Using the following Basic Formula can help to simplify your drug calculations:

\[
\frac{D \times V}{H} = \text{amount to give}
\]

- \(D\) = desired dose (i.e. the drug dose ordered by the physician)
- \(H\) = on-hand dose (i.e. the drug dose on the label of the drug container)
- \(V\) = vehicle (i.e. the form and amount in which the drug comes)

When answering the following questions, be sure to:
- round off to 2 decimal points for mL and mg (where applicable)
- state the unit of measurement in each answer
- remember that, in general, students are generally required to administer an IV medication over a minimum of 2 minutes

1. The physician’s order reads:
   Cefoxitin 1g IV q12h
   The drug label reads:
   500 mg / mL
   You decide to give this by the direct IV method. The drug monograph states it is to be given over 2 – 5 minutes.

   a. How many mLs are required for one dose?

   b. Over what period of time will you administer this dose?
   (if applicable, show your work to support that the time period you select is safe)

   c. Based on how you answered “b” above, how many mLs is that q15seconds?
2. The physician’s order reads:
   Colchicine 0.5 mg IV STAT
The drug label reads:
   0.1 mg/mL
You decide to give this by the direct IV method. The drug monograph states that it is to be given over 2 – 5 minutes.

   a. How many mLs are required for one dose?

   b. Over what period of time will you administer this dose?
      (if applicable, show your work to support that the time period you select is safe)

   c. Based on how you answered “b” above, how many mLs is that q15seconds?

3. The physician’s order reads:
   Narcan 0.1 mg IV STAT
The drug label reads:
   0.1 mg/mL
You decide to give this by the direct IV method. The drug monograph states that IV infusion is not to exceed 1 minute.

   a. How many mLs are required for one dose?

   b. Over what period of time will you administer this dose?
      (if applicable, show your work to support that the time period you select is safe)

   c. Based on how you answered “b” above, how many mLs is that q15seconds?

4. The physician’s order reads:
   Amobarbitol 150 mg IV now
The drug label reads:
   50 mg/mL
You decide to give this by the direct IV method. The drug monograph states that IV infusion is not to exceed 100 mg/ min.

   a. How many mLs are required for one dose?

   b. Over what period of time will you administer this dose?
      (if applicable, show your work to support that the time period you select is safe)

   c. Based on how you answered “b” above, how many mLs is that q15seconds?
5. The physician’s order reads:
   Diazepam 10 mg IV q6h
The drug label reads:
   25 mg/ 10 mL
You decide to give this by the direct IV method. The drug monograph states that IV infusion is not to exceed 2 mg/min.

   a. How many mLs are required for one dose?

   b. Over what period of time will you administer this dose?
      (if applicable, show your work to support that the time period you select is safe)

   c. Based on how you answered “b” above, how many mLs is that q15seconds?

6. The physician’s order reads:
   Digoxin 0.5 mg IV stat
The drug label reads:
   0.1 mg/ 2 mL
You decide to give this by the direct IV method. The drug monograph states that it is to be given over 5 minutes.

   a. How many mLs are required for one dose?

   b. Over what period of time will you administer this dose?
      (if applicable, show your work to support that the time period you select is safe)

   c. Based on how you answered “b” above, how many mLs is that q15seconds?

7. The physician’s order reads:
   Morphine 4 mg IV stat
The drug label reads:
   10 mg/ mL
You decide to give this by the direct IV method. The drug monograph states that it is to be given over 2 - 5 minutes.

   a. How many mLs are required for one dose?

   b. Over what period of time will you administer this dose?
      (if applicable, show your work to support that the time period you select is safe)

   c. Based on how you answered “b” above, how many mLs is that q15seconds?
### Direct Intravenous Injections (IV Push) Answer Key

