

Intermediate Algebra
Sample Final Exam Fall 2014

NAME _____

You will have 2 hours to complete this exam. You may use a calculator (TI-84 or lower, no cell phones) but must show all algebraic work in the space provided to receive full credit. Read all directions carefully, simplify all answers fully, and clearly indicate your answer. Good Luck!

Factor Completely. If the polynomial is prime, say so. (2pts each)

1. $3x^2 + 14x + 8$

2. $5x^3 + 10x^2 - 15x$

Perform the indicated operation and simplify completely. Leave complex answers in the form $a + bi$, rationalize all denominators. (3 pts each)

3. $\frac{5x+5}{x-2} \cdot \frac{2x^2-8x+8}{x^2-1}$

4. $\frac{5x}{x-7} - \frac{3x}{7-x}$

5. $\frac{x}{x^2+2x+1} + \frac{1}{x^2+5x+4}$

6. $\sqrt[3]{54x^9y^7}$

Perform the indicated operation and simplify completely. Leave complex answers in the form $a + bi$, rationalize all denominators. (3pts each)

7. $\sqrt{\frac{5}{3}}$

8. $5\sqrt{12} + 6\sqrt{27}$

9. $(4 - \sqrt{5})(2 + \sqrt{5})$

10. $(3 - 2\sqrt{2}) - (5 - 4\sqrt{2})$

11. $(3 - 2i)(4 - 3i)$

12. $\frac{10}{3+i}$

Find the domain of each function below. Give your answer in interval notation. (2 pt each)

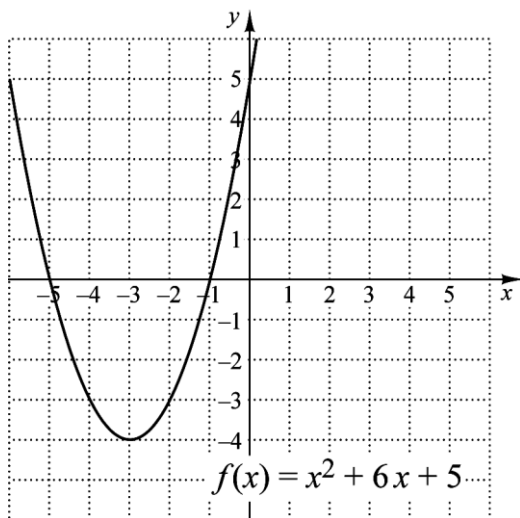
13. $f(x) = 2x^2 - 3x + 5$

14. $f(x) = \frac{2x-3}{x^2+7x+12}$

15. $f(x) = \sqrt{3x - 5}$

16. (1pt) Given $f(x) = x^2 - 3x + 5$, find $f(-3)$

17. Use the graph of the function below to determine the following: (2pts each)



What is the minimum value of the function? _____

What is the range of the function? _____

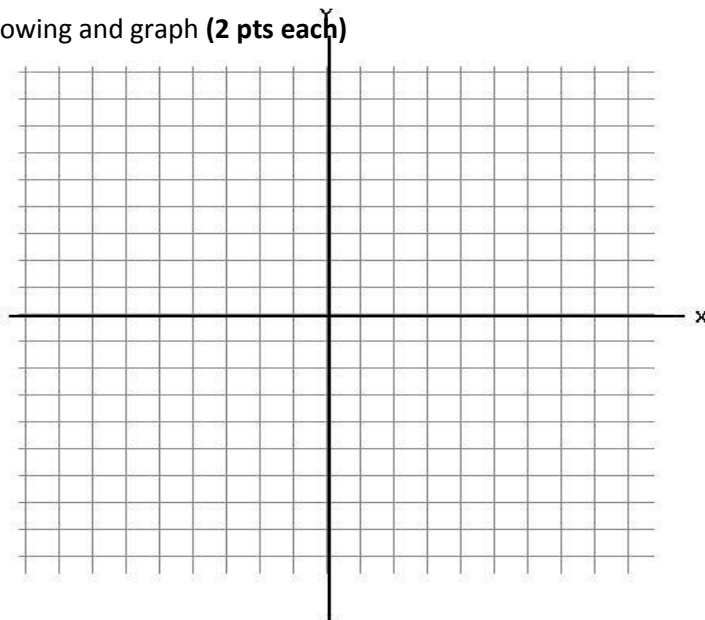
What are the zeros of the function? _____

18. For the quadratic function $f(x) = 2x^2 + 5x - 3$, find the following and graph (2 pts each)

Vertex _____

x-intercept(s) _____

y-intercept _____



Match the graph to the type of function that best describes it. The same type may be used multiple times. (2pts each)

