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HW9

Problem 1:

1.1:

(a)

```
data coordinates;
input x y z;
datalines;
1 3 15
7 13 7
8 12 5
3 4 14
4 7 10
;
proc corr data=coordinates;
title 'Coordinate Correlation';
var x y z;
run;
```

Pearson Correlation Coefficients, N = 5 Prob > r under H0: Rho=0			
	x	y	z
x	1.00000	0.96509 0.0078	-0.97525 0.0047
y	0.96509 0.0078	1.00000	-0.96317 0.0084
z	-0.97525 0.0047	-0.96317 0.0084	1.00000

The probability of x against y, y against z, and x against z are all below .05, therefore we can reject the null hypothesis that the variables are related by chance.

(b)

```
data coordinates;
input x y z;
datalines;
1 3 15
7 13 7
8 12 5
3 4 14
4 7 10
;
proc corr data=coordinates;
title 'Coordinate Correlation';
var x y;
```

```
partial z;
run;
```

Pearson Partial Correlation Coefficients, N = 5 Prob > r under H0: Partial Rho=0		
	x	y
x	1.00000	0.43318 0.5668
y	0.43318 0.5668	1.00000

The probability of x against y, when the effect of z has been removed, is above .05, so we cannot reject the null hypothesis that the variables are related by chance.

1.2:

(a)

```
data coordinates;
input x y z;
datalines;
1 3 15
7 13 7
8 12 5
3 4 14
4 7 10
;
proc reg data=coordinates;
title 'Coordinate regression';
model y=x;
run;
```

(b)

Slope = 1.52410

Intercept = .78916

(c)

For the intercept, $p = .5753 > .05$, so we cannot reject the null hypothesis that the intercept is approximately 0.

For the slope, $p = .0078 < .05$, so we can reject the null hypothesis and state, with 95% confidence, that the slope is significantly different than 0.

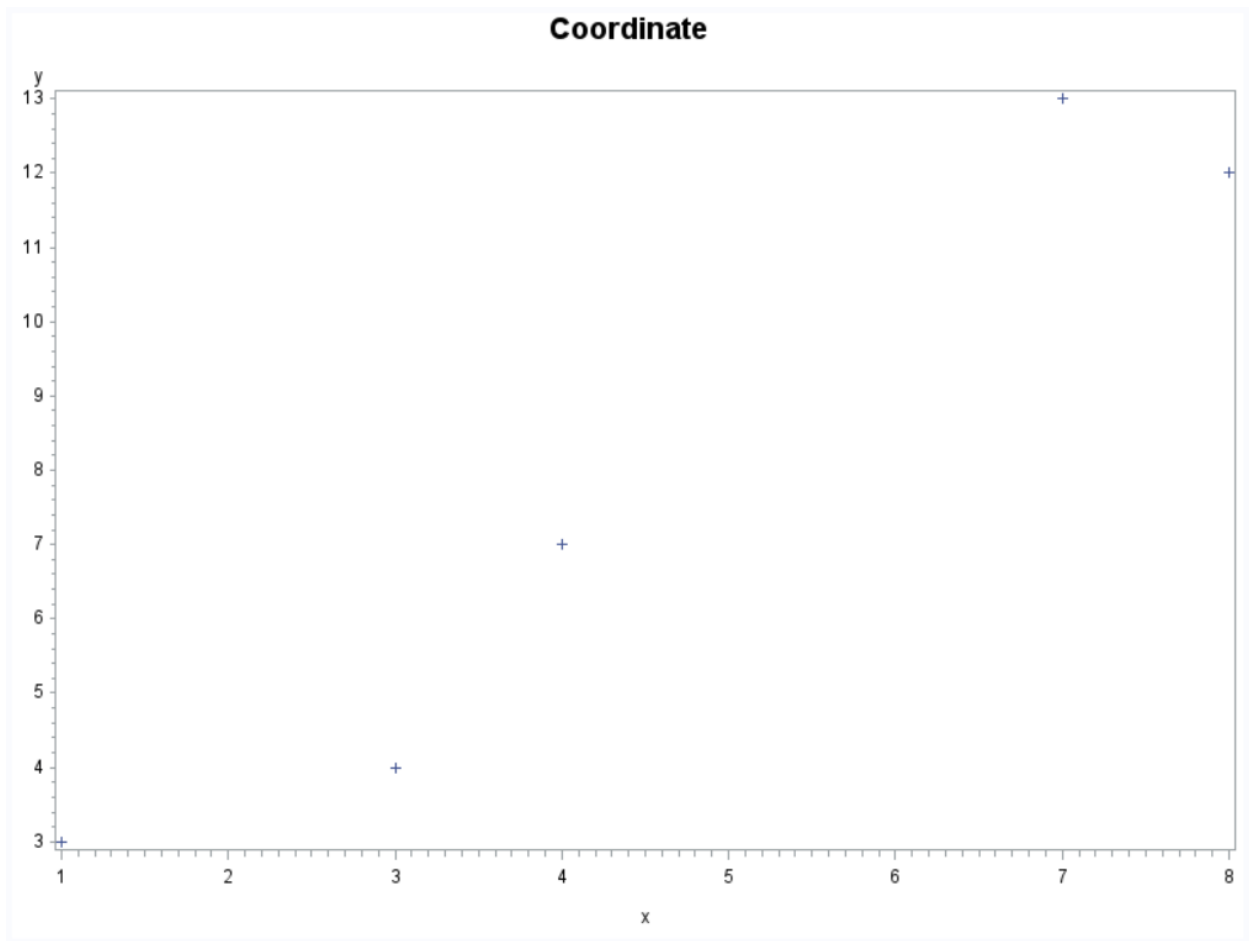
(d)

```
data coordinates;
input x y z;
datalines;
1 3 15
7 13 7
8 12 5
```

```

3 4 14
4 7 10
;
proc gplot data=coordinates;
title 'Coordinate';
plot y*x;
run;

