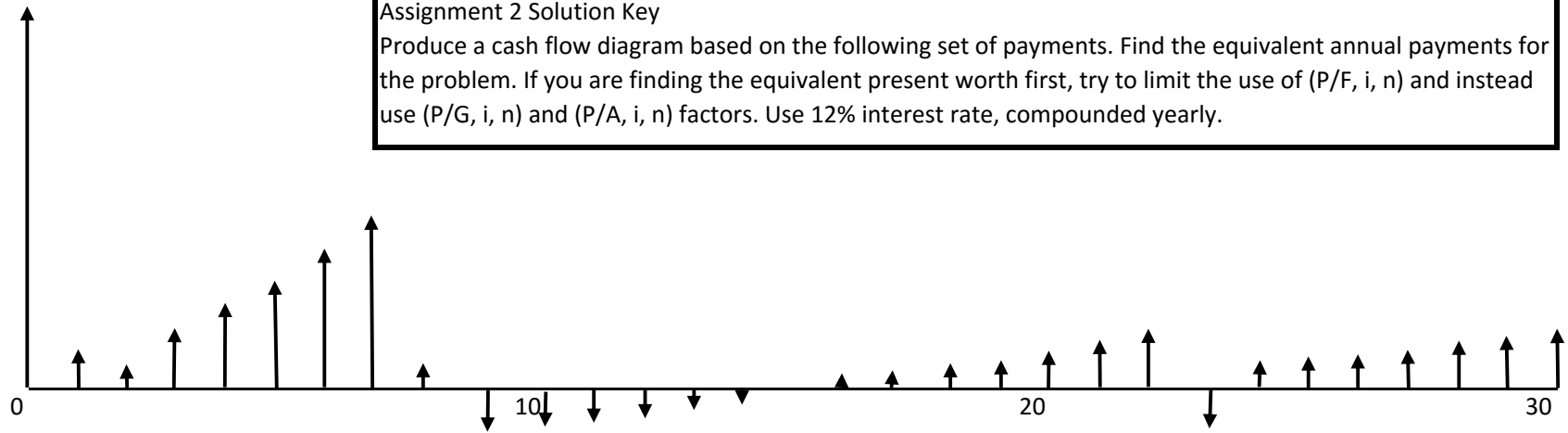


IEGR 350: Engineering Economy
 Fall 2015
 M. Salimian
 Assignment 2 Solution Key
 Produce a cash flow diagram based on the following set of payments. Find the equivalent annual payments for the problem. If you are finding the equivalent present worth first, try to limit the use of (P/F, i, n) and instead use (P/G, i, n) and (P/A, i, n) factors. Use 12% interest rate, compounded yearly.



0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
 6540 280 100 370 425 480 535 590 85 -120 -100 -80 -60 -40 -20 0 21 42 63 84 105 126 147 -102 79 90 101 112 123 134 145

Using NPV function of EXCEL the exact present worth of the cash flow is \$8,211.39.
 Using the factor of (A/P, 12%, 30) we can find the equivalent annual payment of this cash flow.

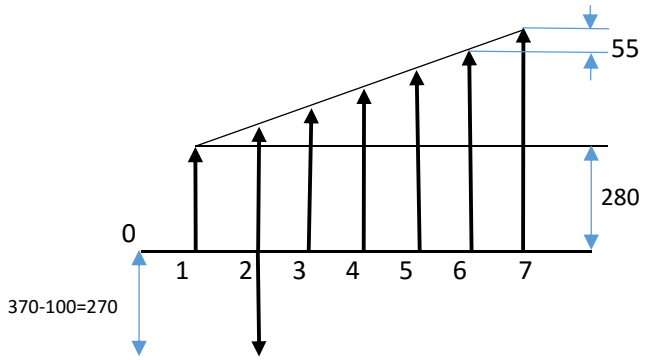
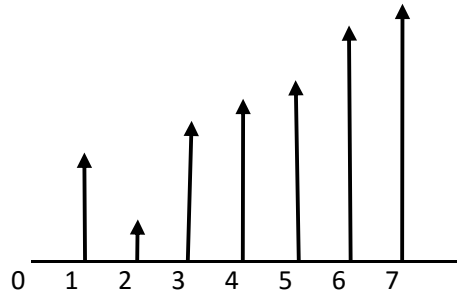
Year	0									
Paym	6540									
Year	1	2	3	4	5	6	7	8	9	10
Paym	280	100	370	425	480	535	590	85	-120	-100
Year	11	12	13	14	15	16	17	18	19	20
Paym	-80	-60	-40	-20	0	21	42	63	84	105
Year	21	22	23	24	25	26	27	28	29	30
Paym	126	147	-102	79	90	101	112	123	134	145

