Math 71 Name _____
Fall, 2007

Exam 1

No work = No credit!

Remember: Keep a positive attitude! Believe in yourself – you can do this!
If you feel yourself getting stressed, <u>stop, take a deep breath, and think calming thoughts!</u>

1. A person invested $17,000 for one year, part at 10%, part at 12%, and the remainder at 15%. The total annual interest income from these investments was $2110. The amount of money invested at 12% was $1000 less than the amount invested at 10% and 15% combined. Find the amount invested at each rate. **6 points**

2. Simplify each exponential expression. Leave no negative exponents in your answers. **3 points each**

a) $\dfrac{\left(3x^3y^2\right)^{-1}\left(2x^2y\right)^{-2}}{\left(xy^2\right)^{-5}\left(x^2y^3\right)^3}$

b) $\dfrac{20x^3}{-5x^4}$

c) $\left(-2x^{-5}y^4z^2\right)^4$

d) -2^{-4}

e) $(-2)^{-4}$

f) $(4a^2)(-2a^{-5})$

g) $\left(\frac{3a^{-5}b^2}{12a^3b^{-4}}\right)^0$

3. Including 8% sales tax, an inn charges $162 per night. Find the inn's nightly cost before the tax is added. **5 points**

4. A chemist working on a flue vaccine needs to mix a 10% sodium-iodine with a 60% sodium-iodine solution to obtain 50 milliliters of a 30% sodium-iodine solution. How many milliliters of the 10% solution and the 60% solution should be mixed? **6 points**

5. Find an equation of the line whose slope is undefined and contains the point $(4,-7)$. Graph the line. **6 points**

6. Solve the system: **6 points**

$$\begin{cases} 3x + 2y - 3z = -2 \\ 2x - 5y + 2z = -2 \\ 4x - 3y + 4z = 10 \end{cases}$$

7. Let $f(x) = 2x^2 - 5x - 2$ and $g(x) = -x^2 - 2x + 3$. **2 points each**

   a) Find $(f - g)(x)$

   b) Find $(f - g)(1)$

   c) $f(-2) + g(0)$

   d) $f(-3) - g(-3)$

8. The selling price of a refrigerator is $584. If the markup is 25% of the dealer's cost, what is the dealer's cost of the refrigerator? **5 points**

9. Let $f(x) = \dfrac{x}{5x + 7}$. State the domain of *f*. **3 points**

10. Solve each equation. **4 points each**

a) $2-(7x+5)=13-3x$

b) $-4x-3(2-2x)=7+2x$

c) $\frac{3x}{5}-\frac{x-3}{2}=\frac{x+2}{3}$

d) $4x+7=7(x+1)-3x$

e) $2[3x-(4x-6)]=5(x-6)$

11. Find two numbers such that the second number is 3 more than twice the first number and the sum of the two numbers is 72. **5 points**

12. Solve: $\begin{cases} 2x-5y=13 \\ 5x+3y=17 \end{cases}$ **5 points**

13. A boat's crew rowed 16 kilometers downstream, with the current, in 2 hours. The return trip upstream, against the current, covered the same distance but took 4 hours. Find the crew's rowing rate in still water and the rate of the current. **6 points**

14. Find an equation of the line passing through the point $(-2,6)$ and perpendicular to the line $y = \frac{1}{3}x + 4$. Graph both lines. **8 points**

15. Let $f(x) = x^2 + 4x$ and $g(x) = x + 2$. **2 points each**

a) Find $(fg)(x)$ and simplify.

b) Find $(fg)(-5)$.

c) Find $\left(\frac{f}{g}\right)(x)$.

d) Find $\left(\frac{f}{g}\right)(2)$.

e) Find the domain of $\left(\frac{f}{g}\right)(x)$.

16. Find an equation of the line passing through the points $(-1,-3)$ and $(4,2)$. Graph the line. **6 points**

17. The sum of two numbers is 7. If one number is subtracted from the other, the result is -1. Find the numbers. **5 points**

18. The length of the rectangular tennis court at Wimbledon is 6 feet longer than twice the width. If the court's perimeter is 228 feet, what are the court's dimensions? **5 points**

19. Let $2x - y = 6$. Graph the line. Labeling the x- and y-intercepts. **5 points**