<p>| | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>1a.</strong></td>
<td>( \frac{1000 \text{ mg}}{500 \text{ mg}} \times 1 \text{ mL} = 2 \text{ mL} )</td>
<td></td>
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<tr>
<td><strong>1b.</strong></td>
<td>Any time period from 2 to 5 minutes is acceptable for this drug. <strong>NOTE:</strong> There is no need to “show your work” because the drug monograph guidelines for time are very specific. <strong>NOTE:</strong> The longer the period of time that you choose to give the med over, the smaller the amount of medication that you will be giving q15seconds. Sometimes these “small” amounts are so small that it is difficult to measure them accurately.</td>
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<tr>
<td><strong>1c.</strong></td>
<td>If you chose to give the drug over 2 minutes, then: [ 2 \text{ minutes} = 8 \times 15 \text{ second blocks of time} ] ( \frac{2 \text{ mL}}{8 \text{ “blocks”}} = 0.25 \text{ mL/15 seconds} )</td>
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<td></td>
<td>If you chose to give the drug over 3 minutes, then: [ 3 \text{ minutes} = 12 \times 15 \text{ second blocks of time} ] ( \frac{2 \text{ mL}}{12 \text{ “blocks”}} = 0.16 \text{ mL/15 seconds} )</td>
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<td></td>
<td>If you chose to give the drug over 4 minutes, then: [ 4 \text{ minutes} = 16 \times 15 \text{ second blocks of time} ] ( \frac{2 \text{ mL}}{16 \text{ “blocks”}} = 0.13 \text{ mL/15 seconds} )</td>
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<td></td>
<td>If you chose to give the drug over 5 minutes, then: [ 5 \text{ minutes} = 20 \times 15 \text{ second blocks of time} ] ( \frac{2 \text{ mL}}{20 \text{ “blocks”}} = 0.1 \text{ mL/15 seconds} )</td>
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<tr>
<td><strong>2a.</strong></td>
<td>( \frac{0.5 \text{ mg}}{0.1 \text{ mg}} \times 1 \text{ mL} = 5 \text{ mL} )</td>
<td></td>
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<tr>
<td><strong>2b.</strong></td>
<td>Any time period from 2 to 5 minutes is acceptable for this drug. <strong>NOTE:</strong> There is no need to “show your work” because the drug monograph guidelines for time are very specific. <strong>NOTE:</strong> The longer the period of time that you choose to give the med over, the smaller the amount of medication that you will be giving q15seconds. Sometimes these “small” amounts are so small that it is difficult to measure them accurately.</td>
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<tr>
<td><strong>2c.</strong></td>
<td>If you chose to give the drug over 2 minutes, then: [ 2 \text{ minutes} = 8 \times 15 \text{ second blocks of time} ] ( \frac{5 \text{ mL}}{8 \text{ “blocks”}} = 0.63 \text{ mL/15 seconds} )</td>
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<td></td>
<td>If you chose to give the drug over 3 minutes, then: [ 3 \text{ minutes} = 12 \times 15 \text{ second blocks of time} ] ( \frac{5 \text{ mL}}{12 \text{ “blocks”}} = 0.42 \text{ mL/15 seconds} )</td>
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<td>If you chose to give the drug over 4 minutes, then: [ 4 \text{ minutes} = 16 \times 15 \text{ second blocks of time} ] ( \frac{5 \text{ mL}}{16 \text{ “blocks”}} = 0.31 \text{ mL/15 seconds} )</td>
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<td></td>
<td>If you chose to give the drug over 5 minutes, then: [ 5 \text{ minutes} = 20 \times 15 \text{ second blocks of time} ] ( \frac{5 \text{ mL}}{20 \text{ “blocks”}} = 0.25 \text{ mL/15 seconds} )</td>
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<td></td>
<td><strong>NOTE:</strong> It would be difficult to measure these amounts exactly!</td>
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<tr>
<td>Problem</td>
<td>Solution</td>
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<td>---------</td>
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<tr>
<td>3a.</td>
<td>(0.1 \text{ mg} \times 1 \text{ mL} = 1 \text{ mL})</td>
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</tbody>
</table>
| 3b. | **1 minute**  
**NOTE:** you would need to consult with your teacher before administering this drug over this period of time since students are generally required to give an IV medication over a minimum of 2 minutes  
**NOTE:** There is no need to “show your work” because the drug monograph guidelines for time are very specific. |
| 3c. | \(1 \text{ minute} = 4 \text{ 15 second blocks of time} \quad \frac{1 \text{ mL}}{4 \text{ “blocks”}} = 0.25 \text{ mL/ 15 seconds}\) |
| 4a. | \(150 \text{ mg} \times \frac{1 \text{ mL}}{50 \text{ mg}} = 3 \text{ mL}\) |
| 4b. | \(\frac{100 \text{ mg}}{1 \text{ min}} \times \frac{150 \text{ mg}}{X} = X = 1.5 \text{ minutes}\)  
**NOTE:** you would need to consult with your teacher before administering this drug over this period of time since students are generally required to give an IV medication over a minimum of 2 minutes.  
**NOTE:** Because the drug monograph gives you only a **minimum** time for administering the med, it would be acceptable for you to decide to give it over a longer period (i.e. 2 minutes) (this is the time that will be used to calculate the answer to the next question) |
| 4c. | \(2 \text{ minutes} = 8 \text{ 15 second blocks of time} \quad \frac{3 \text{ mL}}{8 \text{ “blocks”}} = 0.38 \text{ mL/ 15 seconds}\) |
| 5a. | \(10 \text{ mg} \times \frac{1 \text{ mL}}{25 \text{ mg}} = 4 \text{ mL}\) |
| 5b. | \(\frac{2 \text{ mg}}{1 \text{ min}} \times \frac{10 \text{ mg}}{X} = X = 5 \text{ minutes}\) |
| 5c. | \(5 \text{ minutes} = 20 \text{ 15 second blocks of time} \quad \frac{4 \text{ mL}}{20 \text{ “blocks”}} = 0.2 \text{ mL/ 15 seconds}\) |
| 6a. | \(0.5 \text{ mg} \times \frac{1 \text{ mL}}{0.1 \text{ mg}} = 10 \text{ mL}\) |
| 6b. | **5 minutes**  
**NOTE:** There is no need to “show your work” because the drug monograph guidelines for time are very specific. |
| 6c. | \(5 \text{ minutes} = 20 \text{ 15 second blocks of time} \quad \frac{10 \text{ mL}}{20 \text{ “blocks”}} = 0.5 \text{ mL/ 15 seconds}\) |
7a. \[ \frac{4}{10} \text{ mg} \times 1 \text{ mL} = 0.4 \text{ mL} \]

