

MTH 65 – Practice Final – Version 1

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 $\begin{cases} 2x - 3y = 29 \\ x - 2y = 18 \end{cases}$.

2. Use the elimination (addition) method to solve the system of equations $\begin{cases} 3x - 4y = 1 \\ 4x + 6y = -27 \end{cases}$.

3. Expand and simplify each product.

a. $(2x + y)(3x - y)$

b. $(w - 9)^2$

c. $(2x + 3)(4x^2 - 6x + 9)$

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

a. $\frac{35x^7y}{7x^2y^8}$

b. $\frac{-2^{-2}a^2}{a^{-4}b^{-12}}$

c. $10x^{-1}$

d. $(-4a^8b^{-4})^2$

e. $\left(\frac{2x^3yz^{-1}}{3x^0y^8z^{-1}}\right)^{-3}$

5. Write each number in scientific notation.

a. $-21,500,000,000$

b. 0.0000000000000091

6. Write each number in standard notation.

a. -7.2×10^{-1}

b. 8.88×10^{11}

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

a. $(2.2 \times 10^{-8})(5 \times 10^3)$

b. $\frac{4.2 \times 10^{-5}}{8.4 \times 10^{-9}}$

8. Find $f(-7)$ for the function $f(x) = -x^2 - 8x + 50$.

9. Completely factor each expression.

a. $8x^2 + 6x - 35$

b. $16w^4 - 1$

c. $4x^2 + y^2$

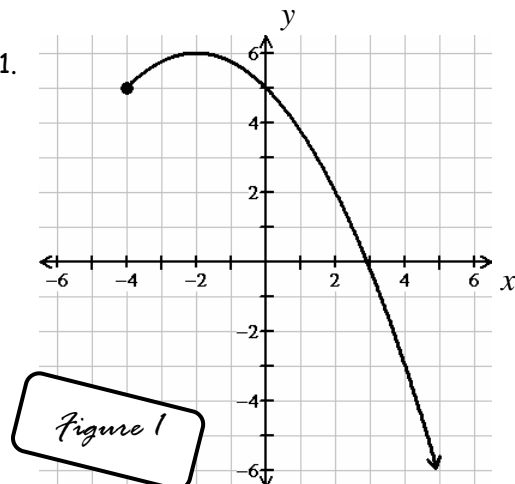
d. $12y^2 + 4xy + 16x^2$

e. $x^2 + 9xy - 90y^2$

10. Solve $w^2 + 8w - 8 = 0$ using the quadratic formula.
11. Solve $x^2 - 10x + 21 = 0$ using the zero principle.
12. Solve $(3t + 9)^2 - 180 = 0$ using the square root property.
13. Find the x and y intercepts of the parabola $y = 3x^2 - 5x + 3$.
14. Find the vertex and x and y intercepts of the parabola $y = -x^2 + 5x + 12$. Plot the parabola after finding at least nine points that are centered at the vertex.
15. Use the graphing method to find the solution to the system of equations $\begin{cases} 2x - 3y = 7 \\ x + 4y = 20 \end{cases}$.
16. Heidi Hoho had a total of \$17,000 invested in two different accounts; one account earned a total of 6% interest last year while the other earned a total of 6.5% interest. Between the two accounts, the total amount of interest Heidi earned was \$1087. Use a system of equations to determine how much money Heidi had invested in each account.
17. Barnaby Bumbell has a piece of wire that is 30 inches long. Barnaby folds the wire into a rectangle and the area of the resultant rectangle is 55.25 in^2 . How long is each side of the rectangle formed by Barnaby?
18. Charlie Chugsalot drove from his house to the Jumptown jamboree which was held at the Jumptown Buffalo Lodge. Because he imbibed too much at the jamboree, Charlie slept it off on a cot set up in the back of the Buffalo Lodge. Still not feeling so swift the next morning, Charlie's average speed driving back home was 10 mph slower than his average speed driving to the jamboree. It took Charlie 1 hour and 12 minutes to drive to the jamboree and 1 hour and 30 minutes to drive back home. How far is it from Charlie's house to the Jumptown Buffalo Lodge? (Hint: You're going to have to convert the hours/minutes to hours. How many minutes are there in an hour?)

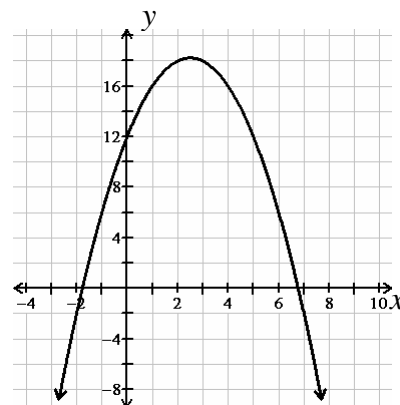
19. Consider the function $y = g(x)$ shown in Figure 1.

