

## MTH 65 – Practice Final – Version 2

Remember that all problems will be evaluated for the way in which you present your work as well as for the “correctness” of your “answer.”

1. Use the method of substitution to solve the system of equations  $\begin{cases} 10x - 15y = 30 \\ 3y = 2x - 6 \end{cases}$ .

2. Use the elimination (addition) method to solve the system of equations  $\begin{cases} x - 7y = 3 \\ 3x - 6y = 24 \end{cases}$ .

3. Expand and simplify each product.

a.  $(x^2 + y^8)(x^2 - y^8)$       b.  $3x(x + 3)^2$       c.  $(x - 5)(x^2 - 5x + 25)$

4. Simplify each exponential expression. Make sure that your final expression contains no negative exponents.

a.  $\frac{16x^{-1}}{12x^{-4}y^{-1}}$       b.  $-5^0$       c.  $\frac{1}{(5x^{-1})^{-1}}$       d.  $-3^{-2}a^{-7}b^7$       e.  $\left(\frac{-6x^{-8}y^5z^0}{3x^4y^{-8}z^{-1}}\right)^{-2}$

5. Write each number in scientific notation.

a. 9,020,000,000,000      b. 0.00000000000000000012

6. Write each number in standard notation.

a.  $2.6 \times 10^{-8}$       b.  $-8.88 \times 10^7$

7. Find the product or quotient - write the result in scientific notation.

a.  $(3.10 \times 10^8)(5.00 \times 10^{-9})$       b.  $\frac{6.3 \times 10^{-10}}{7.0 \times 10^{12}}$

8. Find  $f(-2)$  for the function  $f(x) = \frac{-x^2}{x^2 - 2}$ .

9. Completely factor each expression.

a.  $t^3 + 27$       b.  $3x^3y^2 - 18x^2y^3 - 81xy^4$       c.  $a^4b^2 + a^4$   
d.  $3x^2 - 5x - 10$       e.  $x^3 + 6x^2 - 4x - 24$

10. Solve  $w^2 + 3w + 6 = 0$  using the quadratic formula.
11. Solve  $x^2 - 4x = 96$  using the zero principle.
12. Solve  $(2t + 1)^2 - 20 = 0$ .
13. Find the  $x$  and  $y$  intercepts of the parabola  $y = 12x^2 - 9x - 21$ .
14. Find the vertex and  $x$  and  $y$  intercepts of the parabola  $y = 4x^2 + 12x + 9$ . Plot the parabola.
15. Use the graphing method to find the solution to the system of equations 
$$\begin{cases} 5x + 2y = -23 \\ y = \frac{4}{3}x \end{cases}$$
.
16. Buster Briquette had burgers to buy, 'cuz it was time for the annual Briquette family Buds and burgers smorgasbord. The Bud drinkers in the family all wanted 100% beef burgers, of course, while the more genteel Briquettes preferred turkey burgers. The beef burgers came 8 to a pack and each 8-pack cost \$7.50. Turkey burgers came 4 to a pack and for some reason the 4-packs each cost \$5.50. Buster bought a total of 188 burgers for a total tax-free cost of \$178. Use a system of equations to determine the total number of packages of each type of burger Buster bought.
17. Barter Jane's sells chocolate covered pretzels in 2 different boxes. One box is a perfect cube with each side having length 6 inches. The other box has the same volume and height as the perfect cube, but its length is 1 inch longer than twice its width. Find the length and width of the non-cube box.
18. Vance Vancalot spends his weekends carting his kids from one activity to the next. On one trip, starting at home, he drove at an average speed of 25 mph along the side streets to pick up his daughter Chance from her origami lessons. From there, he hopped on the freeway to go pick up his son Lance who had just completed his autoharp lesson; Vance's average speed on the freeway was 60 mph. The total distance from Vance's house to Chance to Lance was 32.5 miles. Vance spent 10 minutes ( $\frac{1}{6}$  hour) longer driving from home to Chance than he spent driving from Chance to Lance. What was the total driving time from home to Chance to Lance?
19. Consider the function  $y = h(x)$  shown in Figure 1.
- What is the value of  $h(3)$ ?
  - What is the domain of  $h$ ?
  - What is the range of  $h$ ?

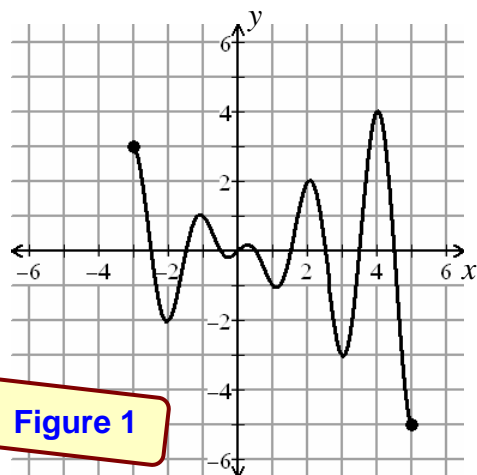


Figure 1

## MTH 65 – Practice Final – Version 2 – Answers

1. There are "infinitely many" solutions to the system.    2. The solution to the system is  $(10,1)$ .

3. a.  $x^4 - y^{16}$     b.  $3x^3 + 18x^2 + 27x$     c.  $x^3 - 10x^2 + 50x - 125$

4. a.  $\frac{4x^3y}{3}$     b.  $-1$     c.  $\frac{5}{x}$     d.  $-\frac{b^7}{9a^7}$     e.  $\frac{x^{24}}{4y^{26}z^2}$

5. a.  $9.02 \times 10^{12}$     b.  $1.2 \times 10^{-16}$     6. a.  $0.0000000026$     b.  $-88,800,000$

7. a.  $1.55 \times 10^0$     b.  $9.0 \times 10^{-23}$     8.  $f(-2) = -2$

9. a.  $(t+2)(t^2 - 3t + 9)$     b.  $3xy^2(x-9y)(x+3y)$     c.  $a^4(b^2 + 1)$

d.  $3x^2 - 5x - 10$  is prime    e.  $(x+2)(x-2)(x+6)$

10. The equation has no real number solutions.

11. The solutions to the equation are 12 and  $-8$ .

12. The solutions to the equation are  $\frac{-1 \pm 2\sqrt{5}}{2}$ .

13. The y-intercept is  $(0, -12)$  and the x-intercepts are  $(-1, 0)$  and  $(\frac{7}{4}, 0)$ .

14. The vertex is  $(-1.5, 0)$ , the y-intercept is  $(0, 9)$ , and the x-intercept is  $(-1.5, 0)$ .

15. The solution to the system is  $(-3, -4)$

16. Buster bought 23 packages of beef burgers and 1 package of turkey burgers.

17. The length is 9 inches and the width is 4 inches.

18. Vance drove a total of 50 minutes.

19. a.  $h(3) = -3$     b. The domain of  $h$  is  $[-3, 5]$ .

c. The range of  $h$  is  $[-5, 4]$ .

