Circle your final answers.

\[
\text{Dose} = 1000\text{mg} \\
F = 1 \\
f_e = 0.30
\]

\[
C_P = \frac{22\text{mg/L}}{e^{\frac{0.23}{\text{hr}}}}
\]

For the above equation, an 1000 mg iv bolus dose was administered and 30% of the drug is excreted unchanged in the urine.

1. Calculate the elimination half-life for the drug above? (3 points).
   \[
   t_{1/2} = \frac{0.693}{0.23} = \frac{3.01}{\text{hr}}
   \]

2. Calculate the amount excreted unchanged for the drug above? (3 points).
   \[
   A_e = f_e \cdot D \cdot F \cdot S = (0.3)(1000\text{mg})(1)(1) \\
   A_e = 300\text{mg}
   \]

3. Calculate the volume of distribution for the drug above? (4 points).
   \[
   V_d = \frac{D \cdot F \cdot S}{C_P} = \frac{(1000\text{mg})(1)(1)}{22\text{mg/L}} = 45.45\text{L}
   \]

4. Calculate the renal clearance (Cl) for the drug above? (5 points).
   \[
   Cl = f_e \cdot Cl_p \\
   = f_e \cdot k \cdot V_d = (0.30)(0.23)(45.45\text{L}) = 3.14\text{L/hr}
   \]

5. Calculate the Cp 2 hrs after a 750 mg iv dose? (6 points).
   \[
   C_p = \frac{D \cdot F \cdot S}{V_d} \cdot e^{-\frac{0.23}{\text{hr}}t} \\
   = \frac{(750\text{mg})(1)(1)}{45.45\text{L}} \cdot e^{-\frac{0.23}{\text{hr}}(2\text{hr})} = \frac{10.42\text{mg}}{\text{L}}
   \]
Misoprostol (Cytotec, GD Searle) is a synthetic prostaglandin E1 analog. According to the manufacturer, the following information was obtained when a 200 μg oral dose of misoprostol was taken with an antacid or high fat breakfast:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Cmax (pg/mL)</th>
<th>AUC (pg·hr/mL)</th>
<th>Tmax (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>fasting</td>
<td>811</td>
<td>417</td>
<td>14 ± 8</td>
</tr>
<tr>
<td>with antacid</td>
<td>689</td>
<td>349</td>
<td>20 ± 14</td>
</tr>
<tr>
<td>with high fat breakfast</td>
<td>303</td>
<td>373</td>
<td>64 ± 79</td>
</tr>
</tbody>
</table>

6. What is relative bioavailability of the high fat breakfast to the fasting conditions? (4 points).

$$F_{\text{high fat}} = \frac{Dose_{\text{fasting}}}{AUC_{\text{fasting}}} \times \frac{AUC_{\text{high fat}}}{Dose_{\text{high fat}}}$$

$$= \frac{AUC_{\text{high fat}}}{AUC_{\text{fasting}}}$$

$$= \frac{373 \text{ pg·hr/mL}}{417 \text{ pg·hr/mL}}$$

$$= 0.89$$