NOTE: This is a case where you might want to further dilute the medication because it is such a minute volume and it would be difficult to divide it into 15 second “blocks”. I might decide to dilute it to 2 mL. (this is the amount that will be used to calculate the answer to question 7c)

7b. Any time period from 2 to 5 minutes is acceptable for this drug.

NOTE: There is no need to “show your work” because the drug monograph guidelines for time are very specific.

NOTE: The longer the period of time that you choose to give the med over, the smaller the amount of medication that you will be giving q15seconds. Sometimes these “small” amounts are so small that it is difficult to measure them accurately.

7c. If you chose to give the drug over 2 minutes, then:

\[ \frac{2 \text{ mL}}{8 \text{ “blocks”}} = 0.25 \text{ mL/ 15 seconds} \]

If you chose to give the drug over 3 minutes, then:

\[ \frac{2 \text{ mL}}{12 \text{ “blocks”}} = 0.17 \text{ mL/ 15 seconds} \]

If you chose to give the drug over 4 minutes, then:

\[ \frac{2 \text{ mL}}{16 \text{ “blocks”}} = 0.13 \text{ mL/ 15 seconds} \]

If you chose to give the drug over 5 minutes, then:

\[ \frac{2 \text{ mL}}{20 \text{ “blocks”}} = 0.1 \text{ mL/ 15 seconds} \]

NOTE: It would be difficult to measure these amounts exactly!