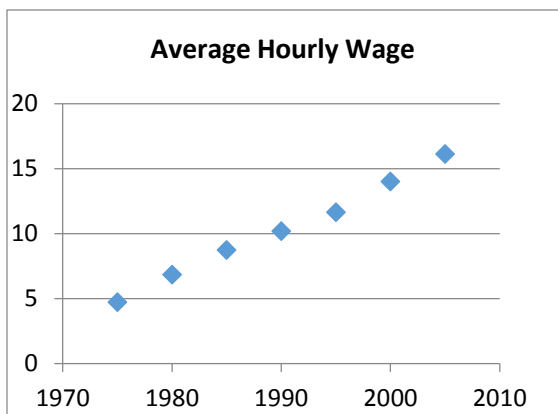
(a) : Linear

(b) : Quadratic

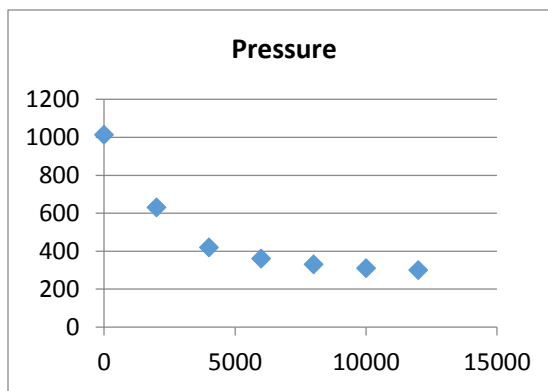
(c) : Exponential

(d) : Radical

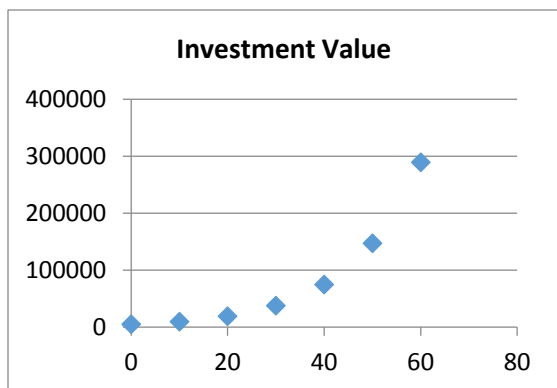
19. _____



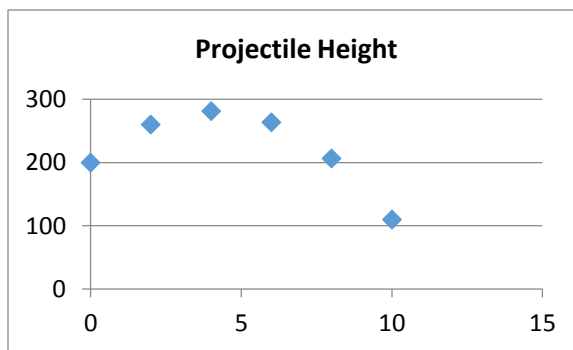
20. _____



21. _____



22. _____



Solve each equation below. Simplify completely, do not round. (3 pts each)

23. $9x^2 + 3x = 0$

24. $\frac{50}{x-2} - \frac{16}{x} = \frac{30}{x}$

25. $x = \sqrt{x-1} + 3$

26. $x^2 + 10 = 6x$

27. $\sqrt[3]{x-2} = -3$

Application Problems. For all problems where an equation is not given, you need to define your variable(s), set up an algebraic equation or equations, solve algebraically, and answer the question with the proper units. If an equation is given, be sure to answer the question completely and with proper units. (4 pts each)

28. Suppose that a flare is launched upward with an initial velocity of 80 ft/sec from a height of 224 ft. Its height $h(t)$, in feet, after t seconds is given by

$$h(t) = -16t^2 + 80t + 224$$

After how long will the flare reach the ground?

29. A rectangular garden is 5 feet longer than it is wide. Determine the dimensions of the garden if it measures 25 ft. diagonally.

30. The HP LaserJet works twice as fast as the Canon LaserJet. If the machines work together, a university can produce all its staff manuals in 15 hours. Find the time it would take each machine, working alone, to complete the same job.

31. A plane travels 120mph in still air and flies 140 miles into the wind and 140 miles with the wind in a total of 2.4 hours. Find the wind speed.

32. The average 140-lb adult burns about 160 calories playing touch football for 20 minutes. How long would the average 140-lb adult need to play in order to burn 200 calories?

33. Ted invests \$6250 in account that earns interest and is compounded annually. After 2 years his investment has grown to \$6760. What was the interest rate on the account?