

Intermediate Algebra
Sample Final Exam Spring 2015

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. $3x^2 - 10x + 8$

2. $3x^3 - 12x^2 + 9x$

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

3. $\frac{7x-14}{x^2-4} \cdot \frac{5x^2+6x+1}{35x+7}$

4. $\frac{x}{x-7} + \frac{2x}{7-x}$

5. $\frac{x}{x^2+5x+6} - \frac{2}{x^2+3x+2}$

6. $\sqrt[4]{32x^5y^4}$

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

7. $\sqrt{\frac{16}{5}}$

8. $3\sqrt{45} + 8\sqrt{20}$

9. $(2 - \sqrt{3})(3 - \sqrt{3})$

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

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

12. $\frac{5}{2-i}$

List any restrictions on the domain of each function below (1pt each)

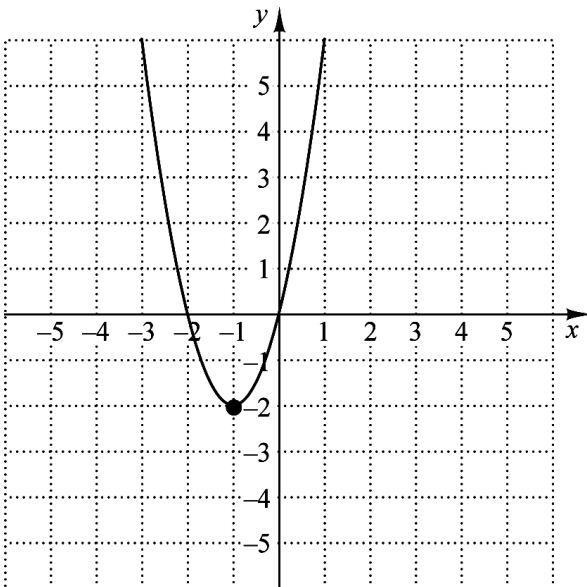
13. $f(x) = x^2 - 3x + 10$

14. $f(x) = \frac{2x-3}{x^2-5x+6}$

15. $f(x) = \sqrt{2x+3}$

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

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



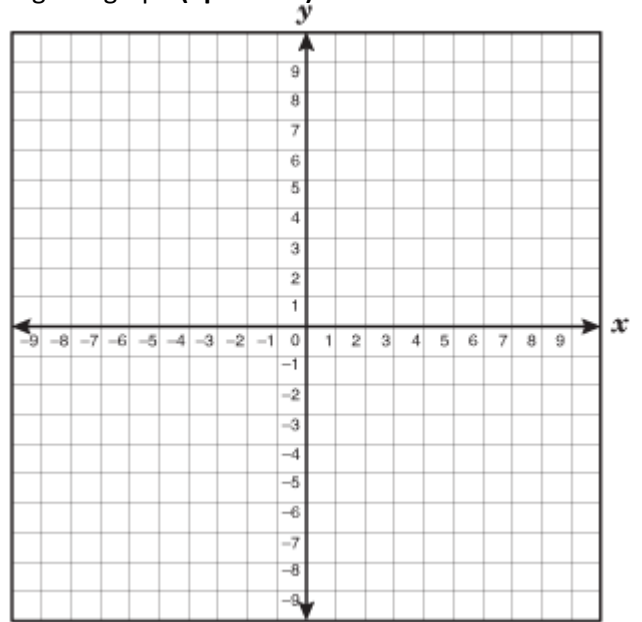
What is the minimum value of the function? _____

What is the range of the function? _____

What are the zeros of the function? _____

18. For the quadratic function $f(x) = x^2 + 4x - 5$, find the following and graph (2pts each)

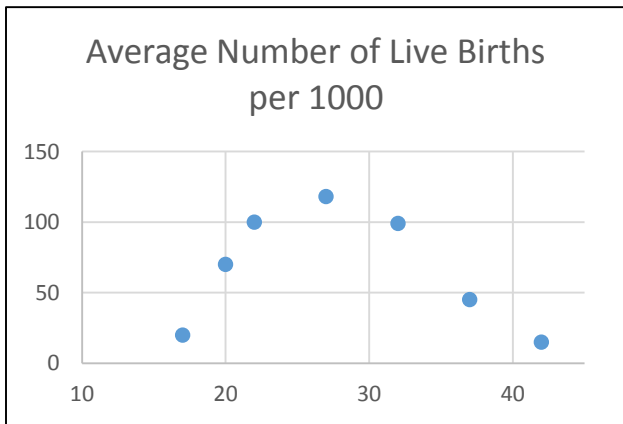
- a. Vertex _____
- b. x-intercept(s) _____
- c. y-intercept _____
- d. Graph to the right



