

Institute of Applied Agriculture
Math Placement Exam
Study Guide

As either an admission requirement to the Institute of Applied Agriculture (IAA) or for a potential course waiver, you will complete the Math Placement Exam. Your score on this exam will help to assess your ability to do college work. It may exempt you from the IAA math course and will be used by advisors to advise you on courses you need to take at the IAA to complete your program.

This study guide was prepared to assist you in your preparations to take the exam. While it is intended to give you samples of the types of problems covered on the exam, it cannot possibly show all the examples that may be used on the exam.

The actual exam consists of 50 questions with a multiple-choice response and will take approximately one hour to complete. Part I of the exam has 28 questions concerning basic math concepts including addition, subtraction, multiplication, division, fractions, decimals, and percents. Part II includes twenty-two questions that are written problems dealing with a variety of situations found in agriculture.

Calculator use: You may not use a calculator for Part I of the exam. Scratch paper will be provided for your use which is to be turned in with the completed exam. This includes the first 28 questions on the exam which deal with basic math. Examples of these questions are shown in part one through five below. You may use a calculator for Part II of the exam which includes 22 questions.

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Part I: Sample Problems

1. Multiplication, division, addition and subtraction of positive and negative numbers.

a. $7573 - 678 =$

b. $37 \times 497 =$

c. $1081 \div 23 =$

d. $248 + 189 - 279 =$

e. $16 + 5 \times 4 - 7 =$

f. $-16 \times 5 =$

g. $-36 \div -4 =$

h. $-15 - (-5) =$

i. $-24 \times -8 =$

2. Operations with fractions

a. $\frac{2}{3} + \frac{3}{5} =$

b. $\frac{7}{9} - \frac{1}{4} =$

c. $2\frac{3}{4} + 3\frac{3}{8} - 2\frac{1}{2} =$

d. $3\frac{7}{8} - 1\frac{1}{2} =$

3. Operations using decimals

a. $21.9 + 23.5 - 13.7 =$

b. $17.9 \times 8.7 =$

c. $5.625 \div 0.375 =$

4. Operations using fractions, decimals and percents

a. Express .78 as a fraction reduced to its lowest terms.

b. Express 12% as a fraction reduced to its lowest terms.

c. Express 125% as a decimal number.

d. Express 0.359 as a percent.

e. $\frac{2}{3}$ of 99 is ??

f. 13 is what part of 52?

g. 7% of 63 is ??

h. 72 is what percent of 200?

i. What % of 300 is 60?

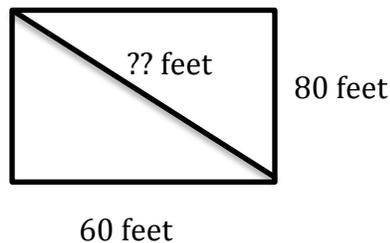
j. Express $\frac{5}{8}$ as a decimal.

- k. Express $\frac{7}{8}$ as a percent.
5. Operations with weights and measures
- a. 5 pounds 12 ounces (dry measure)
+ 3 pounds 15 ounces
 - b. 3 feet 7 $\frac{1}{4}$ inches
+ 2 feet 8 $\frac{3}{4}$ inches

Part II: Word problems

6. Calculate the area of the following shapes:
- a. Flower bed 24 feet by 17 feet
 - b. 35 foot diameter circle (pi (π) is 3.14)
 - c. Triangle with a base 35 feet and height of 50 feet
 - d. Trapezoid with bases of 35 and 25 feet and a height of 15 feet
7. Calculate the volume in cubic feet of the following:
- a. Storage bin 3 feet high, 4 feet wide and 6 feet long
 - b. Fuel tank 3 feet in diameter and 5 feet long (pi (π) is 3.14)
 - c. Triangular shaped greenhouse which has a base 12 feet wide, 14 feet tall and 25 feet long
 - d. Concrete wall 6" thick, 4 feet high and 12 feet long
8. Sample word problems
- a. How many pounds of nitrogen are in 500 pounds of fertilizer containing 10% nitrogen, 10% phosphoric acid and 10% potash?
 - b. At a rate of 5 pounds per 100 square feet, how many pounds of fertilizer will you need to fertilize a turf area that is 125 feet wide and 500 feet long?
 - c. If 136 acres of land is purchased for \$246,738, what is the price per acre?
 - d. A turf mower was purchased at a cost of \$50,000. The machine depreciates in value 20% per year. What is the value of the turf mower at the end of the second year?

- e. A truck weighing 2500 pounds is loaded with 1000 pounds of mulch and 500 pounds of fertilizer. How many tons does the loaded truck weigh? (2000 pounds = 1 ton)
- f. When an animal is slaughtered up to 40% of the animal's weight is lost. The remaining weight of usable meat products is called "dressed weight." Consider a beef animal that weighs 1200 pounds. If the waste is 36%, then 1) what is the percentage of a dressed weight and 2) what is the total dressed weight of the animal?
- g. If 43,560 square feet is one acre, how many acres are there in a land area that measures 330 feet by 660 feet.
- h. A dairy herd of 50 cows requires 2250 pounds of silage daily. If the herd size increases to 65 cows, how much silage will be needed daily?
- i. A beef producer has six animals that weigh 600, 650, 700, 750, 810, and 900 pounds respectively. What is the average weight of the animals?
- j. The circumference of a tree was taped with a measurement of 7.85 feet. If the value of pi (π) is 3.14, calculate the diameter of the tree.
- k. Consider the yard below that measures 60 feet by 80 feet which is rectangular in shape. Calculate the diagonal distance from corner to corner?



