Credit for Prior Learning: Initial Assessment QL 122/GEQL 130
Sample Questions Solutions

1. Global warming creates local problems. Projections forecast that even a moderate air temperature increase of only 1.8 °F could cause brook trout distributions to decrease dramatically. For example, such a temperature increase would take Washburn county's 19 ponds that support brook trout down to 10 ponds. What would be the percent decrease in the number of ponds that support brook trout?

$$\mathbf{19 - 10 = 9\ pond\ decrease}$$
$$\frac{\mathbf{9}}{\mathbf{19}} = \frac{\boldsymbol{x}}{\mathbf{100}} \quad \boldsymbol{By\ cross\ multiplying, x = 47.37\%\ decrease.}$$

There would be a 47.37% decrease in ponds that support brook trout.

2. Virtually every county in the state has seen increases in spring average temperature from 1950 to 2010. Washburn is the most extreme case. The ratio of the number of counties with an average temperature increase of 4.5 degrees or more to the number of counties with an average increase below 4.5 degrees is 2 to 7. If 16 Wisconsin counties have had average temperature increases of 4.5 degrees or more, how many counties experienced changes increases below this?

$$\frac{\mathbf{4.5\ degrees\ or\ more}}{\mathbf{less\ than\ 4.5\ degrees}} = \frac{\mathbf{2}}{\mathbf{7}} = \frac{\mathbf{16}}{\boldsymbol{x}}$$
$$\boldsymbol{By\ cross\ multiplying, x = 56\ counties}$$

From 1950 to 2010, 56 counties in Wisconsin saw average temperature increases of under 4.5°.

3. Washburn county's 3.6 acre Priceless Pond currently supports about 97.5 brook trout per acre. What is the brook trout population of the pond?

$$\mathbf{97.5\ trout\ per\ each\ of\ 3.6\ acres = 97.5\ x\ 3.6 = 351\ trout}$$

Priceless Pond supports a brook trout population of 351 brook trout.

4. Gill lice are tiny parasites that thrive in rising temperatures. The lice infect only brook trout, potentially suffocating them, as they attach to the fish's gills and compromise the trout's ability to obtain sufficient oxygen. Some brook trout populations, such as the one in Tenny Spring Creek in Vernon, have as high as a 39% infection rate. If the population in this creek is 843, how many are infected with this parasite?

$$\frac{\boldsymbol{x}}{\mathbf{843}} = \frac{\mathbf{39}}{\mathbf{100}} \quad \boldsymbol{By\ cross\ multiplication, x = 328.77}$$

About 329 brook trout would be infected with gill lice.

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5. As recent as 2008, Wisconsin was the number four producer of maple syrup in our nation where only ten states produce it. However, the extreme March heat in 2012 decimated this Wisconsin crop because below freezing temperatures are a necessary part of the sugaring cycle. In 2012, Wisconsin produced only 50,000 gallons of the 1.9 million gallons produced in the nation. What percent of our nation's maple syrup crop was produced in Wisconsin in 2012?

$$\frac{\mathbf{50,000}}{\mathbf{1,900,000}} = \frac{\boldsymbol{x}}{\mathbf{100}} \quad \boldsymbol{By\ cross\ multiplication, x = 2.6\%}$$

In 2012, Wisconsin produced only 2.6% of our nation's maple syrup crop.

6.

The National Agricultural Statistics Service tracks data on how many gallons of maple syrup are produced per tap. Here is the data for Wisconsin in the table below for the last several years.

Year	Gallons Yielded per Tap
2009	0.291
2010	0.180
2011	0.235
2012	0.083

a. What is the change in yield per tap from 2009 to 2010?
The yield decreased from 2009 to 2010 and $\boldsymbol{Change = recent - past}$

$$\boldsymbol{Change = 0.180 - 0.291}$$
$$\boldsymbol{= -0.111\ or\ decrease\ of\ 0.111\ gallons\ per\ tap}$$

b. What is the change in yield per tap from 2010 to 2011?

$$\boldsymbol{Change = 0.235 - 0.180}$$
$$\boldsymbol{= 0.055\ or\ increase\ of\ 0.055\ gallons\ per\ tap}$$

c. What is the change in yield per tap from 2011 to 2012?

$$\boldsymbol{Change = 0.083 - 0.235}$$
$$\boldsymbol{= -0.152\ or\ decrease\ of\ 0.152\ gallons\ per\ tap}$$

d. What is the average change in yield per tap for this span of time?

$$\boldsymbol{average = \frac{-0.111 + 0.055 + -0.152}{3} = \frac{-0.208}{3} = -0.069}$$
$$\boldsymbol{or\ a\ decrease\ of\ 0.069\ gallons\ per\ tap}$$

e. What is the difference between the largest increase in yield per tap and the greatest decrease in yield per tap?

$$\boldsymbol{difference = 0.055 - (-0.152) = 0.702}$$
There was a difference of 0.702 gallons between the greatest increase and greatest decrease in per tap yield.

