

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.836704315
R Square	0.700074111
Adjusted R Square	0.670081522
Standard Error	2.564970628
Observations	12

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	153.5659234	153.5659234	23.34156994	0.000690421
Residual	10	65.79074322	6.579074322		
Total	11	219.3566667			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>
Intercept	-11.88455847	13.28162904	-0.894811806	0.391916237	-41.47787216
x	3.740826691	0.77428805	4.83131141	0.000690421	2.015605404

RESIDUAL OUTPUT

<i>Observation</i>	<i>Predicted y</i>	<i>Residuals</i>	y
1	49.0909166	-4.690916602	44.4
2	50.96132995	-2.561329948	48.4
3	57.32073532	-3.120735323	54.2
4	49.5398158	0.460184195	50
5	55.07623931	-0.176239308	54.9
6	53.20582596	0.694174038	53.9
7	46.84642059	0.153579413	47
8	48.71683393	3.683166067	52.4
9	51.70949529	1.290504714	53
10	50.58724728	2.312752722	52.9
11	53.57990863	-0.479908631	53.1
12	59.56523134	2.434768663	62

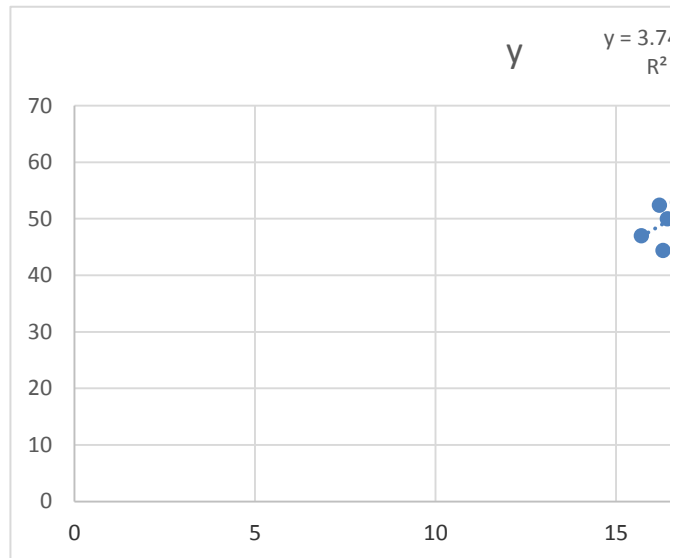
9.4739E-15

<i>Upper 95%</i>	<i>Lower 95,0%</i>	<i>Upper 95,0%</i>
17.70875522	-41.47787216	17.70875522
5.466047978	2.015605404	5.466047978

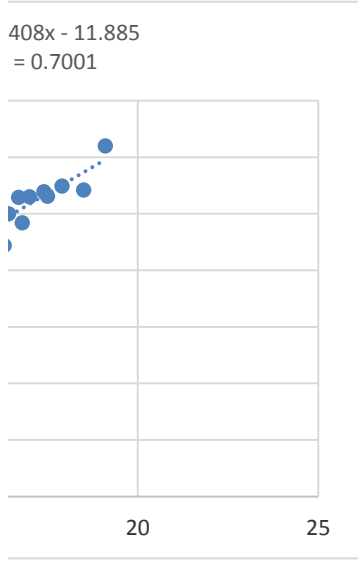
754.9849132

1. In the table, there is an information about the production (y) and about investments in 10 000Kč (x) in 12 years. in a firm.
 - a) Find a linear regression function modelling dependence of a production in the amount of inv
 - b) By using of the coefficient of determinarion R^2 evaluate an accuracy of the regression func
 - c) Calculate residuals of the model
 - d) At a level of significance test a statistical significance of regression coefficients
 - e) Write down an 95% confidence interval for regression coefficient b_1 ?
 - f) What is an expected production in the case of an investment of 2 050 000 Kč?

