MS 100   Sample Final Exam

01. (04 pts) Circle the solution to the equation $2(x + 1) = 4x - 6$.

a) $\frac{-6}{7}$ b) 4   c) -1, $\frac{6}{4}$ d) $\frac{-6}{7}$

02. (04 pts) Solve the equation $ax + b = 0$ for x. Circle your answer.

a) $x = \frac{1}{a-b}$ b) $x = \frac{a}{b}$ c) $x = \frac{1}{a+b}$ d) $x = \frac{-b}{a}$

03. (04 pts) What is 9% of 14,000?

a) 1260   b) 12.6   c) 12600   d) 1555

04. (04 pts) If I make \$14,000 per year and my salary is increased by 9%, what is my new salary?

a) \$14,900   b) \$1260   c) \$15,260   d) \$126,000

05. (04 pts) A room is 5ft. longer than it is wide. The perimeter of the room is 50ft. Find the length and width of the room. Length = _____   Width = _____

06. (04 pts) A room is 5ft. longer than it is wide. The area of the room is 150 square feet. Find the length and width of the room. Length = _____   Width = _____

07. (04 pts) Solve the following by factoring: $x^2 - 7x + 12 = 0$ Solutions $x = \{$ $\}$

08. (04 pts) Solve the following by using the Quadratic Formula: $x^2 - 4x = 6$ Circle the correct answer.

a) 5.16, −1.16   b) $\frac{4 \pm \sqrt{40}}{2}$ c) $\frac{-4 \pm \sqrt{16 - 4(1)(6)}}{2}$ d) −4, −2

09. (04 pts) This is the Position Equation: $s = -16\,t^2 + v_0\,t + s_0$ where v_0 is the velocity when the object is released and s_0 is the feet above ground when the object is released, s is in feet and t in seconds.
An object is dropped from the top of an 112 ft. building. How many feet above the ground will it be 1 second after it is dropped?

a) 96 ft.   b) 50 ft.   c) 18 ft.   d) 16 ft.

10. (04 pts) An object is dropped from the top of an 112 ft. building. How many seconds will it take to hit the ground.
Position equation: $s = -16\, t^2 + v_0\, t + s_0$

a) 1 sec.   b) 2 sec.   c) between 2 and 3sec.   d) more than 5 sec.

11. (04 pts) Find the following, where i is the imaginary unit. Express the answer in **standard form** $a + b\, i$:

   a) $(6 + 10\, i) - (3 - 2\, i)$

   b) $(5 - i)(2 + i)$

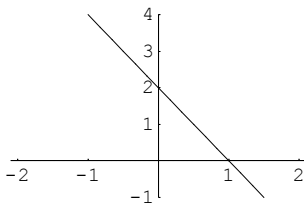12. (04 pts) Solve $6\, x^3 = 12\, x^2$. $x = \{$ $\}$

13. (08 pts) Solve the inequality $-4 < 3\, x + 2 \le 14$.

  a) Express the answer in *inequality notation*.

  b) Express the answer in *interval notation*.

  c) Is the solution set BOUNDED or UNBOUNDED?

  d) Graph the solution on the number line.

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14. (04 pts) Calculate the slope of the line graphed below:

   a) -3 b) -4   c) -2 d) -1

15. (4 pts) You friend changes flat tires for a living. He charges $20 to come out to where you are and $6 for every hour it takes to fix the flat tire. Let F be the fee he charges and h be the number of hours he works on a job. Write the linear relationship between F and h.

16. (1 pt each) For each of the following tables below, state if the table describes a function. (Circle YES or NO). If the answer is NO, explain why.

a)

input	-1	-2	0	-3	4
output	5	6	7	8	9

YES or NO

b)

input	-1	-2	0	3	4
output	5	6	5	8	9

YES or NO

c)

input	−1	4	0	3	4
output	5	6	7	8	9

YES or NO

d)

| input	−1	−2	0	3	4
output	5	5	5	5	5

YES or NO

17. (4 pts) Suppose $h(x) = 3x - 4$.

   a) What is the independent variable?

   b) What is the name of the function?

   c) What is $h(4) =$

   d) Find the value(s) for x such that $h(x) = 0$

18. (04 pts) Find the zeros of $g(x) = x^2 - 4x - 5$ **zeros of g are $x =$ _____**

19. (12 pts) For this problem, use the graph of the function f that you see below.

   a) TRUE or FALSE: The number 4 is in the domain of f.

   b) TRUE or FALSE: The number 0 is in the domain of f.

   c) TRUE or FALSE: The function is decreasing on the entire interval from $x = 0$ to $x = 2$

   d) TRUE or FALSE: The number 1 is in the range of f.

   e) TRUE or FALSE: The number 2 is in the range of f.

   f) List the zero(s) of f:

   g) Estimate $f(2) =$

   h) If f has any local maxima or local minima, draw a dot where each occurs and label it as "max" or "min".
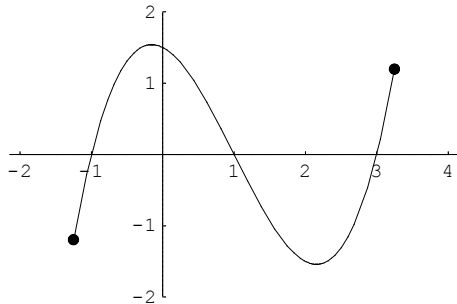
20. (02 pts each) For this section, let $f(x) = x^3$ and $g(x) = 2x + 1$. Select the letter of the correct answer for each part.

   i) Find the function $(f + g)(x)$

   a) $x^3\sqrt{2x+1}$ b) $x^3 + 2x + 1$ c) $(2x+1)^3$ d) $2x^3 + 1$

   ii) Find the function $(f - g)(x)$

   a) $x^3 - 2x - 1$ b) $(-2x-1)^3$ c) $x^3 - \sqrt{2x+1}$ d) $2x + 1 - x^3$

   iii) Find the function $f(x)\,g(x)$

   a) $2x^4 + 1$ b) $x^3(2x+1)$ c) $(x^3)2x+1$ d) $\sqrt{(5x-1)x+2}$

iv) Find the function $\left(\frac{f}{g}\right)(x)$

     a) $\frac{x^3}{2x+1}$ b) $\frac{2x+1}{x^3}$ c) $\left(\frac{2x-1}{x+2}\right)^3$ d) $\frac{5x-1}{\sqrt{x+2}}$

v) Find the function $(f \circ g)(x)$

     a) $x^3(2x+1)$ b) $(2x+1)x^3$ c) $(2x+1)^3$ d) $2x^4+x^3$

vi) Find the function $(g \circ f)(x)$

     a) $x^3(2x+1)$ b) $(2x+1)x^3$ c) $2x^3+1$ d) $(2x^3-1)^3$

21. (04 pts) Here are two tables representing functions f and g:

x	7	8	13
$f(x)$	44	52	100

x	19	44	77
$g(x)$	8	9	10

What is the value of $f(g(19)) =$

22. (04 pts) Find the inverse function of the function $g(x) = 4x - 20$. $g^{-1}(x) =$

23. (04 pts) Each of the tables below represents a function. For each, determine if an inverse function exists. (Circle YES or NO)

a)
x	5	6	7	8	9
$f(x)$	5	6	7	8	9

YES or NO

b)
x	-1	-2	0	3	4
$f(x)$	5	6	5	8	9

YES or NO

c)
x	-1	-2	0	3	4
$f(x)$	9	0	7	6	5

YES or NO

d)
x	-1	-2	0	3	4
$f(x)$	2	2	2	2	2

YES or NO

24. (04 pts) Find the formula for the quadratic function graphed below: