MATH 100 **Solutions**: **QUIZ IX** (the Last Quiz) 15 November 2018

*In the following set of problems, you obtain any credit,* ***you must show your work!***

1. Find the *greatest common factor* of the numbers a = 2205 and b = 2050.

***Solution:*** $ $*Using a factor tree: 2205 = (32)(5)(72) and 2050 = (2)(52)(41)*

 *Thus the greatest common factor (or GCD) of 2205 and 2050 is* ***5****.*

1. Simplify each o+f the following:
2. $49^{- \frac{3}{2}}$

***Solution:*** $ 49^{- \frac{3}{2}}=\frac{1}{49^{\frac{3}{2}}}=\frac{1}{\left(49^{\frac{1}{2}}\right)^{3}}=\frac{1}{7^{3}}=\frac{1}{343}$

1. $\left(100^{- \frac{1}{2}}\right)(125)^{\frac{1}{3}}$

***Solution:*** $ \left(100^{- \frac{1}{2}}\right)\left(125\right)^{\frac{1}{3}}=\left(10^{2}\right)^{-\frac{1}{2}}\left(5^{3}\right)^{\frac{1}{3}}=\left(10^{-1}\right)5=\frac{5}{10}=\frac{1}{2}$

1. Express the following expression without using negative exponents. Simplify if possible.

$$\left(\frac{a^{-3}b^{2}c^{-4}}{b^{-5}}\right)^{-2}$$

***Solution:*** $ \left(\frac{a^{-3}b^{2}c^{-4}}{b^{-5}}\right)^{-2}=\left(a^{-3}b^{7}c^{-4}\right)^{-2}=a^{6}b^{-14}c^{8}=\frac{a^{6}c^{8}}{b^{14}}$

1. *Simplify fully:* $\left(\frac{4}{9}\right)^{- \frac{1}{2}}$

***Solution:*** $ \left(\frac{4}{9}\right)^{-\frac{1}{2}}=\left(\frac{9}{4}\right)^{\frac{1}{2}}=\frac{9^{1/2}}{4^{1/2}}=\frac{3}{2}$

1. *Simplify fully:* $\left(\frac{243}{32}\right)^{\frac{4}{5}}$

***Solution:***$ \left(\frac{243}{32}\right)^{\frac{4}{5}}=\frac{243^{4/5}}{32^{4/5}}=\frac{\left(243^{1/5}\right)^{4}}{\left(32^{1/5}\right)^{4}}=\frac{\left(3\right)^{4}}{\left(2\right)^{4}}=\frac{81}{16}$

1. Factor *fully:*

(a) 15a9b5c3 – 25a8b3c +35a6b2c2

***Solution:*** $ $

 15a9b5c3 – 25a8b3c +35a6b2c2 = **5a6b2c(3a3b3c2 – 5a2b + 7c)**

(b) Factor $x^{2}-11x+30$

***Solution:*** $ x^{2}-11x+30$

$$x^{2}-11x+30=\left(x-6\right)(x-5)$$

(c) Factor $15z^{4}-25z^{5}$

***Solution:*** $ $

$$15z^{4}-25z^{5}=5z^{4}(3-5z)$$

(d) Factor $x^{2}-x-56$

***Solution:*** $ x^{2}-x-56=(x-8)(x+7)$

***7.*** A speck of dust in an electron microscope is 1.2 × 10 millimeters wide. The image is 5×106 times larger than the actual size. How many millimeters wide is the actual speck of dust?

***Solution:*** $ $

*Let the actual size be y (millimeters).*

*Then* $y\left(5×10^{6}\right)=1.2×10^{3}$ *Hence* $y=\frac{1.2×10^{3}}{5×10^{6}}=\frac{1.2}{5×10^{3}}=0.24×10^{-3}=2.4×10^{-4}$ ***millimeters***

***8.*** *Express in scientific notation:*$ \frac{7×10^{5}}{2∙10^{-2 }×2.5∙10^{9}}$

***Solution:*** $ \frac{7×10^{5}}{2∙10^{-2 }×2.5∙10^{9}}=\frac{7}{2(2.5)}×10^{5-\left(-2\right)-9}=1.4×10^{-2}$

Extra Credit Riddles *[1 pt each]:*

1. A hockey stick and ball together cost $50. If the stick costs $49 more than the ball, what is the cost of each?

*Answer: The hockey stick costs $ 49.50 and the ball costs $ 0.50*

1. There are two ducks in front of a duck, two ducks behind a duck and a duck in the middle. How many ducks are there? Explain.

*Answer: 3 ducks is the smallest number possible. But any odd number greater than or equal to 3 works as well.*

1. **What starts with the letter “T,” is filled with “T,” and ends in “T?”**

*Answer:* teapot

1. What is greater than God, more evil than the devil, the poor have it, the rich need it, and if you eat it, you will die?

*Answer:* *nothing*