Year	x	y
1	16.3	44.4
2	16.8	48.4
3	18.5	54.2
4	16.42	50
5	17.9	54.9
6	17.4	53.9
7	15.7	47
8	16.2	52.4
9	17	53
10	16.7	52.9
11	17.5	53.1
12	19.1	62



estment.
tion.

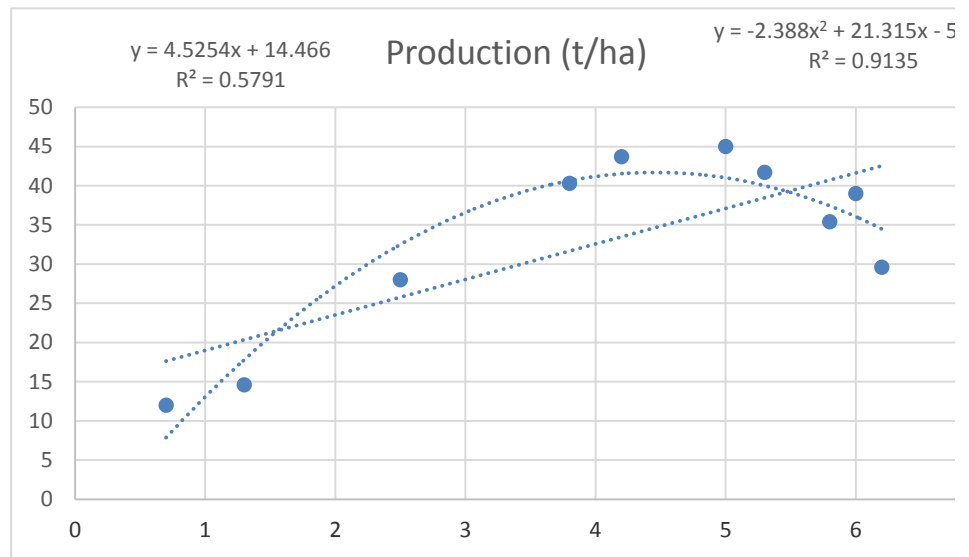


Year	x	y
1	16.3	44.4
2	16.8	48.4
3	18.5	54.2
4	16.42	50
5	17.9	54.9
6	17.4	53.9
7	15.7	47
8	16.2	52.4
9	17	53
10	16.7	52.9
11	17.5	53.1
12	19.1	62
13	205	

In the table there are results of experiments of a new fertilizer on the production of tomatoes.

- Choose an appropriate type of a regression model describing dependence of production on an amount of fertilizer. Is it appropriate to use a linear function, or a quadratic function?
- Determine an equation of a regression function
- By using of the coefficient of determination R^2 evaluate an accuracy of the regression function.
- Find an optimal level of fertilizer

Fertilizer (100 kg/ha)	0.7	1.3	3.8	4.2	2.5	5	5.3	6	5.8	6.2
Production (t/ha)	12	14.6	40.3	43.7	28	45	41.7	39	35.4	29.6



