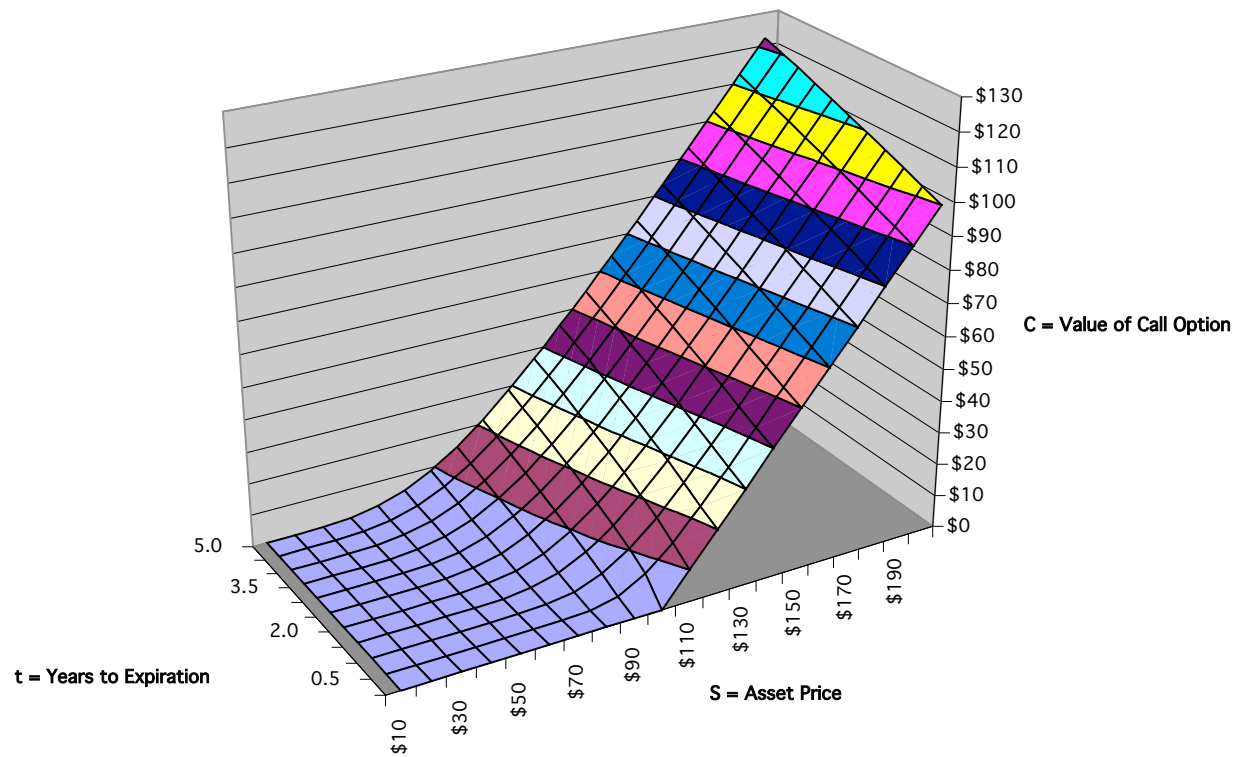


The Black-Scholes Equation for a European Call Option on the S&P 500 Stock Market Index

E = strike price = \$100
sigma = estimated volatility = 19.4756%
r = risk-free rate = 5%



$$C = SN\left(\frac{\ln\frac{S}{E} + (r + \frac{1}{2}\sigma^2)t}{\sigma\sqrt{t}}\right) - e^{-rt}EN\left(\frac{\ln\frac{S}{E} + (r - \frac{1}{2}\sigma^2)t}{\sigma\sqrt{t}}\right)$$

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 February 17, 1999

\$100 E = strike price
 19.4756% sigma = estimated volatility for S&P 500 = standard deviation of continuously compounded returns 1926-1994
 5% r = risk-free rate (continuous compounding, estimated)