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7. $\left(\frac{2}{3}-1\frac{2}{5}\right)\div\left(2\frac{1}{2}+\frac{8}{15}\right)$

$$\left(\frac{2}{3}-\frac{7}{5}\right)\div\left(\frac{5}{2}+\frac{8}{15}\right)=\left(\frac{10}{15}-\frac{21}{15}\right)\div\left(\frac{75}{30}+\frac{16}{30}\right)=-\frac{11}{15}\div\frac{91}{30}$$
$$=-\frac{11}{15}\cdot\frac{30}{91}=-\frac{22}{91}$$

8. $\frac{32\div(5-3)^3+8}{10-8\div4\cdot2}=\frac{32\div(2)^3+8}{10-8\div4\cdot2}=\frac{32\div8+8}{10-8\div4\cdot2}=\frac{4+8}{10-8\div4\cdot2}=$

$$\frac{12}{10-8\div4\cdot2}=\frac{12}{10-2\cdot2}=\frac{12}{10-4}=\frac{12}{6}=2$$

9. $\frac{6-3x}{x+2}=\frac{5}{2}$

$$2(6-3x)=5(x+2)$$
$$12-6x=5x+10$$
$$12-11x=10$$
$$-11x=-2$$
$$x=\frac{2}{11}$$

10. The retention rate for grades 9-12 can be calculated from the formula

$$R=\frac{N}{T}\cdot100$$

where R stands for the retention rate or percent
N stands for the number of students who finish school
T stands for the total number of students enrolled

Use the formula to determine the retention percent when the total number of students enrolled is 657 and the number of students who finish is 643.

$$\mathbf{R}=\frac{643}{657}\cdot100=97.9\%$$

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11. Solve the retention rate formula in #10 for T. In other words, rearrange the formula to express T, the total number of students enrolled, in terms of the other variables.

$$R = \frac{N}{T}100$$
$$R \cdot T = \frac{N}{T} \cdot T \cdot 100$$
$$RT = N \cdot 100$$
$$\frac{RT}{R} = \frac{100N}{R}$$
$$T = \frac{100N}{R}$$

12. The true tuition cost of college can be determined from the listed tuition cost, the college's discount rate, and the outside scholarships a student receives based on the formula below.

$$T = L - DL - S$$

Where T = true tuition cost
L = listed tuition cost
D = discount rate (expressed as a decimal)
S = outside scholarships student receives

Determine the true tuition for a student at a college with $35,000 listed tuition, if the college has a 33.5% discount rate and the student has $2000 in outside scholarships.

$$T = 35{,}000 - 0.335(35{,}000) - 2000 = 35{,}000 - 11{,}725 - 2000 = 21{,}275$$

The true tuition cost is $21,275

13. Using the formula in #11, $\boldsymbol{T = L - DL - S}$, solve the formula for S. In other words, rearrange the formula for S, the outside scholarships received by the student, in terms of the other variables.

$$\boldsymbol{T = L - DL - S}$$
$$\boldsymbol{T - L + DL = -1S}$$
$$\boldsymbol{\frac{T - L + DL}{-1} = S \quad or \; S = L - T - DL}$$

(Either would be acceptable solutions.)

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14. In the 2010-2011 school year, 125,372 elementary and secondary students were enrolled in private schools. This is 12.6% of the total enrollment for all elementary and secondary schools, both private and public. What is the total enrollment for all elementary and secondary schools?

Let T = the total enrollment

$$\mathbf{0.126}\boldsymbol{T} = \mathbf{125,372}$$
$$\boldsymbol{T} = \mathbf{995,016}$$

15. In the 2010-11 school year, 40,302 teachers taught in elementary grades. This number is 3,462 more than twice the number of teachers who taught in secondary grades. How many teachers taught in secondary grades?

Let S = the number of teacher who taught in secondary grades

$$\mathbf{40,302} = \mathbf{2}\boldsymbol{S} + \mathbf{3,462}$$
$$\boldsymbol{S} = \mathbf{18,420}$$

16. In 2002-03, the reported enrollment for home-schooled students was 21,288. Since then, the reported enrollment has decreased at a rate of 320 students per year. At this rate, in how many years will the home-schooled enrollment fall below 13,500 students?

Let Y= the number of years

$$\mathbf{21,288} - \mathbf{320}\boldsymbol{Y} < \mathbf{13,500}$$
$$\boldsymbol{Y} > \mathbf{24.3\ or\ 25\ years}$$

Notice: We had to flip the direction inequality sign since we divided by a negative number.

17. In 2005, the enrollment at UW-Whitewater was 9396 students, and the enrollment at UW-Oshkosh was 10,145 students. Since then, UW-Whitewater's enrollment has increased by approximately 201 students per year, and UW-Oshkosh's enrollment has increased by approximately 109 students per year. When did/will the two universities have the same enrollment? Round to the nearest whole year.

Let Y= the number of years

$$\mathbf{9396} + \mathbf{201}\boldsymbol{Y} = \mathbf{10,145} + \mathbf{109}\boldsymbol{Y}$$
$$\boldsymbol{y} = \mathbf{8.1}\ \boldsymbol{or}\ \mathbf{8}\ \boldsymbol{years}$$

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18. The top two UW System Schools, based on enrollment, are UW at Madison and UW at Milwaukee. The undergraduate enrollment of UW-Milwaukee is 4,930 students less than the undergraduate enrollment at UW-Madison. If the two schools have a combined undergraduate enrollment of 55,408, what is the undergraduate enrollment of each University?

Let X = the undergraduate enrollment at UW-Madison
Let Y = the undergraduate enrollment at UW - Milwaukee

$$\mathbf{X + Y = 55{,}408}$$
$$\boldsymbol{Y = X - 4930}$$
$$\boldsymbol{X + X - 4{,}930 = 55{,}408}$$
$$\mathbf{X = 30{,}169\ Madison}$$

$$\mathbf{30{,}169 - 4{,}930 = 25{,}239\ Milwauee}$$