of fertilizer

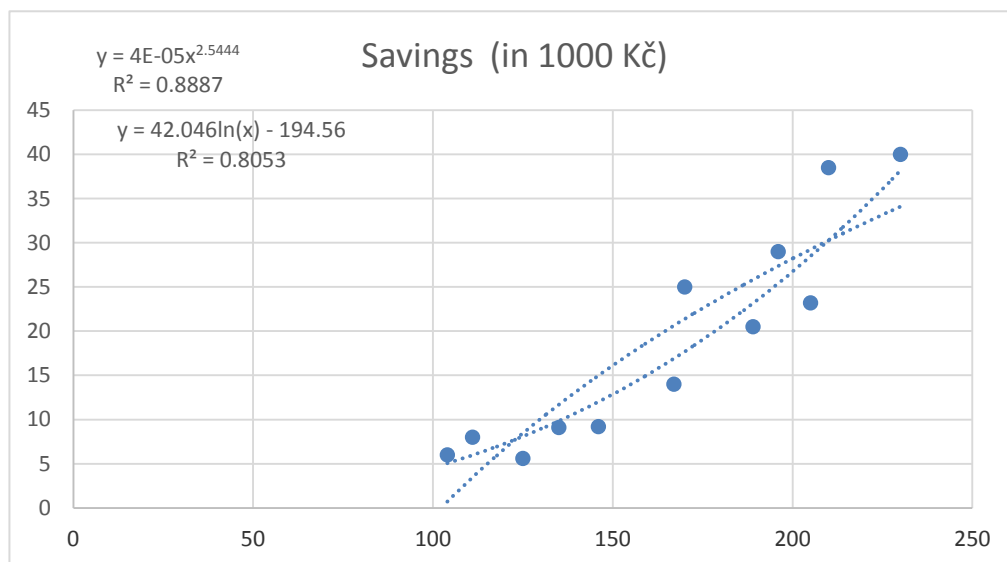
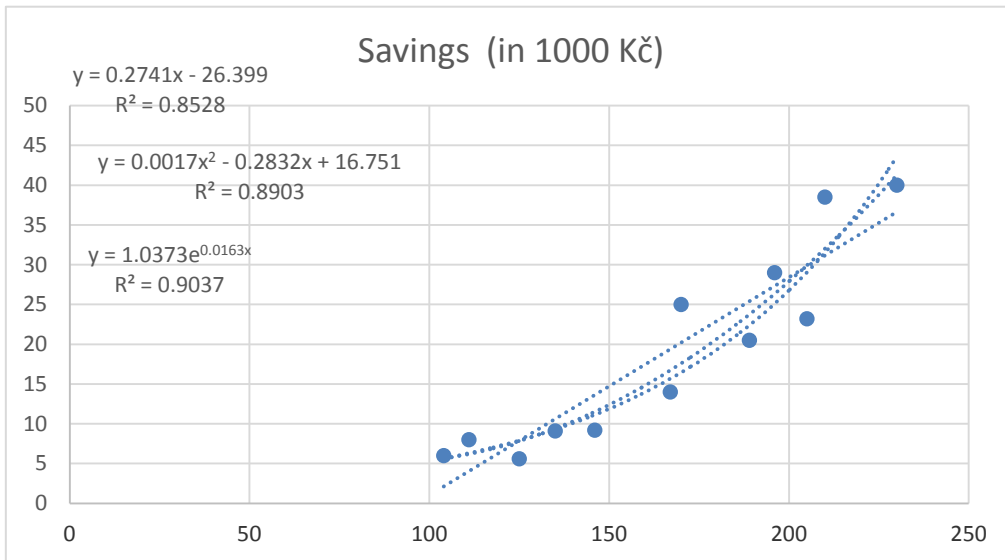


4.46294

x	y
-2	-5
-1	-3
0	0
1	1
2	4

- a) Estimate linear regression model
- a) Estimate quadratic regression model
- c) Estimate exponential regression model
- d) Estimate powered regression model
- e) Estimate logarithmic regression model
- f) which of models a)-e) describes the situation most precisely and why?

Income (in 1000 Kč)	Savings (in 1000 Kč)
104	6
125	5.6
146	9.2
167	14
111	8
135	9.1
189	20.5
196	29
205	23.2
210	38.5
170	25
230	40



Tabulka zachycuje čtvrtletnou míru nezaměstnanosti v německu v letech 1969-2014.

Zdroj: <https://research.stlouisfed.org>

a) Načrtněte graf této časové řady.

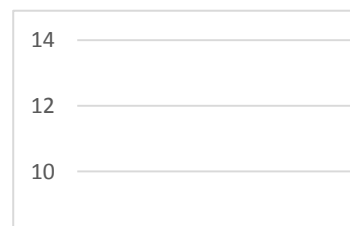
b) Tuto časovou řadu vyrovnejte pomocí klouzavých průměrů.

c) Vyrovnanou časovou řadu načrtněte, porovnejte graf s výsledkem úlohy a).