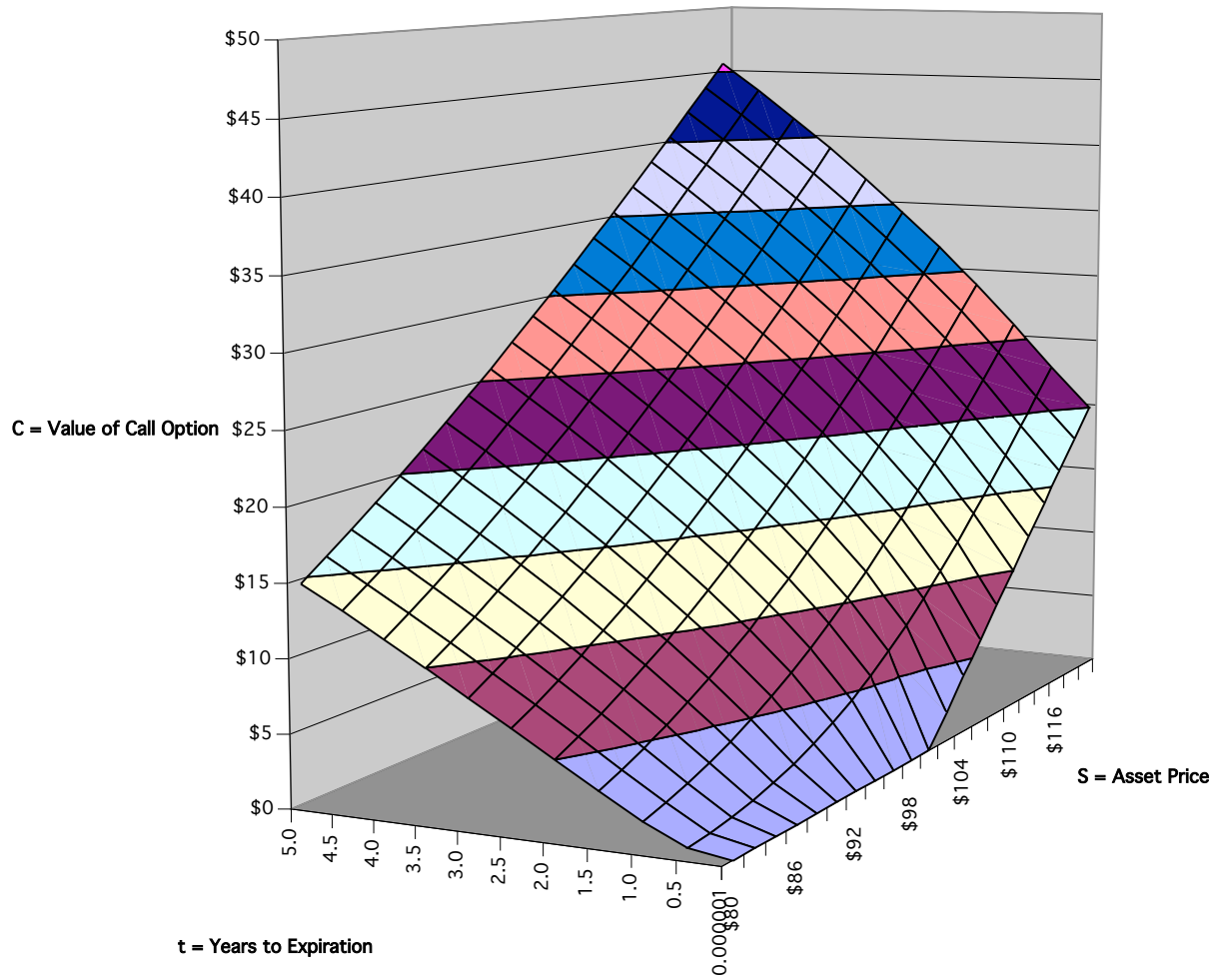
0.018965 the famous 1/2 sigma squared term - figure this one out, and you've discovered the meaning of life
 0.068965 r + 1/2 sigma squared
 0.031035 r - 1/2 sigma squared

	t = time to expiration in years											
	5.0	4.5	4.0	3.5	3.0	2.5	2.0	1.5	1.0	0.5	0.000001	
exp(-r*t)*E =												
present value of E	77.880078	79.851622	81.873075	83.945702	86.070798	88.249690	90.483742	92.774349	95.122942	97.530991	99.999995	
sigma*sqrt(t) =												
volatility over t years	0.435488	0.413140	0.389512	0.364355	0.337327	0.307936	0.275427	0.238526	0.194756	0.137713	0.000195	
(r + 1/2 sigma squared)*t	0.344825	0.310342	0.275860	0.241377	0.206895	0.172412	0.137930	0.103447	0.068965	0.034482	0.000000	
(r - 1/2 sigma squared)*t	0.155175	0.139658	0.124140	0.108623	0.093105	0.077588	0.062070	0.046553	0.031035	0.015518	0.000000	

