

MATH 120  
FALL 2022  
EXAM 1

NAME:

- 5 pts. each List the quadrants satisfying each condition.

  - $y/x > 0$
  - $x < 0$  and  $xy < 0$
- 10 pts. Graph  $y = -\frac{1}{2}|x|$ , letting  $x = -4, -2, 0, 2, 4$ .
- 10 pts. each Find the solution set of each equation.

  - $5x - (2 - 2x) = x + (3x - 5)$
  - $\frac{6}{x+3} - \frac{5}{x-2} = \frac{-20}{x^2 + x - 6}$
- 10 pts. The length of a rectangular pool is 6 meters less than twice the width. If the pool's perimeter is 126 meters, what are its dimensions?
- 10 pts. Solve  $\frac{1}{p} - \frac{2}{q} = \frac{1}{f}$  for  $p$ .
- 10 pts. each Express each in the standard form  $a + bi$ .

  - $(5 - 2i)(3 + i)$
  - $\frac{3 - i}{2 + i}$
- 5 pts. Do a long division that quickly determines whether  $i^{717}$  equals 1,  $-1$ ,  $i$ , or  $-i$ .
- 10 pts. each Solve each by the method indicated.

  - $2(x - 6)^2 = 98$  by the square root property
  - $x^2 + 3x - 1 = 0$  by completing the square
- 15 pts. A machine produces topless boxes using square sheets of metal. The machine cuts equal-sized squares measuring three centimeters on a side from the corners of the sheet, and then folds up the resultant flaps to form the four sides of an open box. If each box must have a volume of  $80 \text{ cm}^3$ , find the dimensions of the box.

10. 10 pts. each Solve each equation.

(a)  $\sqrt{2x - 3} - \sqrt{x - 2} = 1$

(b)  $2x^{2/3} + 7x^{1/3} - 15 = 0$

(c)  $|x + 1| - 9 = -5$

11. 10 pts. each Solve each inequality, stating the solution set in interval notation.

(a)  $7 - \frac{4}{5}x \leq \frac{3}{5}$

(b)  $|2(x - 1) + 4| < 8$

(c)  $-3|x + 7| \geq -27$