DATE	Pořadí	VALUE
1969-01-01	1	1.23
1969-04-01	2	0.50
1969-07-01	3	0.40
1969-10-01	4	0.53
1970-01-01	5	0.97
1970-04-01	6	0.43
1970-07-01	7	0.40
1970-10-01	8	0.53
1971-01-01	9	0.97
1971-04-01	10	0.53
1971-07-01	11	0.57
1971-10-01	12	0.80
1972-01-01	13	1.27
1972-04-01	14	0.80
1972-07-01	15	0.73
1972-10-01	16	0.93
1973-01-01	17	1.23
1973-04-01	18	0.83
1973-07-01	19	0.80
1973-10-01	20	1.33
1974-01-01	21	2.23
1974-04-01	22	1.77
1974-07-01	23	1.97
1974-10-01	24	3.00
1975-01-01	25	4.30
1975-04-01	26	3.87
1975-07-01	27	3.80
1975-10-01	28	4.27
1976-01-01	29	4.90
1976-04-01	30	3.73
1976-07-01	31	3.50
1976-10-01	32	3.80
1977-01-01	33	4.47
1977-04-01	34	3.70
1977-07-01	35	3.63
1977-10-01	36	3.87
1978-01-01	37	4.50
1978-04-01	38	3.57
1978-07-01	39	3.43
1978-10-01	40	3.57
1979-01-01	41	4.13
1979-04-01	42	3.03
1979-07-01	43	2.93
1979-10-01	44	3.07
1980-01-01	45	3.67
1980-04-01	46	2.97
1980-07-01	47	3.20
1980-10-01	48	3.70

1981-01-01	49	4.80	3.98333333
1981-04-01	50	4.23	4.36666667
1981-07-01	51	4.73	4.86666667
1981-10-01	52	5.70	5.41666667
1982-01-01	53	7.00	5.89166667
1982-04-01	54	6.13	6.33333333
1982-07-01	55	6.50	6.78333333
1982-10-01	56	7.50	7.275
1983-01-01	57	8.97	7.71666667
1983-04-01	58	7.90	8.04166667
1983-07-01	59	7.80	8.15833333
1983-10-01	60	7.97	8.15
1984-01-01	61	8.93	8.11666667
1984-04-01	62	7.77	8.125
1984-07-01	63	7.83	8.11666667
1984-10-01	64	7.93	8.16666667
1985-01-01	65	9.13	8.2
1985-04-01	66	7.90	8.19166667
1985-07-01	67	7.80	8.18333333
1985-10-01	68	7.90	8.15833333
1986-01-01	69	9.03	8.08333333
1986-04-01	70	7.60	8
1986-07-01	71	7.47	7.89166667
1986-10-01	72	7.47	7.81666667
1987-01-01	73	8.73	7.8
1987-04-01	74	7.53	7.84166667
1987-07-01	75	7.63	7.9
1987-10-01	76	7.70	7.89166667
1988-01-01	77	8.70	7.90833333
1988-04-01	78	7.60	7.88333333
1988-07-01	79	7.53	7.79166667
1988-10-01	80	7.33	7.58333333
1989-01-01	81	7.87	7.4
1989-04-01	82	6.87	7.20833333
1989-07-01	83	6.77	7.09166667
1989-10-01	84	6.87	6.94166667
1990-01-01	85	7.27	6.80833333
1990-04-01	86	6.33	6.65833333
1990-07-01	87	6.17	6.41666667
1990-10-01	88	5.90	6.13333333
1991-01-01	89	6.13	5.9
1991-04-01	90	5.40	5.75
1991-07-01	91	5.57	5.86666667
1991-10-01	92	6.37	6.35
1992-01-01	93	8.07	6.85833333
1992-04-01	94	7.43	7.38333333
1992-07-01	95	7.67	7.74166667
1992-10-01	96	7.80	7.95
1993-01-01	97	8.90	8.21666667
1993-04-01	98	8.50	8.55833333
1993-07-01	99	9.03	8.93333333
1993-10-01	100	9.30	9.3
1994-01-01	101	10.37	9.56666667
1994-04-01	102	9.57	9.65
1994-07-01	103	9.37	9.575
1994-10-01	104	9.00	9.45