```

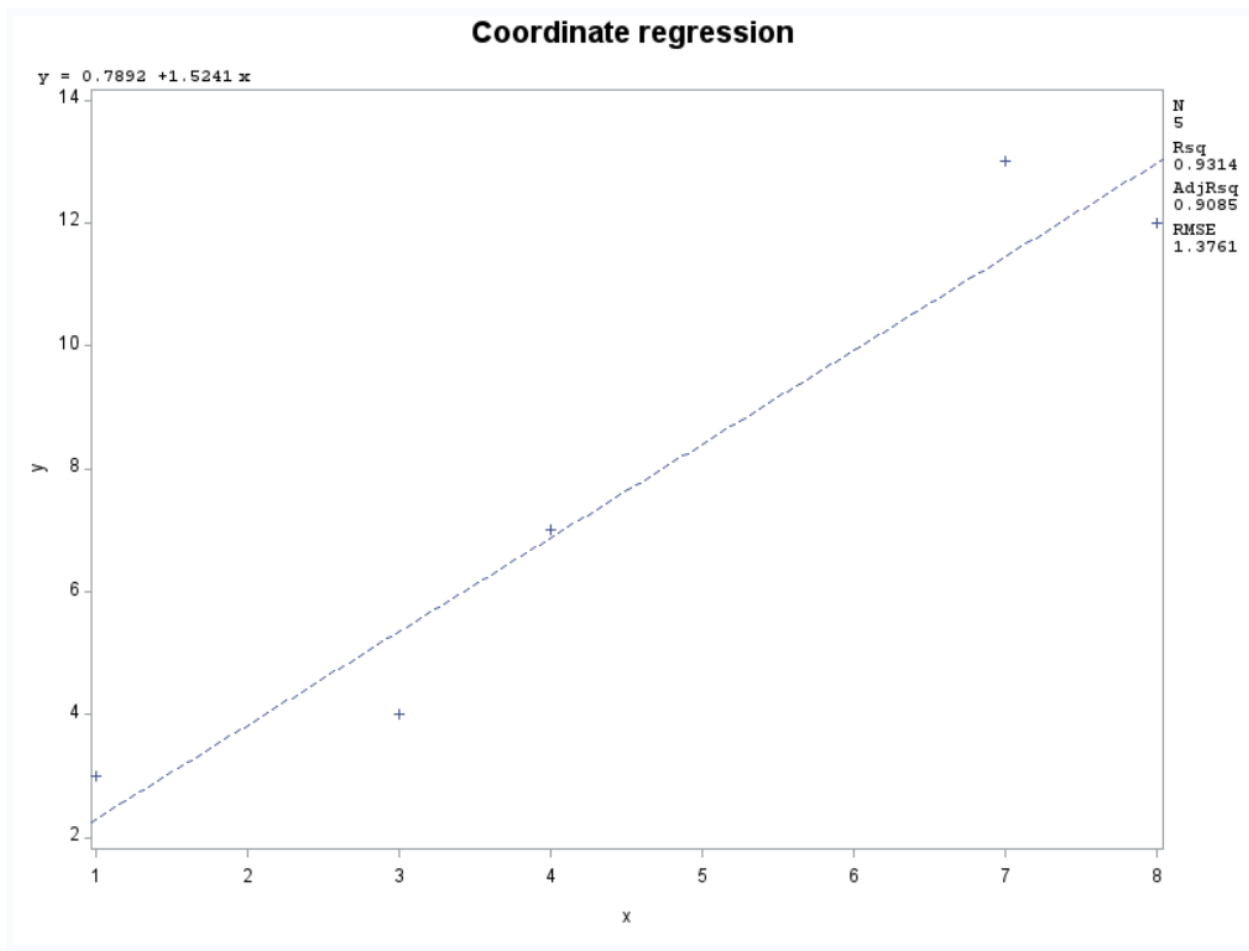


(e)

```

data coordinates;
input x y z;
datalines;
1 3 15
7 13 7
8 12 5
3 4 14
4 7 10
;
proc reg data=coordinates;
title 'Coordinate regression';
model y=x;
plot y*x;
run;

```



1.3:

```
data coordinates;
input x y z;
logx = LOG(x);
logy = LOG(y);
logz = LOG(z);
datalines;
1 3 15
7 13 7
8 12 5
3 4 14
4 7 10
;
proc corr data=coordinates;
title 'Coordinate Correlation';
var logx logy logz;
run;
```

Coordinate Correlation

The CORR Procedure

3 Variables: logx logy logz

Simple Statistics						
Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
logx	5	1.30205	0.83107	6.51026	0	2.07944
logy	5	1.89613	0.65047	9.48067	1.09861	2.56495
logz	5	2.24101	0.46538	11.20504	1.60944	2.70805

Pearson Correlation Coefficients, N = 5 Prob > r under H0: Rho=0			
	logx	logy	logz
logx	1.00000	0.94096 0.0171	-0.88224 0.0476
logy	0.94096 0.0171	1.00000	-0.94277 0.0163
logz	-0.88224 0.0476	-0.94277 0.0163	1.00000

2.

(1)

```
data stocks;
input Date $      Pfizer      Intel Citigroup  AmerExp      Exxon GenMotor;
datalines;
1-Aug-00      -0.001438612      0.049981263 0.044275101 0.017410003 0.010224894
0.093294017
1-Sep-00      0.017489274 -0.255619266      -0.033536503      0.012656982
0.03798902 -0.032209239
2-Oct-00      -0.017046116      0.034546736 -0.011645582      -0.004897625
0.000330555 -0.019602167
1-Nov-00      0.012012934 -0.072550667      -0.022674793      -0.03827587 -
0.00365002 -0.0948916
1-Dec-00      0.016278701 -0.102497868      0.010708311 0      -0.005252049
0.012461253
2-Jan-01      -0.008063083      0.090223122 0.03990062 -0.066129678 -
0.014169243 0.022971579
1-Feb-01      -0.00042298 -0.11219423 -0.055096146      -0.030733152 -
0.014046895 0.000824088
```

