Math Open Note Quiz Name: _____

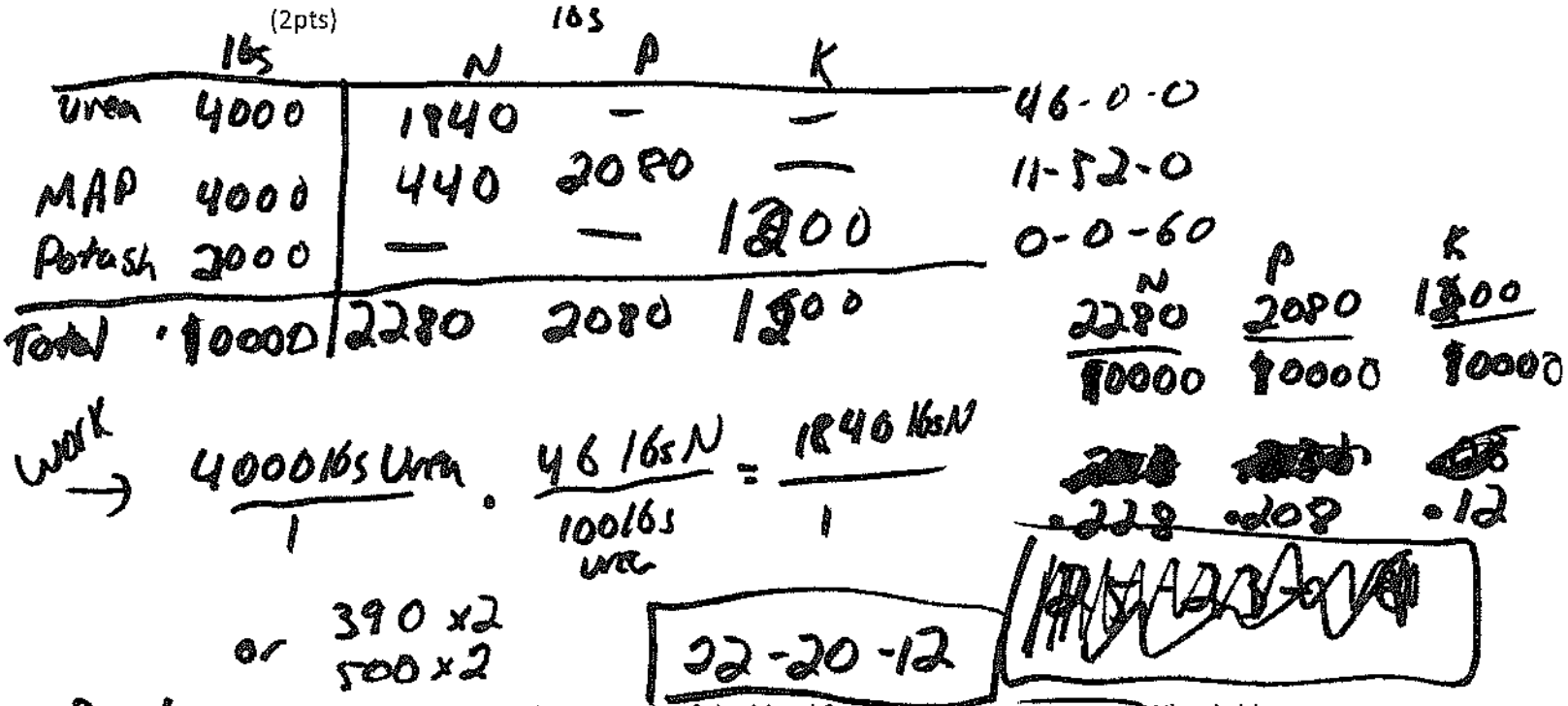
Grading: 0.5 attempt made at solving that makes sense; 0.5 pts for correct answer; 0.5 pts for correct cancelling; 0.5 for use of proper information

References:

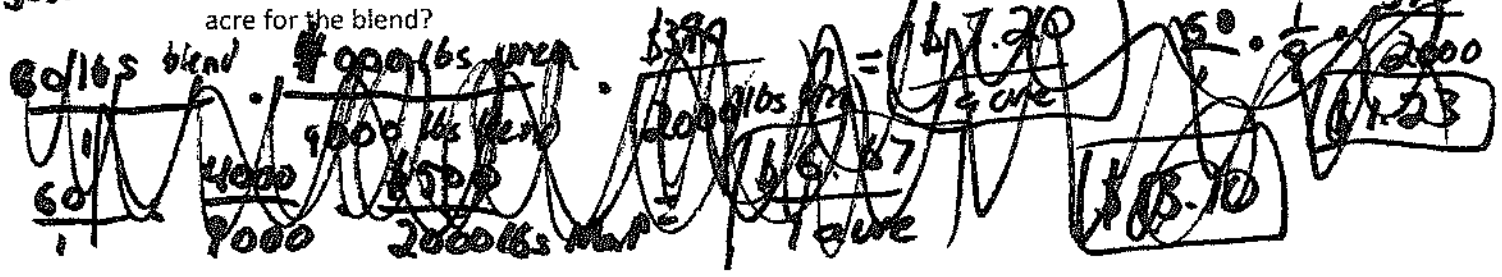
Fertilizer Grade	Fertilizer Name
46-0-0	Urea (dry or liquid)
28-0-0	UAN (28%)
11-52-0	MAP – Mono-Ammonium Phosphate (Dry)
10-34-0	Liquid Ammonium Polyphosphate
18-46-0	DAP – Di-Ammonium Phosphate (Dry)
0-0-60	Potash (Dry or liquid)
21-0-0-24 (S)	AMS – Ammonium Sulfate

