

Name:

Recitation Instructor:

Recitation Day and Time:

Studio College Algebra – Exam 2 - Fall 2021

Directions: You will find 16 problems listed below. SHOW ALL WORK!! Each problem is worth 5 points. No notes/books are allowed. Graphing calculator models above the level of a TI-84 plus are not allowed (in particular, calculators with a built in CAS and/or QWERTY keyboard are not allowed). You have one hour to complete this exam.

1. Solve $(x + 3)^2 - 17 = 0$.

2. Write $x^2 + 8x + 2$ in the form $a(x - h)^2 + k$.

3. A parabola has vertex at $(4, -6)$ and passes through the point $(-2, 3)$. What is the equation of the parabola? Write your answer in the form $y = a(x - h)^2 + k$ (DO NOT MULTIPLY OUT).

4. Consider the function $f(x) = x^2 + 5x - 6$. Find the zeros of this function.

5. Given $h(x) = 2x + 1$ and $k(x) = 13x^2 - 7x$, find $k(x) - h(x)$.

6. Given $r(x) = x + 2$ and $m(x) = 2x^3 - 3x$, find $r(x)m(x)$.

7. Consider the functions, $f(x) = x - 5$ and $g(x) = x^2$:

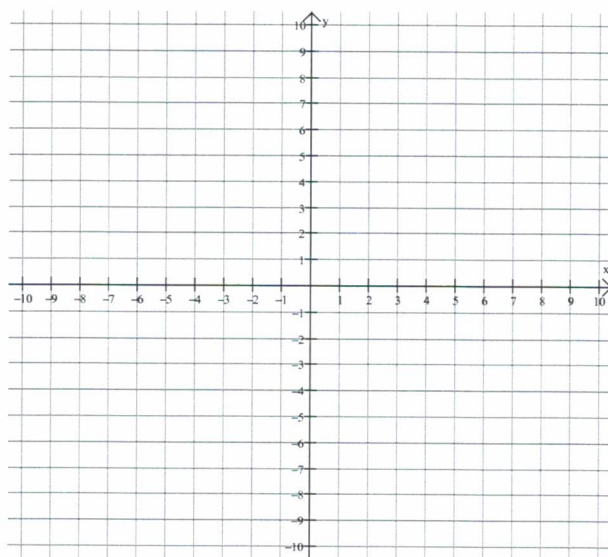
(a) Using the functions above, find $f(4) + g(4)$.

(b) Using the functions above, find $g(g(g(2)))$.

8. Solve the quadratic equation $16x^2 - 10 = 15$.

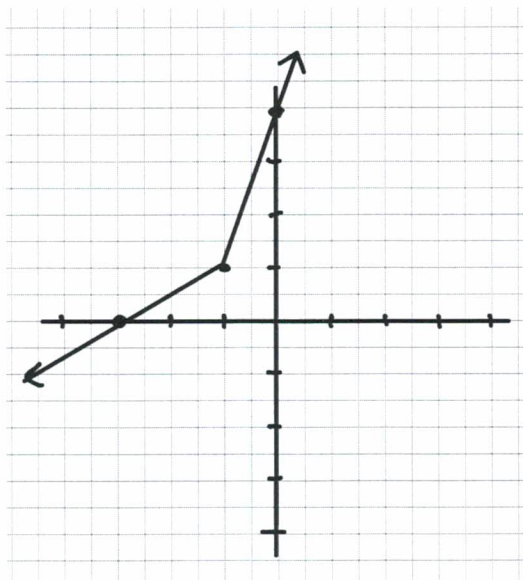
9. Given $f(x) = 3x - 7$, find $f^{-1}(x)$.

10. Graph the function $f(x) = \sqrt{x}$. Include at least 4 points.



11. Recall that Profit = Revenue - Cost. If the revenue function for sales of a certain product is given by $R(x) = 45x$ and the total cost function for making the product is given by $C(x) = 15x + 3000$, where x is a number of units of product and $R(x)$ and $C(x)$ are in dollars, find a profit function, $P(x)$, for this situation.
12. A 3-dimensional cartoon portrays an expanding sphere that grows in volume according to the function $V(r) = \frac{4}{3}\pi r^3$, where r is the radius of the sphere, in millimeters. If the radius grows according to the function $r(t) = 4t$, where t is measured in seconds, find and interpret $V(r(2))$.

13. Given the graph of $f(x)$ below, graph $f^{-1}(x)$.



14. Insect resting metabolic rate (RMR) has been found to be scaled positively with body mass (M) according to the equation $RMR = 4.14(M^{0.66})$, where M is measured in mg and RMR is measured in mm^3O_2 per hour. Find the RMR of an insect weighing 100 mg.

15. A student claims that linear functions are always one-to-one functions. Evaluate the accuracy of this statement, using complete sentences. The more correct details you include, the better!

16. Write up a piecewise linear function, $C(x)$, that describes the total monthly cost of water usage based on the table below. Here, x is the number of gallons used.

Monthly Usage (in gallons)	Monthly Charge
0-200	\$8, plus \$0.05 per gallon
More than 200, up to 500	\$20, plus \$0.07 for every gallon over 200
More than 500, up to 800	\$42, plus \$0.09 for every gallon over 500