- What is the value of $g(0)$?
- What is the domain of g ?
- What is the range of g ?



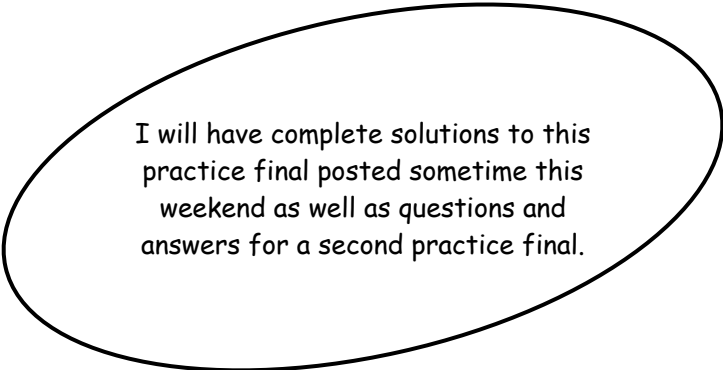
MTH 65 – Practice Final – Version 1 – Answers

1. The solution to the system is $(4, -7)$.
2. The solution to the system is $\left(-3, -\frac{5}{2}\right)$.
3. a. $6x^2 + xy - y^2$ b. $w^2 - 18w + 81$ c. $8x^3 + 27$
4. a. $\frac{5x^5}{y^7}$ b. $-\frac{a^6 b^{12}}{4}$ c. $\frac{10}{x}$ d. $\frac{16a^{16}}{b^8}$ e. $\frac{27y^{21}}{8x^9}$
5. a. -2.15×10^{10} b. 9.1×10^{-14} 6. a. -0.72 b. $888,000,000,000$
7. a. 1.1×10^{-4} b. 5.0×10^3 8. $f(-7) = 57$
9. a. $(2x + 5)(4x - 7)$ b. $(4w^2 + 1)(2w + 1)(2w - 1)$ c. $4x^2 + y^2$ is prime
 d. $4(3y^2 + xy + 4x^2)$ e. $(x - 6y)(x + 15y)$
10. The solutions to the equation are $-4 \pm 2\sqrt{6}$.
11. The solutions to the equation are 3 and 7.
12. The solutions to the equation are $-3 \pm 2\sqrt{5}$.
13. The y-intercept is $(0, 3)$ and there are no x-intercepts.
14. The vertex is $(2.5, 18.25)$, the y-intercept is $(0, 12)$, and the x-intercepts are $\left(\frac{5 + \sqrt{73}}{2}, 0\right)$ and $\left(\frac{5 - \sqrt{73}}{2}, 0\right)$.
15. The solution to the system is $(8, 3)$
16. Heidi had \$3,600 invested in the 6% account and \$13,400 invested in the 6.5% account.
17. The rectangle sides' lengths are 6.5 inches and 8.5 inches.
18. It's 60 miles from Charlie's house to the Jumptown Buffalo Lodge.
19. a. $g(0) = 5$ b. The domain of g is $[-4, \infty)$. c. The range of g is $(-\infty, 6]$.



The review problems listed are similar to the stated problem on the practice final. Remember - your first priority should be to work the types of problems you find difficult! Practicing problems that you are already good at might make you feel good, but it's not going to help you a lot when it comes time to take the final.

1. p. 292: 15 - 23 odd
2. p. 292: 25 - 33 odd
3. pp. 348-349: 55 - 93 odd
4. pp. 347-349: 5 - 29 odd, 103 - 123 odd
5. p. 349: 125, 127, 129
6. p. 349: 131, 133, 135
7. p. 336: 91 - 97 odd
8. p. 229: 41 - 47 odd
9. p. 406: 1 - 49 odd
10. p. 555: 7 - 43 odd
11. p. 406: 51 - 65 odd
12. p. 542: 19 - 35 odd
13. p. 570: 7 - 23 odd
14. p. 570: 7 - 23 odd
15. p. 250: 9 - 27 odd
16. p. 272: 17, 19, 21, 29, 37
17. p. 273: 31, 33; p. 399: 27 - 33 odd; p. 406: 67
18. pp. 273-274: 23, 25, 41, 43, 45
19. p. 230: 49 - 55 odd, 63, 65, 67



I will have complete solutions to this practice final posted sometime this weekend as well as questions and answers for a second practice final.