Fertilizer	Price
UAN	$232 per ton
Urea	$390 per ton
10-34-0	$450 per ton
DAP	$495 per ton
Potash	$370 per ton
MAP (Monoammonium phosphate)	$500 per ton
AMS (Ammonium sulfate)	$350 per ton

1. What is the analysis of a blend consisting of 2 tons of Urea, 2 tons of Map, and 1 ton of potash? (2pts)



2. Dan Patrick is putting sixty pounds of the blend from above down per acre. What is his cost per acre for the blend?



$$\frac{60 \text{ lbs blend}}{1} \times \frac{400 \text{ lbs urea}}{1000 \text{ lbs blend}} \times \frac{\$390}{2000 \text{ lbs urea}} = \$4.68$$

2.

$$\frac{60 \text{ lbs blend}}{1} \times \frac{4000 \text{ lbs MAP}}{10000 \text{ lbs blend}} \times \frac{\$500}{4000 \text{ lbs MAP}} = \$6$$

$$\frac{60 \text{ lbs blend}}{1} \times \frac{2000 \text{ lbs PA}}{10,000 \text{ lbs Blend}} \times \frac{\$370}{2000 \text{ lbs PA}} = \$2.22$$

$\$12.90$

or

$\$390 \times 2 = \$780$

$\$500 \times 2 = \$1000$

$\$370 \times 1 = \$370$

$$\frac{\$2150}{10,000 \text{ lbs}} \times \frac{60 \text{ lbs}}{1} = \$12.90$$

3. What is the cost for one pound of NITROGEN in UAN? 2 pts

$$\frac{100\text{ lbs UAN}}{28\text{ lbs N}} \cdot \frac{1\text{ ton UAN}}{2000\text{ lbs UAN}} \cdot \frac{\$232}{1\text{ ton UAN}} = \frac{\$0.414}{1\text{ lb N}}$$

28-0-0

4. A. You want to apply 45 pounds per acre of P2O5 in season using liquid 10-34-0 (liquid ammonium polyphosphate). How many gallons of 10-34-0 do you put down given that the density of the liquid is 11.64 pounds per gallon? 2 pts

$$\frac{45\text{ lbs } P_2O_5}{1\text{ acre}} \cdot \frac{100\text{ lbs } 10\text{-}34}{34\text{ lbs } P_2O_5} \cdot \frac{1\text{ gal } 10\text{-}34}{11.64\text{ lbs } 10\text{-}34} = \frac{\text{gals}}{1\text{ acre}}$$

$$\frac{11.37\text{ gal}}{\text{acre}}$$

$$\star\ \frac{1\text{ gal}}{11.64\text{ lbs}} \times \frac{45\text{ lbs}}{1\text{ ac}} =$$

B. Given the price of 10-34-0 above, a price of nitrogen in urea of $0.43/pound of nitrogen ($/lb N)

i. What is the value of the nitrogen in a ton of 10-34-0? 2 pts

$$\frac{2000\text{ lbs } 10\text{-}34}{1\text{ ton } 10\text{-}34} \cdot \frac{10\text{ lbs N}}{100\text{ lbs } 10\text{-}34} \cdot \frac{\$.43}{1\text{ lb N}} = \frac{\$86}{1\text{ ton } 10\text{-}34}$$

ii. Given your answer from (i) what is the value of P2O5 expressed in $/lb of P2O5? 2 pts

10-34-0 $\frac{\$450}{1\text{ ton}} - \frac{\$86}{1\text{ ton}} = \frac{\$364}{1\text{ ton } 10\text{-}34}$

$$\frac{\$364}{1\text{ ton } 10\text{-}34} \cdot \frac{1\text{ ton } 10\text{-}34}{2000\text{ lbs } 10\text{-}34} \cdot \frac{100\text{ lbs } 10\text{-}34}{34\text{ lbs } P_2O_5} = \frac{\$0.535}{1\text{ lb } P_2O_5}$$

$\frac{\$0.66}{1\text{ lb } P_2O_5}$ w/ right work OK

5. Katie Nolan wants to apply 85 pounds of nitrogen, 40 pounds of P2O5, and 20 pounds of sulfur to an acre of land. She will use urea, MAP, and AMS. How much (lbs) of each fertilizer do you apply per acre? (lbs/acre)

N	P_2O_5	K_2O	S
85	40	0	20
Urea 46-0-0	MAP 11-52-0		AMS 21-0-024

i. $\frac{20 \text{ lbs S}}{1 \text{ acre}} \cdot \frac{100 \text{ lbs AMS}}{24 \text{ lbs S}} = \boxed{83.3 \text{ lbs AMS per acre}}$

ii. $\frac{83.3 \text{ lbs AMS}}{1} \cdot \frac{21 \text{ lbs N}}{100 \text{ lbs AMS}} = 17.493 \text{ N}$

iii. $\frac{40 \text{ lbs } P_2O_5}{1 \text{ acre}} \cdot \frac{100 \text{ lbs MAP}}{52 \text{ lbs } P_2O_5} = \boxed{76.93 \text{ lbs MAP per acre}}$

iv. $\frac{76.93 \text{ lbs MAP}}{1} \cdot \frac{11 \text{ lbs N}}{100 \text{ lbs MAP}} = 8.46 \text{ lbs N}$

v. $85 - 17.493 - 8.46 = 59.04 \text{ lbs N}$

$\frac{59.04 \text{ lbs N}}{1 \text{ acre}} \cdot \frac{100 \text{ lbs urea}}{46 \text{ lbs N}} = \boxed{128.36 \text{ lbs urea per acre}}$