Math 118 – Spring 2007
Practice Final Examination

____

31. Let the supply and demand for radial tires in dollars be given by

supply: $p = \frac{3}{2}q$

demand: $p = 81 - \frac{3}{4}q$

a. Find the equilibrium price: _________

b. Find the equilibrium quantity: _________

32. (3.3.34) The owners of a parking lot have determined that their weekly revenue and cost in dollars are given by $R = 80x$ and its monthly cost in dollars is given by
$C = 50x + 2400$, where x is the number of long term parkers.

a. Find the break-even point.

$x =$ _____________

b. Find the profit or loss when there are 120 long-term parkers.

Profit or loss? ____________

Amount $_______________

33. Input-output analysis: Find X if the technology matrix is $A = \begin{bmatrix} .5 & .4 \\ .25 & .2 \end{bmatrix}$ and the demands matrix is $D = \begin{bmatrix} 2 \\ 4 \end{bmatrix}$.

$$X = \begin{bmatrix} \_\_\_\_ \\ \_\_\_\_ \end{bmatrix}$$

34. (3.5.10) (15 points) The supply function for a commodity is given by $p = q^2 + 200$ and the demand function is given by $p = -10q + 3200$.

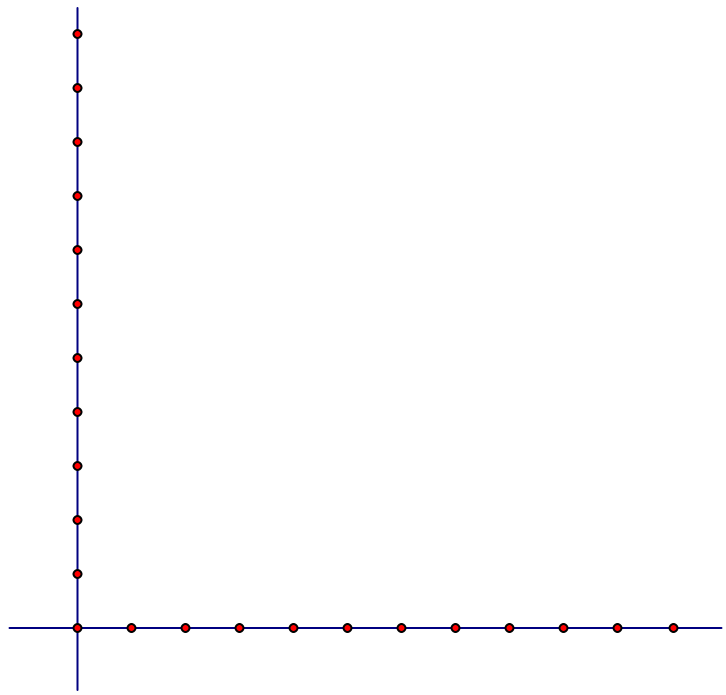
a. Graph the supply and demand functions on the axes given. Find an appropriate window that shows all the important features of the graph, and label your axes carefully.

b. Find the equilibrium quantity.

____

c. Find the equilibrium price

____



35. Find the interest rate that makes \$2550 grow to \$3905 in 11 years, compounded annually.

Interest rate = ___________ %

What kind of problem is this? ___________

36. Ron Hampton is saving for a computer. At the end of each month, he puts $60 into a savings account that pays 4.5% interest compounded monthly. How much is in the account after 3 years?

Amount in account = $ ______________

What kind of problem is this? ___________

37. Solve by any method:

$$\begin{aligned} 3x + 2y + 4z &= 18 \\ 2x - 2y + 3z &= 6 \\ x + y + 2z &= 8 \end{aligned}$$

x = ________

y = ________

z = ________

38. You have received a message that was encoded with the following matrix:

$A = \begin{pmatrix} 2 & 5 & 4 \\ 1 & 4 & 3 \\ 1 & 3 & 2 \end{pmatrix}$. The message you received is 111, 77, 56, 79, 56, 41, 173, 134, 96.

Decode the message.

Message: _____ _____ _____ _____ _____ _____ _____ _____ _____

39. Find the tangent line to the function $y = x^3 - x$ at $x = 2$

y = ____________________

40. A developer needs $80,000 to buy land. He is able to borrow the money at 10% per year compounded quarterly. How much should he pay each quarter to pay the loan off in five years?

quarterly payment = $ ______________

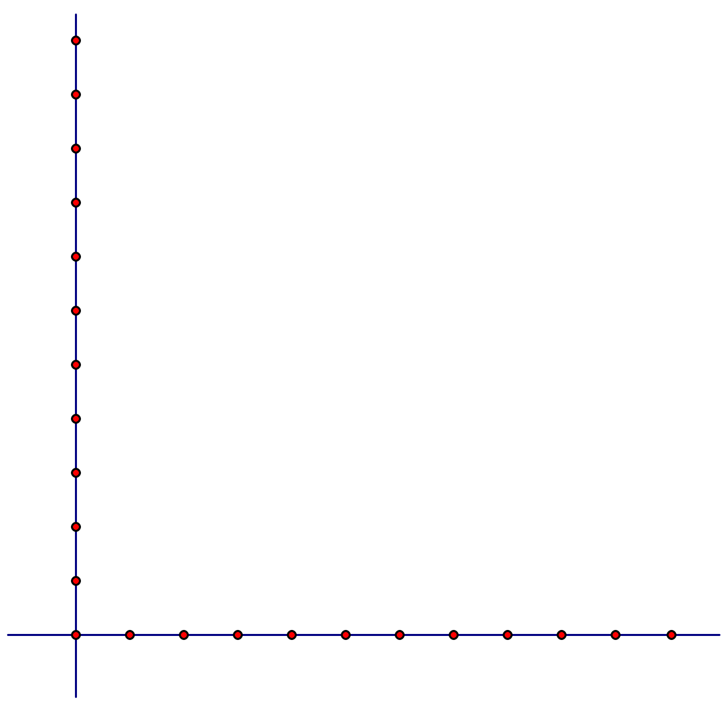
What kind of problem is this? ___________

41. Pauline Wong spends 4 hours selling a used car and 6 hours selling a new car. She works no more than 40 hours per week. In order to receive a bonus, she must sell at least one used car and four new cars each week. In that case, she receives a bonus of $180 for each used car and $290 for each new car. Now many used and how many new cars should she try to sell to maximize her bonus? (Show your work. Identify corners. etc.)

used cars ________

new cars ________

max bonus ________



Formula sheet

A	Simple interest	$A = P(1 + rt)$
B	Simple interest	$P = \dfrac{A}{1 + rt}$
C	Compound interest	$A = P(1 + i)^n$
D	Effective rate	$r_E = \left(1 + \dfrac{r}{m}\right)^m - 1$
E	Compound interest	$P = \dfrac{A}{(1 + i)^n}$
F	Continuous compounding	$A = Pe^{rt}$
G	Continuous compounding	$P = \dfrac{A}{e^{rt}}$
H	Sum of terms	$S_n = \dfrac{a(r^n - 1)}{r - 1} \quad r \neq 1$
I	Ordinary annuity	$S = R\left[\dfrac{(1 + i)^n - 1}{i}\right]$
J	Annuity due	$S = R\left[\dfrac{(1 + i)^{n+1} - 1}{i}\right] - R$
K	Ordinary annuity	$P = R\left[\dfrac{1 - (1 + i)^{-n}}{i}\right]$
L	Amortization	$R = P\left[\dfrac{i}{1 - (1 + i)^{-n}}\right]$
M	Sinking fund	$R = S\left[\dfrac{i}{(1 + i)^n - 1}\right]$