

Math 220 Section 04 Test 1  
(draft 26 Sept 2015)

1. For the functions, write the natural domain, the  $x$ - and  $y$ -intercepts, if any:

$$f(x) = -x^3 + 45$$

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

2. Find the indicated limits:

$$\lim_{x \rightarrow 1^-} \frac{1+x}{1-x^2}$$

$$\lim_{x \rightarrow 1^+} \frac{1+x}{1-x^2}$$

$$\lim_{x \rightarrow 1} \frac{1+x}{1-x^2}$$

$$\lim_{h \rightarrow 0} \frac{2 - \sqrt{h+4}}{h}$$

3. Martín Velazquez owns a small publishing house specializing in Latin American poetry. His cost function is  $C(x) = 2.15x + k$ , and to print 1000 copies of the book costs \$2675.

a) Find  $k$ . What does  $k$  represent?

b) Write the linear cost function for Marti's book production.

c) Martín sells his books for \$4.95 each. Write the revenue function for the operation.

d) How many poetry books must he produce and sell in order to break even?

e) How many books must he produce and sell to make a profit of \$1000?

f) What is his marginal profit, both dollar amount and what it represents?

4. Write the equation of the tangent line to the curve  $f(x) = \sqrt{x} - 3$  at  $x = 4$ ?

5. Find the derivative of each function:  $f(x) = \left(2x^4 - x^2 + \frac{1}{x}\right)^3$   $g(x) = e^x(4x - 1)^5$

6. Given a profit function for the sale of handbags is  $P(x) = 80x^{1/2} + 12x - 45$ , what is the marginal profit when 400 handbags are sold?