0.12
 \$8,211.39

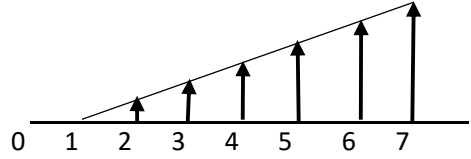
YR	Payment (\$)	(P/F,i,n)	Present W (100\$)
0	6540	1.0000	6540.00
1	280	0.8929	250.00
2	100	0.7972	79.72
3	370	0.7118	263.36
4	425	0.6355	270.10
5	480	0.5674	272.36
6	535	0.5066	271.05
7	590	0.4523	266.89
8	85	0.4039	34.33
9	-120	0.3606	-43.27
10	-100	0.3220	-32.20
11	-80	0.2875	-23.00
12	-60	0.2567	-15.40
13	-40	0.2292	-9.17
14	-20	0.2046	-4.09
15	0	0.1827	0.00
16	21	0.1631	3.43
17	42	0.1456	6.12
18	63	0.1300	8.19
19	84	0.1161	9.75
20	105	0.1037	10.89
21	126	0.0926	11.66
22	147	0.0826	12.15
23	-102	0.0738	-7.53
24	79	0.0659	5.20
25	90	0.0588	5.29
26	101	0.0525	5.30
27	112	0.0469	5.25
28	123	0.0419	5.15
29	134	0.0374	5.01
30	145	0.0334	4.84

8211.39

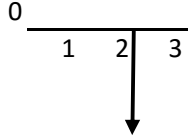
Arithmetic series with
G=55 but year 2 value
does not match.



+



+



PW1 = 280 (P/A, 12%, 7)
PW1 = 280 (4.5638) = 1277.86

+

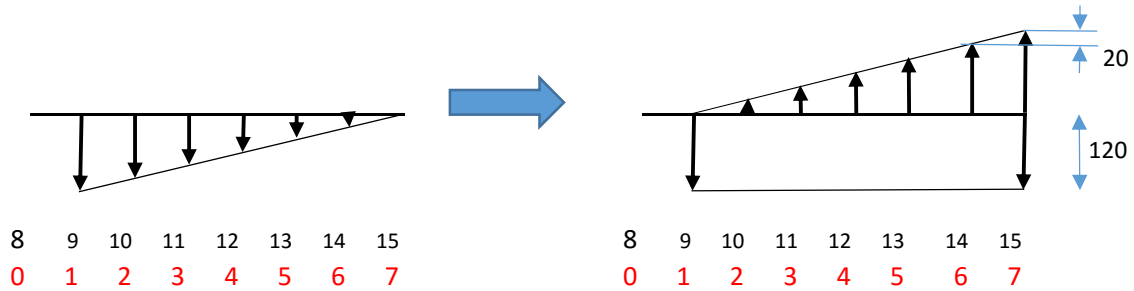
PW2 = 55 (P/G, 12%, 7)
PW2 = 55 (11.644) = 640.42

+

PW3 = -270 (P/F, 12%, 2)
PW3 = -270 (0.7972) = -215.24

=

1704.39
(at year 0)



$$PW4 = -120 (P/A, 12\%, 7)$$

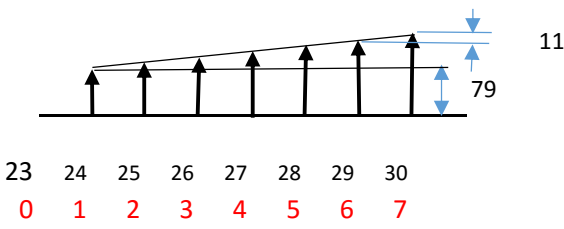
$$PW4 = -120 (4.5638) = -547.66$$

$$PW5 = 20 (P/G, 12\%, 7)$$

$$PW5 = 20 (11.644) = 232.88$$

$$= -314.78$$

(at year 8)



$$PW6 = 79 (P/A, 12\%, 7)$$

$$PW6 = 79 (4.5638) = 360.54$$

$$PW7 = 11 (P/G, 12\%, 7)$$

$$PW7 = 11 (11.644) = 128.08$$

$$= 488.62$$

(at year 23)

$PW = 6540 + 1704.39 + (85 - 314.78) (P/F, 12\%, 8) + (488.62 - 102) (P/F, 12\%, 23)$
 $PW = 8244.39 - 229.78 (0.4039) + 386.62 (0.0738) = 8180.11$
 $A = 8180.11 (A/p, 12\%, 30) = 8180.11 (0.1241) = 1015.14$
 Note that the small difference between Calculated PW value of 8180.11 and the EXCEL calculated value of 8211.39 is due to the use of full decimals in EXCEL.