

Reading Question 6.1:

You should have followed the example in the book and printed a spreadsheet page that looks like the one illustrated in Figure 6.4.

Reading Question 6.2:

Entering the information into cells in the spreadsheet has at least two advantages:

- a) It makes it simple to change the input information and repeat the calculations.
- b) It provides more complete documentation which is also easier to follow.

Reading Question 6.3:

Use of the formula with the fixed cell addresses allowed the user to copy the formula directly (without modification) into additional cells.

Reading Question 6.4:

You should follow the steps and turn in a printout that looks like Figure 6.6.

Homework Problem 6.1:

- a. $(15.1 * \text{TAN}(0.71))^4.3$
- b. $\text{SQRT}((A9 + G27)/C21)$
- c. $(21.3 * \text{EXP}(D7))/F19 + 3.85$

Homework Problem 6.2:

Salary:

The salary increases by the amount of the designated interest. For example, in the spreadsheet shown below, the first year's salary in cell C10 is the value given in D2. But the second year's salary in C11 is calculated by applying the raise to the previous year, as in the following formula:

$$C11: =C10(1+D\$3)$$

The dollar sign is used with the D3 address so the contents of C11 can be filled down to C29 without incrementing the D3 address.

Retirement Account:

The first year of the retirement account is the amount saved from the first year's salary, so the contents of D10 is

$$D10: =C10*D5$$

The second year's retirement account is the amount saved from the second year's salary plus the amount of interest from the first year:

$$D11: =C11*D\$5+D10*(1+D\$4)$$

This is then filled down to D29.

	A	B	C	D	E	F	G	H	I	J
1	Retirement Calculation									
2			Start. Salary	\$75,000		Start. Salary	\$75,000		Start. Salary	\$75,000
3			Raises	5%		Raises	5%		Raises	10%
4			Interest	8%		Interest	8%		Interest	8%
5			Saved	6%		Saved	10%		Saved	6%
6										
7	Year		Salary	Retirement		Salary	Retirement		Salary	Retirement
8				account			account			account
9										
10	1		\$75,000	\$4,500		\$75,000	\$7,500		\$75,000	\$4,500
11	2		\$78,750	\$9,585		\$78,750	\$15,975		\$82,500	\$9,810
12	3		\$82,688	\$15,313		\$82,688	\$25,522		\$90,750	\$16,040
13	4		\$86,822	\$21,747		\$86,822	\$36,246		\$99,825	\$23,312
14	5		\$91,163	\$28,957		\$91,163	\$48,262		\$109,808	\$31,766
15	6		\$95,721	\$37,017		\$95,721	\$61,695		\$120,788	\$41,555
16	7		\$100,507	\$46,009		\$100,507	\$76,681		\$132,867	\$52,851
17	8		\$105,533	\$56,021		\$105,533	\$93,369		\$146,154	\$65,848
18	9		\$110,809	\$67,151		\$110,809	\$111,919		\$160,769	\$80,762
19	10		\$116,350	\$79,505		\$116,350	\$132,508		\$176,846	\$97,834
20	11		\$122,167	\$93,195		\$122,167	\$155,325		\$194,531	\$117,332
21	12		\$128,275	\$108,347		\$128,275	\$180,578		\$213,984	\$139,558
22	13		\$134,689	\$125,096		\$134,689	\$208,494		\$235,382	\$164,846
23	14		\$141,424	\$143,589		\$141,424	\$239,316		\$258,920	\$193,569
24	15		\$148,495	\$163,986		\$148,495	\$273,310		\$284,812	\$226,143
25	16		\$155,920	\$186,460		\$155,920	\$310,767		\$313,294	\$263,032
26	17		\$163,716	\$211,200		\$163,716	\$352,000		\$344,623	\$304,752
27	18		\$171,901	\$238,410		\$171,901	\$397,350		\$379,085	\$351,877
28	19		\$180,496	\$268,313		\$180,496	\$447,188		\$416,994	\$405,047
29	20		\$189,521	\$301,149		\$189,521	\$501,915		\$458,693	\$464,972

Homework Problem 6.3:

