0.006 lbs P<sub>2</sub>O<sub>5</sub>/ 1 pound of alfalfa removed  
2000 pounds/ 1 ton

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12. You are reading a label of chemical. The recommended rate of herbicide is 20 oz/acre. You can spray 67 acres / 1 tank. How much chemical in gallons do you add to your tank? Answer will be in gallons per tank. Given 128 oz / 1 gal