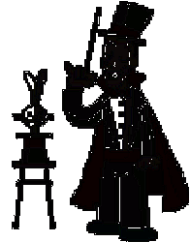


Perform your work on separate paper as needed. Work must be clearly **legible**. Answers should be **simplified** and **boxed** or **circled** and written on **THIS** page. Unless otherwise stated write answers as an exact value where possible. Check your answers where possible.

- 1) Houdini is thinking of two numbers. Their sum is 844. In addition, $\frac{5}{8}$ of the sum of 3 times the first number plus 12 times the second number is 885. Let the missing numbers be x & y . Write a 2×2 system of equations for this scenario then solve the problem.



- 2) Brady has just won a huge pot of 796 coins worth \$68.35 at the weekly poker game. Let the number of coins be N (nickels) & D (dimes). Write a 2×2 system of equations for this scenario then solve the problem.



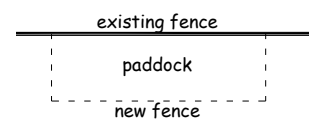
- 3) Tarzan can swim at 10 ft/sec while Charlie the Croc chasing him can swim at 14 ft/sec. When Tarzan dove into the river, Charlie was 300 yds away. How long until the Charlie catches up with Tarzan. Don't worry, Tarzan can easily handle Charlie. Let x = seconds. Write an equation for this scenario then solve the problem.



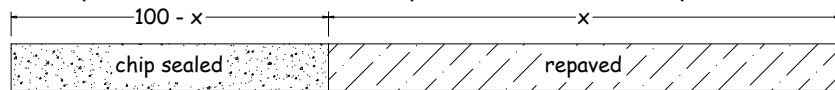
- 4) A semi truck travels 480 mi while a freight train travels only 320 mi in the same time. Assume the truck averages 20 mph faster than the train. What is the average speed of each? Let x = travel time. Write an equation for this scenario then solve the problem.



- 5) Old MacDonald wants to create a new paddock on his farm. One side is already fenced. He has 60 ft of fencing and he wants his paddock to be such that the length is 3 times the width. What dimensions should he use for the paddock? Let L = length & W = width. Write a 2×2 system of equations for this scenario then solve the problem.



- 6) 100# of a new alloy is to be made which is 30% Copper (Cu) and 70% Nickel (Ni) by mixing existing alloys. Alloy A is 50% Cu and 50% Ni while alloy B is 20% Cu & 80% Ni. How many pounds of each must be used? Let A = # of alloy A & B = # of alloy B. Write a 2 x 2 system of equations for this scenario then solve the problem.
- 7) A 100 mi section of road is to be repaved or chip-sealed. Assume paving costs \$60,000/mi while chip-sealing cost \$24,000/mi. Let x = miles. Write an equation for the cost of improving 100 mi of road. Then determine the position for x if the County has \$3.5 million to spend.



- 8) A water line is to be installed from Pt A to Pt B which are 640' apart. Ideally, the owner would like to use 6" pipe but it costs 4 times as much for 6" pipe as for 4" pipe and there is a limited budget of \$10,000. Assume the 4" pipe costs \$5.50/ft. Let x = 4" portion. Write an equation for the cost of the waterline installation. Then determine how much of each size is possible.

- 9) Fred has a small business delivering fresh vegetables to restaurants. He paid \$1200 for a delivery truck and vegetables cost him \$12/box. He sells them for \$32.50/box. Let x = boxes. Write an equation for Fred's expenses. Write an equation for Fred's Revenues. Determine when Fred's revenues equal his expenses. This is called his breakeven point.



- 10) Fred has collected some data and found that at \$25/box he had 20 clients but at \$30/box he dropped to 17 clients and at \$32.50/box he now has 16 clients (see chart).

x or y				
	selling price (SP)	\$25	\$30	\$32.50
	number of clients	20	17	16

Determine independent vs dependent variable. Then run linear regression to find an equation for number of clients vs. selling price. Write it here. Then use your equation to find the SP that will result in Fred losing all his clients.