Review for Exam 2 ----- Math 1643 , Spring 2013

2.1 ⟶ Coordinate plane

1) Find the distance between the two given points:

   a) $(-5, 2)$ and $(19, -5)$ b) $(6, -8)$ and $(-9, b)$

2) Find the midpoint of the line segment AB given:

   a) $A = (-7, 12)$ and $B = (-3, -4)$

   b) $A = (4, 3a)$ and $B = (-20, 7a)$

3) If M is the midpoint of line segment AB and $A = (-4, -1)$ and $M = (7, -8)$, then find the corrdinates of point B.

4) Is the triangle ABC scalene, isosceles or equilateral if $A = (2, -3)$ and $B = (10, -9)$ and $C = (4, -17)$?

2.2 ⟶ Graphs of Equations

1) Find the x-intercept and y-intercept of the function $5x - 3y = 60$.

2) Are the following symmetric about the x-axis, y-axis or origin?

   a) $y = 3x^4 - 5x^2$ b) $y = x^3 - 3x$ c) $4x - y^2 = 9$

3) Find the center and radius of each of the following circles:

   a) $(x + 6)^2 + (y - 9)^2 = 256$ b) $x^2 + (y + 1)^2 = \frac{16}{49}$

   c) $x^2 + y^2 + 14x - 16y - 8 = 0$

2.3 ⟶ Lines

1) Find the slope in each of the following situations:

   a) given points $(-4, 9)$ and $(2, 6)$

   b) the line with equation $5x - 15y = 8$

   c) the horizontal line with equation $y = -7$

2) Find the equation of the line (in standard form) given each situation:

   a) a slope of $\frac{3}{7}$ and passes through the point $(-3, 8)$

   b) perpendicular to the line $4x + 5y = 11$ and passes through $(3, 2)$

   c) has x-intercept of $(3, 0)$ and y-intercept of $(0, -11)$

   d) passes through the point $(5, 6)$ and has no slope

3) Are the following pairs of lines parallel, perpendicular or neither?

   a) $4x - 6y = 11$
      $3y = 8 - 2x$

   b) $2x + y = 9$
      $6 + x - 2y = 0$

2.4 ⟶ Relations and Functions

1) Determine the domain and range of each of the following:

   a) $y = |x| + 6$

   b) $y = \sqrt{3x - 9} + 1$

2) Given $f(x) = 8 - 5x - x^2$, find $f(3)$, $f(-2)$, $f(4a^3)$

3) Find the x-intercept(s) and y-intercept(s) of $y^3 = 16x^2 - 64$

4) If $f(x) = 8 - 3x$, then find $\frac{f(x) - f(2)}{x - 2}$

2.5 ⟶ Properties of Functions

1) Determine if the following functions are even or odd or neither:

a) $f(x) = 9 + 2|x|$ b) $y = 3x^5 - 9x$

2) Find the average rate of change of f (x) from x = a to x = b :

a) $f(x) = 9x - x^3$; $a = -2$ and $b = 3$

b) $f(x) = \frac{x}{2} + \sqrt{x-1}$; $a = 2$ and $b = 10$

3) Find and simplify the difference quotient for f (x) [$\frac{f(x+h)-f(x)}{h}$]

a) $f(x) = 3x^2 - 5x + 8$ b) $f(x) = -2x^2 - x$

4) Find and simplify the difference quotient for f (x) [$\frac{f(x)-f(c)}{x-c}$]

a) $f(x) = 4x^2$; $c = 2$ b) $f(x) = 6x - x^2$; $c = -2$

2.6 ⟶ A Library of Functions

1) If $f(x) = 8x - [[x]]$ (where $[[x]]$ is the greatest integer function) then evaluate each of the following:

a) $f(1.5)$ b) $f(-2.5)$

2) If $f(x) = \begin{cases} |4x| - x^2 & \text{if } x < -2 \\ 2x^3 + 1 & \text{if } -2 \leq x < 3 \\ \frac{2x}{3} - 4 & \text{if } x \geq 3 \end{cases}$ **, then find:**

a) $f(-1)$ b) $f(3)$ c) $f(1) - f(6)$

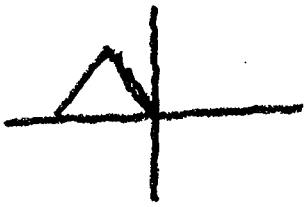
2.7 ⟶ Transformations

1) How is the graph of $f(x)$ shifted to obtain each of the following graphs?

a) $h(x) = f(x+2) - 3$ b) $g(x) = f(x-1) + 4$

2) Given the graph of $f(x)$ to the right, what is the transformation to obtain the following graphs?

a)



b)

2.8 ⟶ Combining Functions

1) If $f(x) = 4x - 3x^2$ and $g(x) = \frac{2x+7}{3}$ and $h(x) = \frac{1}{2}x^3$, then find:

a) $f+g(1)$ b) $h-f(2)$ c) $gh(-2)$

d) $\frac{f}{h}(1)$ e) $f \circ g(1)$ f) $g \circ f(1)$

g) $g \circ h(x)$ h) $f \circ f(2)$

2) Find $f \circ g(x)$ if $f(x) = 2x^2 + 5$ and $g(x) = \sqrt{3x+6}$ and state the domain of $f \circ g(x)$.

3) If $h(x) = f \circ g(x)$ and $h(x) = x^4 - 6x^2 + 7$ and $g(x) = \frac{1}{2}x^2$, then find $f(x)$.

2.9 ⟶ Inverse Functions

1) If $f(x) = \frac{2x+1}{3}$, then find: a) $f^{-1}(11)$ b) $f^{-1}(-23)$

2) Find the inverse for each of the following functions:

a) $f(x) = 8 - 3\sqrt{x}$ b) $f(x) = \frac{7-9x}{5}$ c) $f(x) = \frac{3x+2}{2x-5}$