It really is not an economic problem solely — it is a complex problem.

Possible alternatives might include:

1. Live at home.
2. Live in a room in a private home in return for work in the garden, etc.
3. Become a Resident Assistant in a university dormitory.
4. Live in a camper — or tent — in a nearby rural area.
5. Live in a trailer on a construction site in return for “keeping an eye on the place.”

Choose the better of the undesirable alternatives.

Plan A: Profit = Income − Cost = $800 − $600 = $200/acre
Plan B: Profit = Income − Cost = $1,900 − $1,500 = $400/acre
Plan C: Profit = Income − Cost = $2,250 − $1,800 = $450/acre
Plan D: Profit = Income − Cost = $2,500 − $2,100 = $400/acre

To maximize profit, choose Plan C.

Ethics consists of standards of behavior, conduct, and moral judgment.
Student answers to this question will be highly variable depending on what they find.

(a) Possible ethical and legal conflicts that may arise are: (1) exploitation of workers can be effected by placing them on salary with no extra pay for overtime, (2) workers may “fake” work in order to receive overtime pay, (3) the existence of overtime pay may be used by employers to “force” employees to work longer hours, i.e., “don’t complain, you’re getting paid for it,” (4) an employer may make you work 70 hours one week and only 10 the next but only pay you for a normal 80 hours every two weeks (probably illegal), (5) your employer may fire you for challenging questionable overtime practices (probably illegal).

(b) The federal government regulates overtime law with the Fair Labor Standards Act (FLSA) of 1938, however, almost 42% of laborers are exempt for one reason or another from this act. The Wage and Hour Division of the U. S. Labor Department is charged with enforcing the FLSA. States may pass additional overtime laws as is the case in California.

(c) Student answers will vary depending on what they find.
The fundamental concept here is that we will trade an hour of study in one subject for an hour of study in another subject so long as we are improving the total results. The stated criterion is to "get as high an average grade as possible in the combined classes." (This is the same as saying "get the highest combined total score").

Since the data in the problem indicate that additional study always increases the grade, the question is how to apportion the available 15 hours of study among the courses. One might begin, for example, assuming five hours of study on each course. The combined total score would be 190.

Decreasing the study of mathematics one hour reduces the math grade by 8 points (from 52 to 44). This hour could be used to increase the physics grade by 9 points (from 59 to 68). The result would be:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>Physics</td>
<td>6</td>
<td>68</td>
</tr>
<tr>
<td>Engr. Econ.</td>
<td>5</td>
<td>79</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>191</strong></td>
</tr>
</tbody>
</table>

Further study would show that the best use of the time is:

<table>
<thead>
<tr>
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<th>Hours</th>
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</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>Physics</td>
<td>7</td>
<td>77</td>
</tr>
<tr>
<td>Engr. Econ.</td>
<td>4</td>
<td>71</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>192</strong></td>
</tr>
</tbody>
</table>
Area A: Preparation Cost = $2 \times 10^6 \times $2.35 = $4,700,000

Area B: Difference in Haul
0.60 \times 5 \text{ miles} = 3.0 \text{ miles}
0.20 \times -2 \text{ miles} = -0.4 \text{ miles}

0.20 \times 0 = 0 \text{ miles}

Total = 2.6 \text{ miles} \text{ average additional haul}

Cost of additional haul/\text{load} = 2.6 \text{ mi}/15 \text{ mph} \times $35/\text{hr} = $6.07

Since truck capacity is 20 \text{ m}^3;
Additional cost/cubic yard = $6.07/20 \text{ m}^3 = $0.303/\text{m}^3

For 14 million cubic meters:
Total Cost = 14 \times 10^6 \times $0.303 = $4,240,000

Area B with its lower total cost is preferred.

\section*{1-59}

\textbf{Profit} = \text{Income} - \text{Cost}
= PQ - C \text{ where } PQ = 35Q - 0.02Q^2
\quad C = 4Q + 8,000

d(\text{Profit})/dQ = 31 - 0.04Q = 0

Solve for Q:
\quad Q = 31/0.04 = 775 \text{ units/year}

\quad d^2 (\text{Profit})/dQ^2 = -0.04

The negative sign indicates that profit is maximum at Q equals 775 units/year.
Answer: Q = 775 units/year