- l. If 500 pounds of 10-10-10 fertilizer (10% nitrogen) is mixed with 250 pounds of 20-20-20 (20% nitrogen), what is the final percentage of Nitrogen in the batch?
- m. Consider a 2-4-6 analysis fertilizer (2% nitrogen, 4% phosphorous, and 6% potash) that is applied at a rate of one ton per acre with a cost of \$100 per ton. What would it cost to apply the same amount of fertilizing elements of a 3-6-9 fertilizer (3% nitrogen, 6% phosphorous, and 9% potash) if its cost was \$145 per ton? (One ton = 2000 pounds)
- n. A gear with 20 teeth is spinning at 300 revolutions per minutes drives a gear with 30 teeth this many revolutions per minute.

- o. Consider applying a pesticide at a rate of one pound per acre. Your sprayer has a 500 gallon tank with a boom 18 feet wide and dispenses five gallons of liquid in a distance of 605 feet. How many pounds of pesticide need to be added to make a full tank to spray at the specified rate of one pound of pesticide per acre? (One acre = 43560 square feet)

9. Simplify the following problems

- a. $10m - 2m$ b. $-2z + 5z - 7z =$ c. $6(n + 3) + 2n$
- d. If $\omega = v \times a$, then $v = ??$

10. Solve for the variable in the following problems:

- a. $8c = c + 14$ b. $2x + 15 + 8x = 20$ c. $12 / 84 = 1 / n$
- d. $a / 48 = 5 / 6$ e. $3(x + 3) + 6x = 12$

11. Business/finance

- a. How much interest do you pay if you borrow \$1,000 for three years at an annual rate of 12%?
- b. What is the total paid back to the credit card company on a credit card purchase of \$3,000 paid over 3 years with an annual interest rate of 18%?
- c. If you paid \$585 simple interest on a loan of \$6500 borrowed for six months, what was the annual interest rate?

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Answer Key

Part I: Sample problems

1. a. $7573 - 678 = 6895$ b. $37 \times 497 = 18389$ c. $1081 \div 23 = 47$
d. $248 + 189 - 279 = 158$ e. $16 + 5 \times 4 - 7 = 29$ f. $-16 \times 5 = -80$
g. $-36 \div -4 = 9$ h. $-15 - (-5) = -10$ i. $-24 \times -8 = 192$

2. a. $\frac{2}{3} + \frac{3}{5} = 1\frac{4}{15}$ b. $\frac{7}{9} - \frac{1}{4} = \frac{19}{36}$ c. $2\frac{3}{4} + 3\frac{3}{8} - 2\frac{1}{2} = 3\frac{5}{8}$
d. $3\frac{7}{8} - 1\frac{1}{2} = 2\frac{3}{8}$

3. a. $21.9 + 23.5 - 13.7 = 31.7$ b. $17.9 \times 8.7 = 155.73$ c. $5.625 \div 0.375 = 15$

4.
 - a. Express .78 as a fraction reduced to its lowest terms = $\frac{39}{50}$
 - a. Express 12% as a fraction reduced to its lowest terms = $\frac{3}{25}$
 - b. Express 125% as a decimal number = 1.25
 - c. Express 0.359 as a percent = 35.9%
 - d. $\frac{2}{3}$ of 99 is 66
 - e. 13 is $\frac{1}{4}$ of 52
 - f. 7% of 63 is 4.41
 - g. 72 is 36% of 200
 - h. 20% % of 300 is 60
 - i. Express $\frac{5}{8}$ as a decimal = .625
 - j. Express $\frac{7}{8}$ as a percent = 87.5%

5. a. 9 pounds 11 ounces
b. 10 $\frac{1}{2}$ inches

Part II: Word problems

6. Calculate the area of the following shapes:
 - a. Flower bed 24 feet by 17 feet = 408 square feet
 - b. 35 foot diameter circle (pi (π) is 3.14) = 961.625 feet
 - c. Triangle with a base 35 feet and height of 50 feet = 875 square feet
 - d. Trapezoid with bases of 35 and 25 feet and a height of 15 feet = 450 square feet

7. Calculate the volume in cubic feet of the following:
 - a. Storage bin 3 feet high, 4 feet wide and 6 feet long = 72 cubic feet
 - b. Fuel tank 3 feet in diameter and 5 feet long (pi (π) is 3.14) = 35.325 cubic feet

- c. Triangular shaped green house which has a base 12 feet wide, 14 feet tall and 25 feet long = 2100 cubic feet
- d. Concrete wall 6" thick, 4 feet high and 12 feet long = 24 cubic feet

8. Sample word problems

- a. 50 pounds
- b. 312.5 pounds
- c. \$1814.25
- d. \$30,000
- e. 4000 pounds = 2 tons
- f. 1) 64% 2) 768 pounds
- g. 5 acres
- h. 2925 pounds
- i. 735 pounds
- j. 2.5 feet
- k. 100 feet
- l. 13.33%
- m. \$96.67
- n. 200 rpm
- o. 25 pounds

9. a. $10m - 2m = 8m$ b. $-2z + 5z - 7z = -4z$ c. $6(n + 3) + 2n = 8n + 18$

d. If $w = v \times a$, then $v = w/a$ or $w \div a$

10. a. $8c = c + 14$ ($c=2$) b. $2x + 15 + 8x = 20$ ($x=.5$) c. $12 / 84 = 1 / n$ ($n=7$)
 d. $a / 48 = 5 / 6$ ($a=40$) e. $3(x + 3) + 6x = 12$ ($x=1/3$)

- 11. a. \$360
- b. \$4620
- c. 18%