

EXAM 2 - MATH 111

Thursday, October 12

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. Consider the function $f(x) = \frac{7x + 3}{2x - 5}$.

(a) Find the domain of $f(x)$.

(b) Find a formula for the inverse $f^{-1}(x)$.

(c) Find the range of $f(x)$. (Hint: Use $f^{-1}(x)$ in a smart way.)

2. (a) Line L_1 has equation $x - 7y = 10$. Find an equation for a line L_2 which is perpendicular to the line L_1 and passes through the point $(2, 17)$.

- (b) A parabola has vertex $(-7, -5)$ and passes through the origin. Find an equation for the parabola and leave it in general form.

3. A sandwich store owner has noticed that she can sell 20 sandwiches per hour at \$8 each, but that the number increases to 32 if she offers them at the discount price of \$5 each.

(a) Assuming that the function $N(p)$ giving the number N of sandwiches sold in terms of the price p is linear, find a formula for $N(p)$.

(b) Find an expression for the hourly revenue $R(p)$ of the store in terms of the price p at which each sandwich is sold.

(c) Which price per sandwich would maximize the store's revenue?

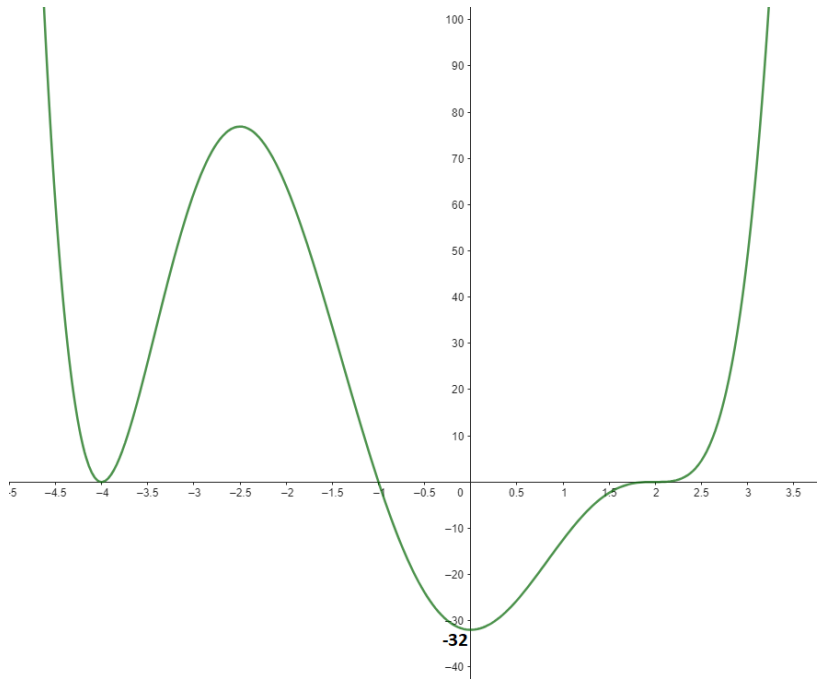
4. Consider the function $f(x) = -x(x + 2)^2(x - 3)^2$.

(a) Describe formally the end-behavior of $f(x)$.

(b) Find the y -intercept and the x -intercepts, including multiplicities.

(c) Sketch the graph of $y = f(x)$.

5. Consider the graph of a polynomial function given below.



(a) Describe its end behavior formally.

(b) Give its y -intercept and its x -intercepts, including multiplicities.

(c) Find a possible formula for $y = f(x)$.