

EXAM 2 - MATH 111

Friday, March 1

YOUR NAME: _____

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Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

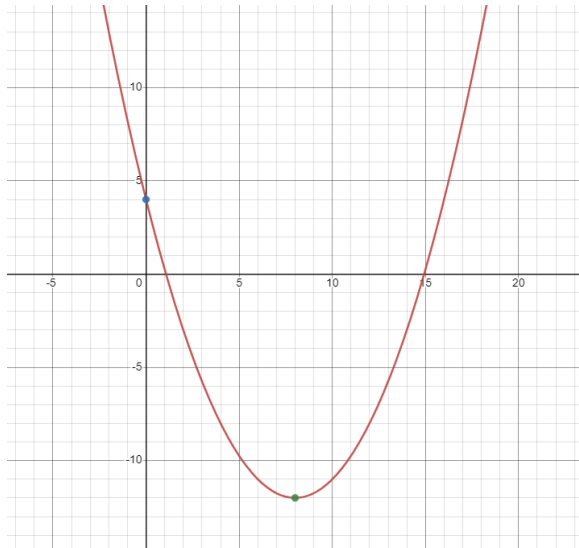
1. (a) Find a formula for $f^{-1}(x)$ if $f(x) = \sqrt{5x-2} + 9$.

(b) Find a formula for $f^{-1}(x)$ if $f(x) = \frac{3x+5}{1-x}$.

2. (a) A line ℓ passes through the points $(-10, -3)$ and $(-5, 22)$. Find an equation for the perpendicular line to ℓ that passes through $(3, -7)$.

- (b) A population of a certain species in a constricted area has increased from 25 in 2020 to 53 in 2024. Write a linear model for the population $P(t)$ as a function of the time t .

3. Consider the figure showing a graph of a parabola.



(a) Write an equation for the parabola in standard form.

(b) Convert into general form.

(c) Find the domain and the range.

4. If a manufacturer sells a gadget at the price of \$10.00, then it can sell 50 gadgets. But if the price is increased to \$13.00, then only 32 gadgets can be sold.

(i) Find a linear equation for the number $N(p)$ of gadgets sold in terms of the price p of a gadget.

(ii) Find an equation for the revenue function $R(p)$ in terms of the price p .

(iii) Find the price p that the manufacturer should charge per gadget to maximize the revenue (explain the reasoning).

5. Consider the polynomial

$$f(x) = -5(x + 3)(x + 1)(x - 2).$$

All of the following should be done by hand and all steps shown.

(a) Write in general form.

(b) Find the leading term.

(c) Describe the end behavior formally.

(d) Find the y - and x -intercepts.