S = asset price
 ln(S/E) = a measure of "how far apart" S and E are

\$10.00	-2.302585	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$20.00	-1.609438	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$30.00	-1.203973	\$0.10	\$0.06	\$0.03	\$0.01	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$40.00	-0.916291	\$0.65	\$0.45	\$0.28	\$0.16	\$0.08	\$0.03	\$0.01	\$0.00	\$0.00	\$0.00	\$0.00
\$50.00	-0.693147	\$2.16	\$1.65	\$1.20	\$0.81	\$0.50	\$0.26	\$0.10	\$0.02	\$0.00	\$0.00	\$0.00
\$60.00	-0.510826	\$4.97	\$4.09	\$3.26	\$2.47	\$1.75	\$1.12	\$0.60	\$0.24	\$0.04	\$0.00	\$0.00
\$70.00	-0.356675	\$9.18	\$7.94	\$6.71	\$5.49	\$4.29	\$3.14	\$2.06	\$1.12	\$0.39	\$0.03	\$0.00
\$80.00	-0.223144	\$14.69	\$13.15	\$11.58	\$9.98	\$8.34	\$6.68	\$5.01	\$3.34	\$1.74	\$0.41	\$0.00
\$90.00	-0.105361	\$21.31	\$19.54	\$17.72	\$15.83	\$13.86	\$11.80	\$9.64	\$7.36	\$4.91	\$2.23	\$0.00
\$100.00	0.000000	\$28.80	\$26.88	\$24.89	\$22.81	\$20.62	\$18.32	\$15.87	\$13.21	\$10.25	\$6.75	\$0.01
\$110.00	0.095310	\$36.96	\$34.95	\$32.86	\$30.67	\$28.37	\$25.94	\$23.36	\$20.57	\$17.50	\$13.97	\$10.00
\$120.00	0.182322	\$45.62	\$43.56	\$41.42	\$39.18	\$36.84	\$34.38	\$31.78	\$29.02	\$26.06	\$22.90	\$20.00
\$130.00	0.262364	\$54.66	\$52.58	\$50.41	\$48.16	\$45.82	\$43.38	\$40.82	\$38.15	\$35.37	\$32.57	\$30.00
\$140.00	0.336472	\$63.96	\$61.87	\$59.71	\$57.47	\$55.15	\$52.75	\$50.26	\$47.69	\$45.08	\$42.49	\$40.00
\$150.00	0.405465	\$73.46	\$71.38	\$69.23	\$67.01	\$64.72	\$62.36	\$59.93	\$57.45	\$54.95	\$52.47	\$50.00
\$160.00	0.470004	\$83.10	\$81.03	\$78.89	\$76.70	\$74.44	\$72.12	\$69.75	\$67.34	\$64.91	\$62.47	\$60.00
\$170.00	0.530628	\$92.84	\$90.78	\$88.66	\$86.49	\$84.26	\$81.97	\$79.64	\$77.28	\$74.89	\$72.47	\$70.00
\$180.00	0.587787	\$102.65	\$100.60	\$98.50	\$96.35	\$94.14	\$91.89	\$89.59	\$87.25	\$84.88	\$82.47	\$80.00
\$190.00	0.641854	\$112.51	\$110.47	\$108.39	\$106.25	\$104.06	\$101.83	\$99.56	\$97.24	\$94.88	\$92.47	\$90.00
\$200.00	0.693147	\$122.41	\$120.38	\$118.31	\$116.19	\$114.02	\$111.80	\$109.54	\$107.23	\$104.88	\$102.47	\$100.00