1-Mar-01	-0.040906294	-0.035702138	-0.038726816	-
0.026380545	-0.000240008	-0.012105099		
2-Apr-01	0.024190228	0.069994483	0.038511978	0.011868735 0.038897488
	0.024082196			
1-May-01	-0.002978787	-0.05826061	0.019333184	-0.002446047
	0.002844256	0.020148775		
1-Jun-01	-0.029781389	0.03463487	0.013258067	-0.03564197 -
0.006813464	0.053440295			
2-Jul-01	0.012504432	0.008168789	-0.022187219	0.017739418 -
0.019481402	-0.005100405			
1-Aug-01	-0.0306632	-0.027529477	-0.038475736	-0.044368019
	-0.01460743	-0.061635162		
4-Sep-01	0.01981548	-0.135934121	-0.053479798	-0.098043942
	-0.008224146	-0.105946472		
1-Oct-01	0.019063731	0.077211653	0.050835509	0.006689711 0.00061005 -
0.016274333				
1-Nov-01	0.015543895	0.126580684	0.02356606	0.048543672 -0.020726234
	0.08521096			
3-Dec-01	-0.036145791	-0.016421934	0.022871285	0.035242521
	0.021578866	-0.009657415		
2-Jan-02	0.019356687	0.046876533	-0.025940517	0.002871379 -
0.002807817	0.022139216			
1-Feb-02	-0.006050198	-0.088680731	-0.020151007	0.007237226
	0.026948074	0.01967222		
1-Mar-02	-0.013187975	0.027384065	0.039197815	0.050683167 0.025807264
	0.057331233			
1-Apr-02	-0.038640426	-0.026448085	-0.058277811	0.00137534
	-0.037828005	0.025768635		
1-May-02	-0.020012226	-0.014900615	0.000481346	0.015691714 -
0.000118352	-0.010495544			
3-Jun-02	0.00498962	-0.179572434	-0.046948457	-0.068454444
	0.010640133	-0.065487824		
1-Jul-02	-0.034159152	0.01226155	-0.062746165	-0.01186007 -
0.0465282	-0.060041503			
1-Aug-02	0.011452067	-0.051537916	0.022330581	0.009740522 -
0.013050696	0.016998701			
3-Sep-02	-0.056822917	-0.079127863	-0.043102044	-
0.063162423	-0.045786933	-0.090010126		
1-Oct-02	0.039382501	0.09536996	0.097624046	0.067951966 0.023357105 -
0.068058029				
1-Nov-02	-0.001620779	0.082000518	0.022127194	0.029514688 0.017231827
	0.083238291			
2-Dec-02	-0.013493147	-0.127500953	-0.043258124	-
0.040869439	0.001739589	-0.032155007		
2-Jan-03	-0.000914625	0.002562217	-0.008110182	0.002151752 -
0.009860009	-0.006417575			
3-Feb-03	-0.007697729	0.042681011	-0.012956568	-0.024428147
	0.001227785	-0.025617995		
3-Mar-03	0.01899439	-0.025156666	0.014203546	-0.004565156
	0.011692992	-0.001942487		
1-Apr-03	-0.005686915	0.053056729	0.056727624	0.057647618 0.003171011
	0.030362391			
1-May-03	0.005686915	0.054144721	0.021322255	0.041490099 0.01767084 -
0.00280191				
2-Jun-03	0.041784483	-0.000213046	0.018444872	0.001579917 -
0.005981586	0.008214181			