1995-01-01	105	9.87	9.34166667
1995-04-01	106	9.13	9.325
1995-07-01	107	9.30	9.44166667
1995-10-01	108	9.47	9.7
1996-01-01	109	10.90	9.94166667
1996-04-01	110	10.10	10.15833333
1996-07-01	111	10.17	10.39166667
1996-10-01	112	10.40	10.675
1997-01-01	113	12.03	10.93333333
1997-04-01	114	11.13	11.225
1997-07-01	115	11.33	11.48333333
1997-10-01	116	11.43	11.58333333
1998-01-01	117	12.43	11.53333333
1998-04-01	118	10.93	11.33333333
1998-07-01	119	10.53	11.075
1998-10-01	120	10.40	10.81666667
1999-01-01	121	11.40	10.66666667
1999-04-01	122	10.33	10.59166667
1999-07-01	123	10.23	10.50833333
1999-10-01	124	10.07	10.36666667
2000-01-01	125	10.83	10.13333333
2000-04-01	126	9.40	9.875
2000-07-01	127	9.20	9.61666667
2000-10-01	128	9.03	9.4
2001-01-01	129	9.97	9.33333333
2001-04-01	130	9.13	9.31666667
2001-07-01	131	9.13	9.375
2001-10-01	132	9.27	9.45
2002-01-01	133	10.27	9.55833333
2002-04-01	134	9.57	9.675
2002-07-01	135	9.60	9.79166667
2002-10-01	136	9.73	10.01666667
2003-01-01	137	11.17	10.24166667
2003-04-01	138	10.47	10.41666667
2003-07-01	139	10.30	10.51666667
2003-10-01	140	10.13	10.475
2004-01-01	141	11.00	10.45833333
2004-04-01	142	10.40	10.49166667
2004-07-01	143	10.43	10.55833333
2004-10-01	144	10.40	10.95
2005-01-01	145	12.57	11.30833333
2005-04-01	146	11.83	11.575
2005-07-01	147	11.50	11.725
2005-10-01	148	11.00	11.60833333
2006-01-01	149	12.10	11.39166667
2006-04-01	150	10.97	11.10833333
2006-07-01	151	10.37	10.775
2006-10-01	152	9.67	10.25833333
2007-01-01	153	10.03	9.8
2007-04-01	154	9.13	9.375
2007-07-01	155	8.67	8.98333333
2007-10-01	156	8.10	8.60833333
2008-01-01	157	8.53	8.275
2008-04-01	158	7.80	7.98333333
2008-07-01	159	7.50	7.75833333
2008-10-01	160	7.20	7.73333333



2009-01-01	161	8.43	7.85
2009-04-01	162	8.27	8
2009-07-01	163	8.10	8.125
2009-10-01	164	7.70	8.15833333
2010-01-01	165	8.57	8.03333333
2010-04-01	166	7.77	7.875
2010-07-01	167	7.47	7.7
2010-10-01	168	7.00	7.50833333
2011-01-01	169	7.80	7.33333333
2011-04-01	170	7.07	7.18333333
2011-07-01	171	6.87	7.05833333
2011-10-01	172	6.50	6.93333333
2012-01-01	173	7.30	6.85833333
2012-04-01	174	6.77	6.81666667
2012-07-01	175	6.70	6.83333333
2012-10-01	176	6.57	6.85
2013-01-01	177	7.37	6.86666667
2013-04-01	178	6.83	6.875
2013-07-01	179	6.73	6.875
2013-10-01	180	6.57	6.84166667
2014-01-01	181	7.23	
2014-04-01	182	6.63	

