NAME _____

MATH 101: FALL 2020	FINAL EXAM PART 1

You are allowed three pages of notes and a calculator. No phones, bags not on table, please put out of sight. More than 200pts to earn. $\boxed{\textit{Box}}$ *your answers for full credit and show work. Thanks!*

Problem 1: (10pts) Solve $-4x + 22 = 3x - 20$.

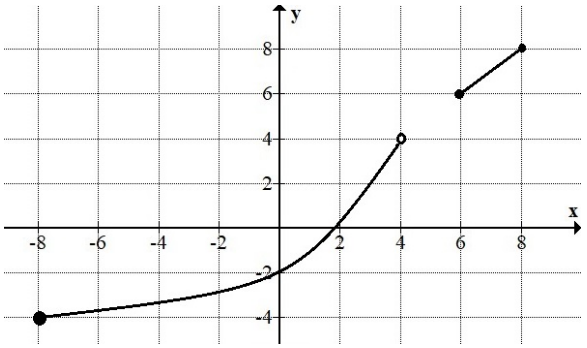
Problem 2: (10pts) Solve $-\frac{3}{10}x + 1 = \frac{7}{5}$.

Problem 3: (10pts) Solve $|4 - 5x| = 6$.

Problem 4: (10pts) Consider the graph $y = f(x)$ given below. Answer the following questions using interval notation (might need a union) where appropriate. Fill in the blanks:

(a.) the domain of $f(x) =$ _____.

(b.) the range of $f(x) =$ _____.



Problem 5: (10pts) The perimeter of a playing field is 900 feet. The field is a rectangle and the length is twice the width. Find the length and the width of the field.

Problem 6: (5pts) Let $P(x) = 8x^6 + 7x^5 + 3x + 9$. Calculate $P(-1)$ and $P(0)$.

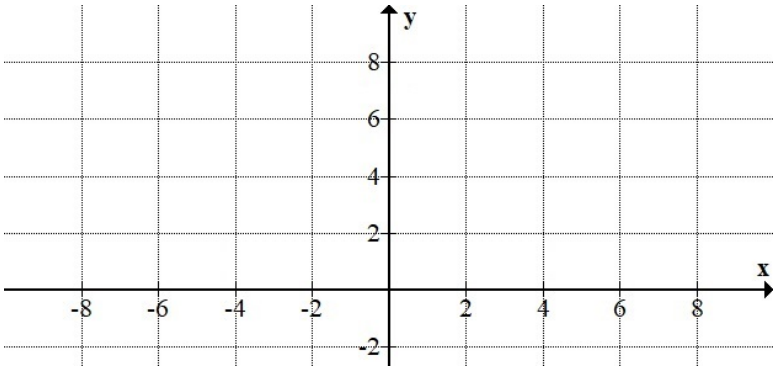
Problem 7: (45pts) Solve each inequality below and give the answer in interval notation.

(a.) $-3x + 4 < x + 12$,

(b.) $|3x + 2| < 1$.

(c.) $|3x + 2| \geq 1$,

Problem 8: (15pts) **Plot** the points $(-8, 2)$ and $(2, 6)$. Also, **find the equation** of the line which passes through the given points and **graph the line**.



Problem 9: (15pts) Solve $\begin{array}{l} 3x - 2y = 8 \\ 5x + y = 9 \end{array}$.

Problem 10: (30pts) Factor each polynomial below completely over $\mathbb{R}$,

(a.) $x^5 - 4x^4 + 3x^3$

(b.) $2x^2 + 5x - 12$

(c.) $2x^2 - 18$

(d.) $x^3 + 8$

(e.) $x^4 - 81$

Problem 11: (20pts) Simplify each expression below:

(a.) $\dfrac{25x^{17}}{5x^2}$

(b.) $\dfrac{x^2}{6x+18} \cdot \dfrac{4x+12}{x}$

(c.) $\dfrac{21x^2+9x^5-30x^8}{3x}$

(d.) $\dfrac{8b^2}{16b^5-24b^3+8b^2}$

Problem 12: (15pts) Solve $\dfrac{x-2}{x+3} = \dfrac{1}{2}$.

Problem 13: (15pts) Solve $x = 3 + \sqrt{x+3}$.