1-Jul-03	-0.010109859	0.077829522	0.023189447	0.024870758	-
0.003990877	0.016906014				
1-Aug-03	-0.045266311	0.06043443	-0.01419843	0.008620388	0.028166116
	0.046380496				
2-Sep-03	0.006546894	-0.016587184	0.021075597	0.000112293	-0.01291723
	-0.001791893				
1-Oct-03	0.017184425	0.078321576	0.020888904	0.018572284	-0.00024981
	0.018169063				
3-Nov-03	0.028255616	0.007861351	-0.003462108	-0.01144524	-
0.001501884	0.006155458				
1-Dec-03	0.022153888	-0.019719492	0.013782077	0.024270976	0.054151115
	0.096343714				
2-Jan-04	0.015748075	-0.021237664	0.011862818	0.03132587	-0.00221919
	-0.031390331				
2-Feb-04	0.002115176	-0.018679024	0.006780909	0.01301928	0.01712318
	-0.009458693				
1-Mar-04	-0.01928823	-0.030753805	0.012267738	-0.012145545	-
0.006030469	-0.007941261				
1-Apr-04	0.008607804	-0.024068646	-0.027843588	-0.024949111	
	0.009863444	0.001620126			
3-May-04	-0.003063819	0.045791862	-0.015263851	0.015239967	
	0.00995531	-0.014176433			
1-Jun-04	-0.013135825	-0.01478726	0.000692103	0.006594513	0.011450989
	0.011337234				
1-Jul-04	-0.030491723	-0.053760665	-0.019188415	-	
0.009580051	0.018083807	-0.03339934			
2-Aug-04	0.011876253	-0.058250748	0.023904782	-0.002001822	
	0.000773627	-0.013614662			
1-Sep-04	-0.02833205	-0.02581149	-0.023595125	0.012265109	0.020475586
	0.012073829				
1-Oct-04	-0.024200939	0.045251691	0.006452318	0.01438828	0.007945468
	-0.042109935				
1-Nov-04	-0.015356644	0.003157084	0.003644451	0.021085951	0.019898881
	0.006031965				
1-Dec-04	-0.01408469	0.019040089	0.032148678	0.005093112	8.64354E-05
	0.016341604				
3-Jan-05	-0.046516472	-0.017862074	0.00770161	-0.022982941	
	0.002842759	-0.036824626			
1-Feb-05	0.039975516	0.030472706	-0.008076244	0.006507102	0.090927282
	-0.00798521				
1-Mar-05	-0.000338104	-0.013929818	-0.02606549	-0.02185412	-
0.026194026	-0.083992068				
1-Apr-05	0.014633051	0.00525287	0.023245386	0.011111802	-0.019130346
	-0.042013994				
2-May-05	0.014630589	0.060803225	0.001318328	0.009356124	-0.004194614
	0.079608491				
1-Jun-05	-0.005088825	-0.015344193	-0.008162243	-	
0.004091884	0.009725145	0.03275369			
1-Jul-05	-0.017295755	0.018252426	-0.022110024	0.014246467	
	0.009586797	0.034619924			
1-Aug-05	-0.014040733	-0.02213234	0.002713407	0.001894712	0.010547196
	-0.02599387				
1-Sep-05	-0.008682706	-0.01834345	0.016994806	0.016950229	0.025608232
	-0.047977476				
3-Oct-05	-0.060303366	-0.020818266	0.002497608	-0.003389887	
	-0.053831314	-0.048092196			

```
1-Nov-05      0.002411637 0.058709923 0.03829912  0.024183203 0.031923551 -  
0.070676054
```

```
;  
proc reg data=stocks;  
title 'stock regression';  
model Pfizer=Exxon;  
run;
```

Intercept: -.0053

Slope: .35465

(2)

```
proc corr data=stocks;  
title 'stocks Correlation';  
var Pfizer Exxon;  
run;
```

Correlation: .35210

The probability of this correlation being due to chance is .0043, so we can reject the null hypothesis and conclude the correlation is significantly different than 0 with over 95% confidence.

3.

(a)

```
data Prob3;  
input AGE SBP;  
datalines;  
15 116  
20 120  
25 130  
30 132  
40 150  
50 148  
;  
proc corr data=prob3;  
title 'Correlation';  
var AGE SBP;  
run;
```

Correlation is .95258

(b)

```
data Prob3;  
input AGE SBP;  
datalines;  
15 116  
20 120  
25 130  
30 132  
40 150  
50 148  
;  
proc reg data=Prob3;  
title 'Regression';
```



```
model sbp=age;  
plot sbp*age;  
run;
```

