1. [10 points] Find a general form \((Ax + By + C = 0)\) of an equation of the line that passes through the points \((1, 2)\) and \((-3, 7)\).

Answer: \(\)
2. [10 points] For the pair of supply-and-demand equations find the equilibrium quantity $x$ in thousands and the equilibrium price $p$ in dollars.

\begin{align*}
2x + 7p - 24 &= 0 \\
3x - 11p + 7 &= 0
\end{align*}

Answer: $x = \boxed{2}$, $p = \boxed{3}$
3. [15 points] Calculate $2A - B^T C$ if $A = \begin{bmatrix} 2 \\ 3 \end{bmatrix}$, $B = \begin{bmatrix} 3 & -2 \\ -1 & 0 \\ 0 & 3 \end{bmatrix}$, $C = \begin{bmatrix} 2 \\ 4 \\ 1 \end{bmatrix}$

Answer: 3
4. [15 points] Using the inverse matrix method solve the system of linear equations

\begin{align*}
x + 2z &= 1 \\
2y - 3z &= 8 \\
2z &= -4
\end{align*}

(a) [5 points] Express the system as a matrix equation
(b) [5 points] Find $A^{-1}$
(c) [5 points] Solve the system using the inverse matrix

(a) Answer:
(b) \( A^{-1} = \)

(c) Answer: \( x = \) **[Blank]** \( y = \) **[Blank]** \( z = \) **[Blank]**
5. [10 points] Construct the truth table for the compound proposition $\sim p \lor (p \land q)$.
6. [15 points] For the given argument

   If Mary wins the race, then Stacy loses the race.
   Mary did not win the race.
   Therefore, Stacy won the race.

define premises and the conclusion. Then represent the argument symbolically, and determine if it is a valid argument by constructing its truth table.
7. (a) [7 points] Find the accumulated amount $A$ if the principal $P = \$20,000$ is invested at the interest rate of 6%/year for 3 years compounded quarterly.

(b) [8 points] Find the present value of $\$20,000$ due in 3 years at the rate of interest 6%/year compounded monthly.

(a) $A = \boxed{\phantom{000000}}$

(b) $P = \boxed{\phantom{000000}}$
8. [10 points] Find the amount of the ordinary annuity of $1500/semiannual period for 6 years at 8%/year compounded semiannually.

\[ S = \]
bonus problem [15 points extra] Solve the system of equations

\[
\begin{align*}
  x + y^2 &= 5 \\
  \frac{1}{2}x + y &= 1
\end{align*}
\]

Answer: \( x = \) blank, \( y = \) blank