A More Detailed View of the Interesting Part of the Graph



		5.0	4.5	4.0	3.5	3.0	2.5	2.0	1.5	1.0	0.5	0.000001
-0.223144	\$80.00	\$14.69	\$13.15	\$11.58	\$9.98	\$8.34	\$6.68	\$5.01	\$3.34	\$1.74	\$0.41	\$0.00
-0.198451	\$82.00	\$15.93	\$14.34	\$12.72	\$11.05	\$9.33	\$7.58	\$5.80	\$3.99	\$2.20	\$0.61	\$0.00
-0.174353	\$84.00	\$17.22	\$15.58	\$13.90	\$12.17	\$10.38	\$8.55	\$6.66	\$4.72	\$2.75	\$0.88	\$0.00
-0.150823	\$86.00	\$18.54	\$16.86	\$15.13	\$13.34	\$11.49	\$9.57	\$7.59	\$5.52	\$3.38	\$1.23	\$0.00
-0.127833	\$88.00	\$19.91	\$18.18	\$16.40	\$14.56	\$12.65	\$10.66	\$8.58	\$6.40	\$4.10	\$1.68	\$0.00
-0.105361	\$90.00	\$21.31	\$19.54	\$17.72	\$15.83	\$13.86	\$11.80	\$9.64	\$7.36	\$4.91	\$2.23	\$0.00
-0.083382	\$92.00	\$22.74	\$20.94	\$19.08	\$17.14	\$15.12	\$13.00	\$10.77	\$8.39	\$5.80	\$2.90	\$0.00
-0.061875	\$94.00	\$24.21	\$22.38	\$20.47	\$18.50	\$16.43	\$14.26	\$11.96	\$9.49	\$6.79	\$3.68	\$0.00
-0.040822	\$96.00	\$25.71	\$23.85	\$21.91	\$19.89	\$17.78	\$15.56	\$13.20	\$10.66	\$7.86	\$4.58	\$0.00
-0.020203	\$98.00	\$27.24	\$25.35	\$23.38	\$21.33	\$19.18	\$16.92	\$14.51	\$11.90	\$9.02	\$5.60	\$0.00
0.000000	\$100.00	\$28.80	\$26.88	\$24.89	\$22.81	\$20.62	\$18.32	\$15.87	\$13.21	\$10.25	\$6.75	\$0.01
0.019803	\$102.00	\$30.38	\$28.44	\$26.42	\$24.32	\$22.10	\$19.77	\$17.27	\$14.57	\$11.57	\$8.00	\$2.00
0.039221	\$104.00	\$31.99	\$30.03	\$27.99	\$25.86	\$23.62	\$21.25	\$18.73	\$16.00	\$12.96	\$9.36	\$4.00
0.058269	\$106.00	\$33.62	\$31.65	\$29.59	\$27.43	\$25.17	\$22.78	\$20.23	\$17.47	\$14.41	\$10.81	\$6.00
0.076961	\$108.00	\$35.28	\$33.29	\$31.21	\$29.04	\$26.76	\$24.35	\$21.78	\$19.00	\$15.93	\$12.35	\$8.00
0.095310	\$110.00	\$36.96	\$34.95	\$32.86	\$30.67	\$28.37	\$25.94	\$23.36	\$20.57	\$17.50	\$13.97	\$10.00
0.113329	\$112.00	\$38.66	\$36.63	\$34.53	\$32.32	\$30.01	\$27.58	\$24.98	\$22.19	\$19.13	\$15.66	\$12.00
0.131028	\$114.00	\$40.37	\$38.34	\$36.22	\$34.01	\$31.68	\$29.24	\$26.64	\$23.85	\$20.80	\$17.40	\$14.00
0.148420	\$116.00	\$42.11	\$40.06	\$37.93	\$35.71	\$33.38	\$30.93	\$28.32	\$25.54	\$22.52	\$19.19	\$16.00
0.165514	\$118.00	\$43.86	\$41.80	\$39.67	\$37.44	\$35.10	\$32.64	\$30.04	\$27.26	\$24.27	\$21.03	\$18.00
0.182322	\$120.00	\$45.62	\$43.56	\$41.42	\$39.18	\$36.84	\$34.38	\$31.78	\$29.02	\$26.06	\$22.90	\$20.00