Solving the Ideal Gas Law for Volume gives

$$V = \frac{nRT}{P}$$

where the following are given

$$n = 1 \text{ gmol}$$

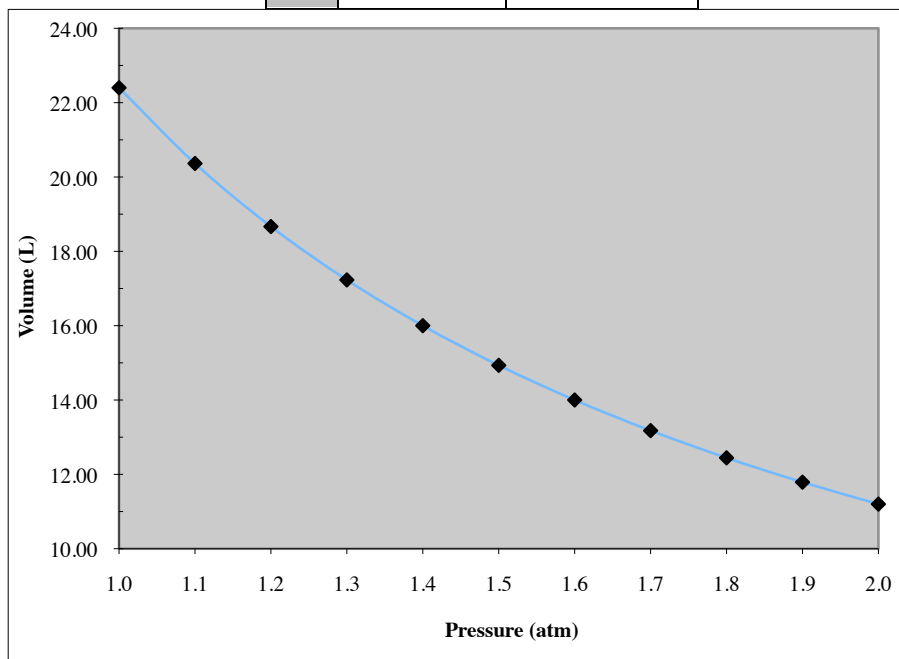
$$R = .08206 \text{ atm L/gmol K}$$

$$T = 273 \text{ K}$$

$$\text{So } V = \frac{(1 \text{ gmol}) \left(.08206 \frac{\text{atm L}}{\text{gmol K}} \right) (273 \text{ K})}{P} = \frac{22.4 \text{ atm L}}{P}$$

That calculation is illustrated below:

	A	B
1	Volume of an Ideal Gas	
2		
3	Pressure	V=22.4/P
4	(atm)	(L)
5		
6	1.0	22.40
7	1.1	20.36
8	1.2	18.67
9	1.3	17.23
10	1.4	16.00
11	1.5	14.93
12	1.6	14.00
13	1.7	13.18
14	1.8	12.44
15	1.9	11.79
16	2.0	11.20



Homework Problem 6.4:

Length: Since the Drilled Volume = $\pi R^2 L = \pi (D/2)^2 L = 85 \text{ cm}^3$, then $L = 4V/\pi D^2$

Volume Before Drilling: Add the wall thickness (0.4 cm) to the drilled length and add twice the wall thickness to the drilled diameter to determine the outside dimensions of the total piece. The volume of that piece is Volume = $\pi R^2 L = \pi (D/2)^2 L$

Material Cost: The cost of \$.025/cm³ is multiplied times the volume of the piece.

Drilling Cost: Applying the given drilling costs, that cost is calculated by setting up the spreadsheet as shown, and the formula for cell E5 is

$$E5: =IF(B5<3,I\$6*B5+I\$7*A5,I\$9*B5+I\$10*A5)$$

Total Cost: This is the Material Cost plus the Drilling Cost

	A	B	C	D	E	F	G	H	I
1	Drilled Cylinders								
2	D (cm)	L (cm)	Vol.bef.drill	Material	Drilling	Total		dr.vol.(cm3)	85
3			(cm^3)	cost (\$)	cost (\$)	cost (\$)		thcknss (cm)	0.4
4								\$/cm3	0.025
5	2.0	27.056	169.063	\$4.227	\$4.197	\$8.424			
6	2.1	24.541	164.740	\$4.118	\$3.904	\$8.023		D<3, \$/L	0.13
7	2.2	22.361	160.885	\$4.022	\$3.655	\$7.677		D<3, \$/D	0.34
8	2.3	20.458	157.433	\$3.936	\$3.442	\$7.377			
9	2.4	18.789	154.328	\$3.858	\$3.259	\$7.117		D≥3, \$/L	0.13
10	2.5	17.316	151.525	\$3.788	\$3.101	\$6.889		D≥3, \$/D	0.41
11	2.6	16.010	148.987	\$3.725	\$2.965	\$6.690			
12	2.7	14.846	146.681	\$3.667	\$2.848	\$6.515			
13	2.8	13.804	144.582	\$3.615	\$2.747	\$6.361			
14	2.9	12.869	142.666	\$3.567	\$2.659	\$6.226			
15	3.0	12.025	140.914	\$3.523	\$2.793	\$6.316			
16	3.1	11.262	139.310	\$3.483	\$2.735	\$6.218			
17	3.2	10.569	137.839	\$3.446	\$2.686	\$6.132			
18	3.3	9.938	136.489	\$3.412	\$2.645	\$6.057			
19	3.4	9.362	135.248	\$3.381	\$2.611	\$5.992			
20	3.5	8.835	134.107	\$3.353	\$2.584	\$5.936			
21	3.6	8.351	133.057	\$3.326	\$2.562	\$5.888			
22	3.7	7.905	132.092	\$3.302	\$2.545	\$5.847			
23	3.8	7.495	131.204	\$3.280	\$2.532	\$5.812			
24	3.9	7.115	130.388	\$3.260	\$2.524	\$5.784			
25	4.0	6.764	129.638	\$3.241	\$2.519	\$5.760			
26	4.1	6.438	128.950	\$3.224	\$2.518	\$5.742			
27	4.2	6.135	128.319	\$3.208	\$2.520	\$5.728			
28	4.3	5.853	127.741	\$3.194	\$2.524	\$5.717			
29	4.4	5.590	127.214	\$3.180	\$2.531	\$5.711			
30	4.5	5.344	126.733	\$3.168	\$2.540	\$5.708			
31	4.6	5.115	126.297	\$3.157	\$2.551	\$5.708			
32	4.7	4.899	125.902	\$3.148	\$2.564	\$5.711			
33	4.8	4.697	125.546	\$3.139	\$2.579	\$5.717			
34	4.9	4.508	125.228	\$3.131	\$2.595	\$5.726			
35	5.0	4.329	124.944	\$3.124	\$2.613	\$5.736			

Homework Problem 6.4 (continued):

