

Name _____ Instructor: _____ Score: _____

Please be sure to show all work to receive full credit. No credit will be given for an answer that is correct but has no work where it is necessary. No credit will be given for an incorrect answer with no work. Please write all answers in the spaces provided on the right side of the page, unless otherwise indicated.

Simplify the following expressions without using a calculator. There should be no decimals in your answer.

1. $(16m^{12})^{-\frac{1}{4}}$ 1. _____(2)

2. $\left(\frac{2x^2z}{8xy}\right)^{-3}$ 2. _____(3)

3. $\sqrt[3]{8x^{25}y^9}$ 3. _____(3)

4. $(4\sqrt{x} + \sqrt{y})^2$ 4. _____(3)

For #5 and #6, perform the operation and simplify the result. There should be no decimals in your answer.

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

5. _____(3)

6. $\frac{3x^2-48}{x^2-8x+15} \div \frac{x+4}{x^2+3x-18}$

6. _____(5)

7. Find the exact value of $\log_m \sqrt[6]{m}$.

7. _____(2)

8. Rewrite $3 \ln(2p) + \ln(p^5)$ as a single logarithm.

8. _____(3)

9. Solve the following system of equations algebraically. 9. _____(6)

$$\frac{2}{3}x - \frac{3}{5}y = -4$$

$$-\frac{8}{3}x + \frac{6}{5}y = 4$$

10. Bacteria can multiply at an alarming rate when each bacterium splits into three new cells, thus tripling. We start with ten bacterium. Write the number of bacteria $P(t)$ as a function of time t , in hours.

10. _____(3)

11. The height, h , in feet of an object being dropped from a cliff is modeled by $h = -16t^2 + 96t + 120$ where t is time in seconds. **Be sure to include units in each answer and round any decimals to two places.**

a. What is the maximum height of the object? 11a. _____(3)
Please calculate by hand and show your work.

b. How long does it take the object to strike the ground? 11b. _____(4)

12. For the function $f(x) = \frac{6x+3}{x+7}$:

- a. Find $f(5)$. Simplify completely. There should be no decimals in your answer.

12a. _____(2)

- b. Find $f(3a - 1)$. Simplify completely. There should be no decimals in your answer.

12b. _____(3)

- c. For what value of x is $f(x) = -3$? There should be no decimals in your answer. You do not need to simplify this answer if you do not wish to do so.

12c. _____(3)

- d. Calculate the x-intercept, if it exists. Keep your answer in simplified fraction form.

12d. _____(3)

- e. Calculate the f(x)-intercept (which is the same thing as the y intercept) if it exists. keep your answer in simplified fraction form.

12e. _____(2)

13. The number of times per day that students check Facebook seems to have a negative effect on the amount of time they spend preparing for class. Consider the following data:

Number of Times Facebook Checked per Day	Time Spent Preparing for Class per day (in minutes)
0	130
2	115
4	100
6	85
8	70
10	55

(a) What are the independent and dependent variables in this scenario?

Independent_____ (1)

Dependent_____ (1)

(b) Is this data representative of a linear or exponential function? Explain.

_____ (2)

(c) Please create a model by hand to represent this data. Be sure to show your work.

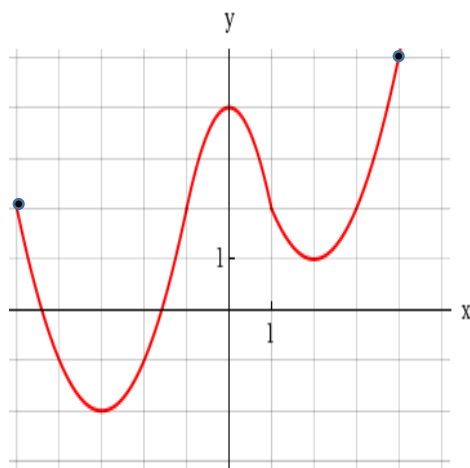
13c_____ (3)

14. A person invests \$3000 in an account at 6% interest compounded annually. The function that models the amount of money in the investment account after t years is $f(t) = 3000(1.06)^t$. Please use this function to answer the following questions. Be sure to show work and round your answer to two decimal places where necessary.

a. What will the value of the investment be in 10 years? 14a._____ (2)

b. When will value of the investment be \$6000? 14b. _____ (5)

15. Use the graph of the function $f(x)$ below to answer parts a-d.



a. Give the domain of $f(x)$. _____(2)

b. Give the range of $f(x)$. _____(2)

c. Find $f(3)$. _____(1)

d. What is x when $f(x) = 5$? _____(1)

Solve as indicated in questions 16-21. All answers should be exact, with no decimals used.

16. Solve for c : $x = -3(y + 2c)$. Simplify.

16. _____(3)

17. Solve for x : $5\log_4(3x - 2) = 15$

17. _____(4)

18. Solve for m : $5^m 5^{2-m} = 6m$

18. _____(3)

19. Solve for x : $3(x - 5)^2 - 4 = 35$.

19. _____(4)

20. Solve for m : $\sqrt{3m - 8} - \sqrt{m} = 0$

20. _____(3)

21. Solve for t : $4t^2 - 12t = -7$

21. _____(5)

22. Plot the function $f(x) = x - 3x^5 - \frac{1}{4}x^2$ by using your graphing calculator. Use the calculator to answer the following questions. Round to two decimal places.

a. List the x-intercept(s) of the function. 22a. _____(3)

b. List the y-intercept(s) of the function. 22b. _____(1)

c. Plot the function $f(x) = x + 1$ in the same window. Use your graphing calculator to Determine precisely where these two functions Intersect. 22c. _____(1)