Unit 1 Test Review: Sections 1.1–1.5 Name: _____ HR: _____

Skills: Distance & Midpoint (1.1); intercepts, symmetry, circles (1.2); slope & equations of lines (1.3); functions, evaluating, domain, difference quotient (1.4); analyzing graphs (1.5).

Work every problem in the space provided, then check the answers box at the end. Bring questions to class!

1.1 Rectangular Coordinates

1. Find the distance between (−3, 4) and (5, −2), and find the midpoint of the segment joining them.

Distance: _____ ***Midpoint:*** _____

1.2 Graphs of Equations

2. Find the x- and y-intercepts of $y = x^2 - x - 6$. Write them as ordered pairs.

x-int: _____ ***y-int:*** _____

3. Test $y = x^4 - 3x^2$ for symmetry with respect to the x-axis, the y-axis, and the origin.

Symmetric to: _____

4. (a) Write the standard form of the equation of the circle with center (−1, 4) and radius 3.

(a) _____

(b) Find the center and radius of $(x - 2)^2 + (y + 5)^2 = 49$.

(b) center: _____ ***radius:*** ____

1.3 Linear Equations in Two Variables

5. Find the slope of the line through (−1, 5) and (3, −3). Then write its equation in slope-intercept form.

m = ____ ***y =*** _____

6. Write equations of the lines through (2, 1) that are (a) parallel and (b) perpendicular to $3x - y = 4$.

(a) _____ ***(b)*** _____

1.4 Functions

7. Is y a function of x? $2x + y^2 = 5$ Explain.

Yes / No —

8. Let $f(x) = x^2 - 3x + 2$. Find f(−2) and f(x + 1).

f(−2) = _____ ***f(x + 1) =*** _____

9. Find the domain: (a) $f(x) = \sqrt{x-6}$ (b) $g(x) = \dfrac{x+1}{x^2-9}$

(a) _____ ***(b)*** _____

10. Find and simplify the difference quotient for $f(x) = x^2 + 2x$:

$\dfrac{f(x+h) - f(x)}{h}$ = _____

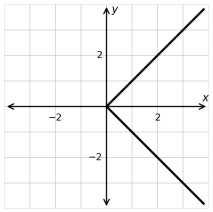
1.4 Functions (continued)

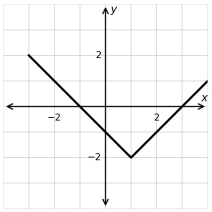
11. Evaluate $f(x) = \begin{cases} 2x+1, & x < 0 \\ x^2 - 1, & x \geq 0 \end{cases}$ at f(−3), f(0), and f(2).

f(−3) = ____ ***f(0) =*** ____ ***f(2) =*** ____

1.5 Analyzing Graphs of Functions

12. Use the Vertical Line Test. Does each graph represent y as a function of x?





(a) Yes / No ***(b) Yes / No***

13. Find the zeros of $f(x) = x^2 + 2x - 24$ algebraically.

Zeros: _____

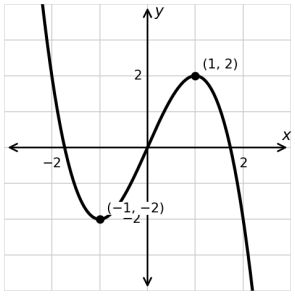
14. Use the graph of $f(x) = -x^3 + 3x$. (Use interval notation)

Increasing:

Decreasing:

Rel. max:

Rel. min:



15. A car's distance in feet from a stoplight is $s(t) = 5t^2$, where t is in seconds. Find the car's average speed from t = 0 to t = 6 seconds.

Avg. speed = _____

16. Find the average rate of change of $f(x) = x^3 - x$ from $x_1 = 0$ to $x_2 = 2$.

A.R.o.C. = _____

17. Determine algebraically whether each function is even, odd, or neither. Show f(−x).

(a) $f(x) = x^4 + 2x^2$ ***(b)*** $f(x) = x^3 - 7x$ ***(c)*** $f(x) = x^2 - 4x$

Even / Odd / Neither ***Even / Odd / Neither*** ***Even / Odd / Neither***

Answers (try first, then check!)

1. d = 10, M = (1, 1) 2. x-int (3, 0), (−2, 0); y-int (0, −6) 3. y-axis only 4. (a) $(x + 1)^2 + (y - 4)^2 = 9$ (b) center (2, −5), r = 7

5. m = −2, y = −2x + 3 6. (a) y = 3x − 5 (b) y = −⅓x + 5⁄3 7. No: x = 2 gives y = 1 and y = −1 8. f(−2) = 12, $f(x + 1) = x^2 - x$

9. (a) [6, ∞) (b) all reals except x = ±3 10. 2x + h + 2 11. −5, −1, 3 12. (a) No (b) Yes 13. x = −6, 4

14. Inc (−1, 1); Dec (−∞, −1) and (1, ∞); rel. max 2 at x = 1; rel. min −2 at x = −1 15. 30 ft/sec 16. 3 17. (a) even (b) odd (c) neither