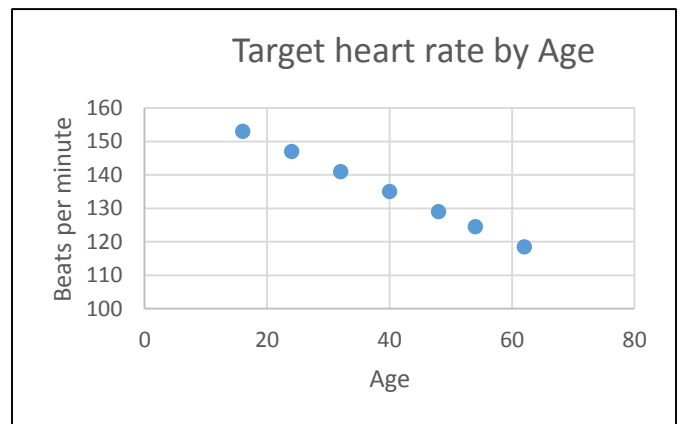
Match the graph to the type of function that best describes it. The same type may be used multiple times. (2pts each)

- (a) : Linear (b) : Quadratic (c) : Exponential (d) : Radical

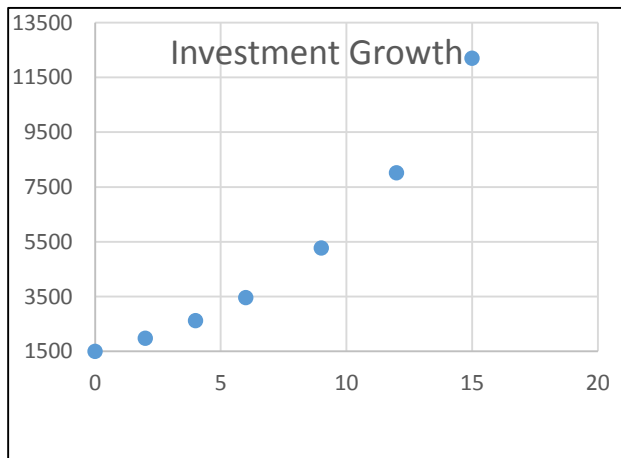
19. _____



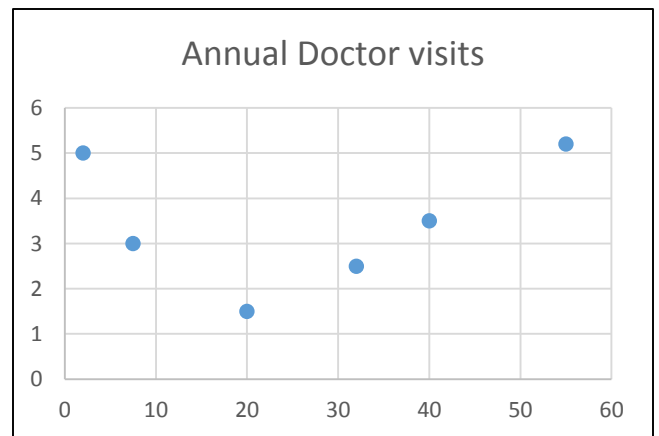
20. _____



21. _____



22. _____



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

23. $6x - 12x^2 = 0$

24. $\frac{2}{x-2} + \frac{1}{x+4} = \frac{x}{x^2+2x-8}$

25. $3 + \sqrt{5-x} = x$

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

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

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 64 ft/sec from a height of 80 ft. Its height, $h(t)$, in feet, after t seconds is given by

$$h(t) = -16t^2 + 64t + 80$$

After how long with the flare reach the ground?

29. A rectangular garden is 3 feet longer than it is wide. Determine the dimensions of the garden if it measures 16 ft. diagonally.

30. Nick can write an exam three times as fast as Hendree can. If they work together it takes them 3 hours. How long would it take each of them to write the exam alone?

31. A loaded Roadway truck is moving 40 mph faster than a New York Railways Freight Train. In the time that takes the train to travel 150 miles, the truck travels 350 miles. Find the speed of both the truck and the train.

32. Lia sent 384 text messages in 8 days. At this rate, how many text messages would Lia send in 30 days?

33. Ted invests \$5000 in account that earns interest and is compounded annually. After 2 years his investment has grown to \$5512.50. What was the interest rate on the account?

Bonus (3pts): Name a two digit number that is the square of its units digit.

Have a wonderful break!

