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MATH 1113 Final Exam Review

Fall 2017

Topics Covered

Exam 1 Problems

Exam 2 Problems

Exam 3 Problems

Exam 1 Problems

Examples

1. The points $A(5, -1)$ and $B(-1, 7)$ are the endpoints on the diameter of a circle.

(a) What is the center and radius of the circle?

(b) Let l_1 be the line through $B(-1, 7)$ perpendicular to the line through A and B . What is the equation of l_1 in slope-intercept form.

2. Consider the equation of a circle:

$$(x - 2)^2 + (y + 1)^2 = 4$$

- (a) What is the center and radius of this circle?
- (b) Find all x and y -intercepts of the circle
- (c) Find the coordinates of the points on the circle where it intersects the line $y = -1$.

3. Given $f(x) = -2x^2 + 7x - 3$, find
- (a) $f(1)$
 - (b) The difference quotient
 - (c) The average rate of change on f in the interval $[1,3]$

4. Determine the domain of the following functions

(a)

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

(b)

$$f(x) = -\frac{4}{x^2 - 1}$$

(c)

$$f(x) = \sqrt{2x - 5}$$

5. Determine if the following functions are odd, even or neither

(a)

$$f(x) = 4x + |x|$$

(b)

$$f(x) = x^2 - |x| + 1$$

(c)

$$f(x) = x^7 + x$$

6. Let x represent the number of widgets sold, and $p(x)$ the price per widget in dollars. The firm begins by selling $x = 300$ widgets at a set of \$70 each. After holding a sale, the firm finds that a \$10 discount on price will yield an increase of 20 more widgets sold.
- (a) If we were to graph the line $p(x)$, write two coordinates that would be on the line based on the information given above.
 - (b) Find the linear pricing function $p(x)$
 - (c) What is the formula for the revenue function, $R(x)$?
 - (d) How many widgets must be sold to yield a maximum revenue?
 - (e) What is the price of the widget when revenue is maximized?

Exam 2 Problems

Examples

7. Solve the following equations for x

(a)

$$2^{x+1} = 8^x$$

(b)

$$2^{5x}5^{x+1} = e^x$$

(c)

$$2 \log_3(x - 2) - \log_3(4x) = 2$$

8. Which type of function, Linear, Quadratic or Exponential, would be best to model each of the following scenarios?
- (a) The amount of radioactive material present after a given time period.
 - (b) The number of bacteria that doubles rapidly over time.
 - (c) The number of computers produced at a factory as a function of time where computers are produced at a constant rate.
 - (d) The area of a square as a function of the length of its sides.

9. Determine if the function $K(x) = x^2 + 6x$ is a one-to-one function or not.

10. Determine the inverse of the function $H(t) = 3e^{5t+3}$.

11. You invest \$2500 in an account earning 3.17% compounded monthly

(a) What is the value of the account after 3 years?

(b) How long will it take for the account value be \$10000?

(c) How long would it take to reach a value of \$10000 if the interest were compounded continuously?

12. A culture of bacteria initially has 400 bacteria present. 10 hours later the bacteria population has grown to 1275

(a) How many bacteria were present after 8 hours?

(b) When will the population reach 3000 bacteria?

Exam 3 Problems

Examples

13. Determine an angle θ that matches the criterion given below. (There are multiple answers, only give one)

(a) An angle that is coterminal with $\alpha = \pi/4$ and is greater than π .

(b) An angle that is coterminal with $\theta = 3\pi/4$ and is negative

14. Given the information below, determine the values of the requested quantities. Please give exact answers.

(a) The point $(x, 0.3)$ is on the unit circle and in the first quadrant. Find x .

(b) $\arctan(-\sqrt{3})$

(c) $\arcsin(\sin(5\pi/6))$

(d) $\sin(\arccos(0.2))$

15. A slice of pizza comes from 16 inch diameter pie which was cut into 7 equally sized slices. What is the area of the slice?
16. An elevator full of painters is moving down the edge of a skyscraper at a constant speed. You are standing one hundred feet away from the skyscraper pointing a laser at the painters. When you first start doing this, the beam has an angle of elevation of 33° , and ten seconds later it has an angle of elevation of 23° . What is the speed of the elevator's descent, in ft/sec?

17. Simplify the following expression so that it contains only the variable u and no trigonometric or inverse trigonometric functions.

$$\cos(\tan^{-1} u + \sec^{-1} u)$$

18. The function below is defined by $f(x) = A \sin(bx - c) + d$. Determine the values of A , b , c , and d where A is a positive number.

