

# examples



working with  
the normal  
distribution



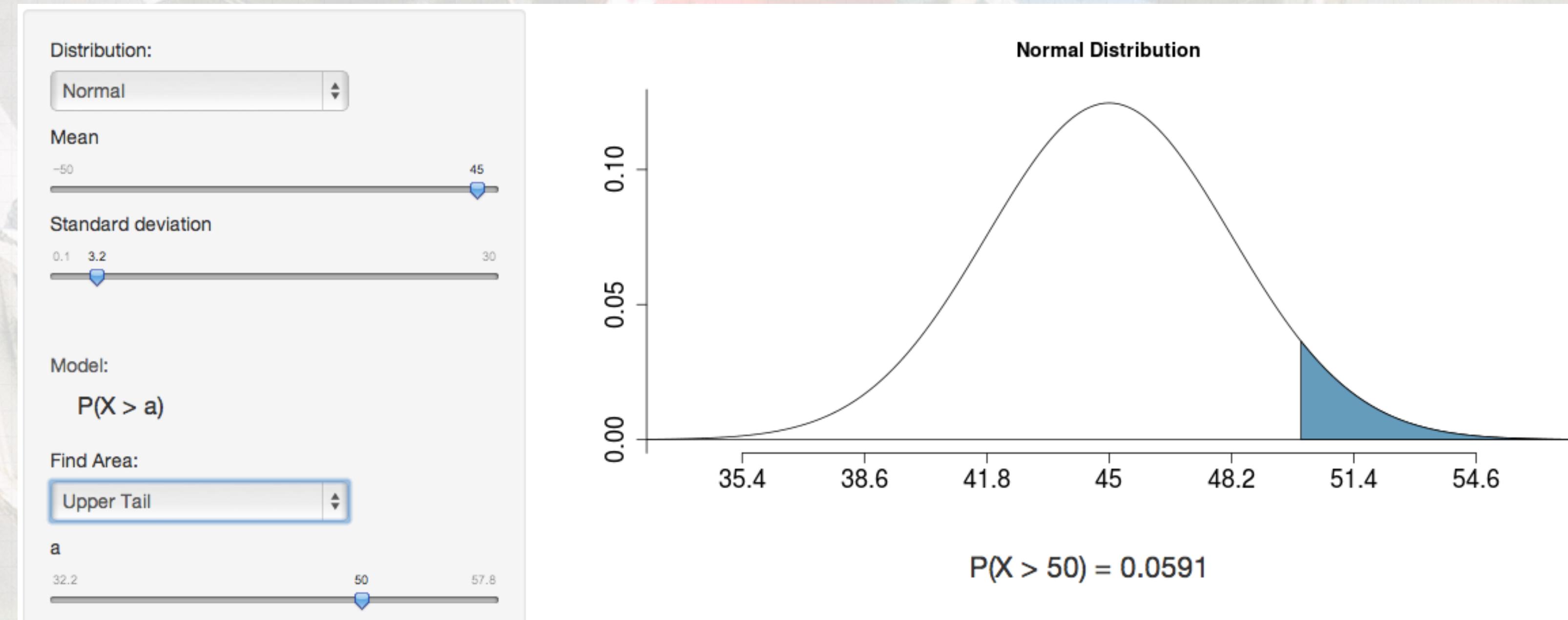
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Suppose weights of checked baggage of airline passengers follow a nearly normal distribution with mean 45 pounds and standard deviation 3.2 pounds. Most airlines charge a fee for baggage that weigh in excess of 50 pounds.

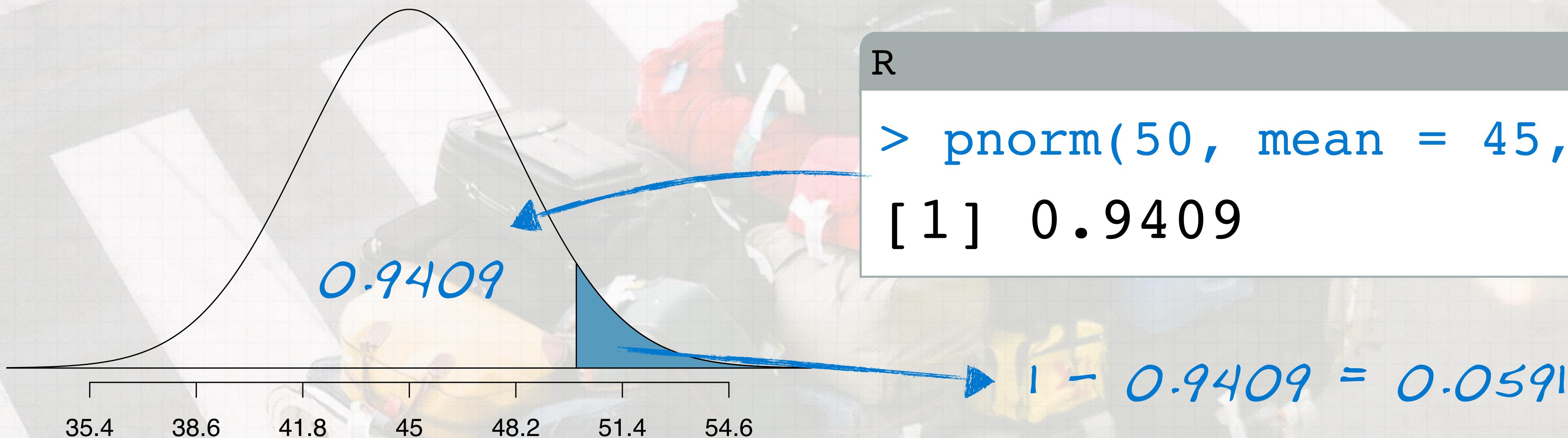
$$\text{baggage} \sim N(\text{mean} = 45, SD = 3.2)$$

What percent of airline passengers are expected to incur this fee?

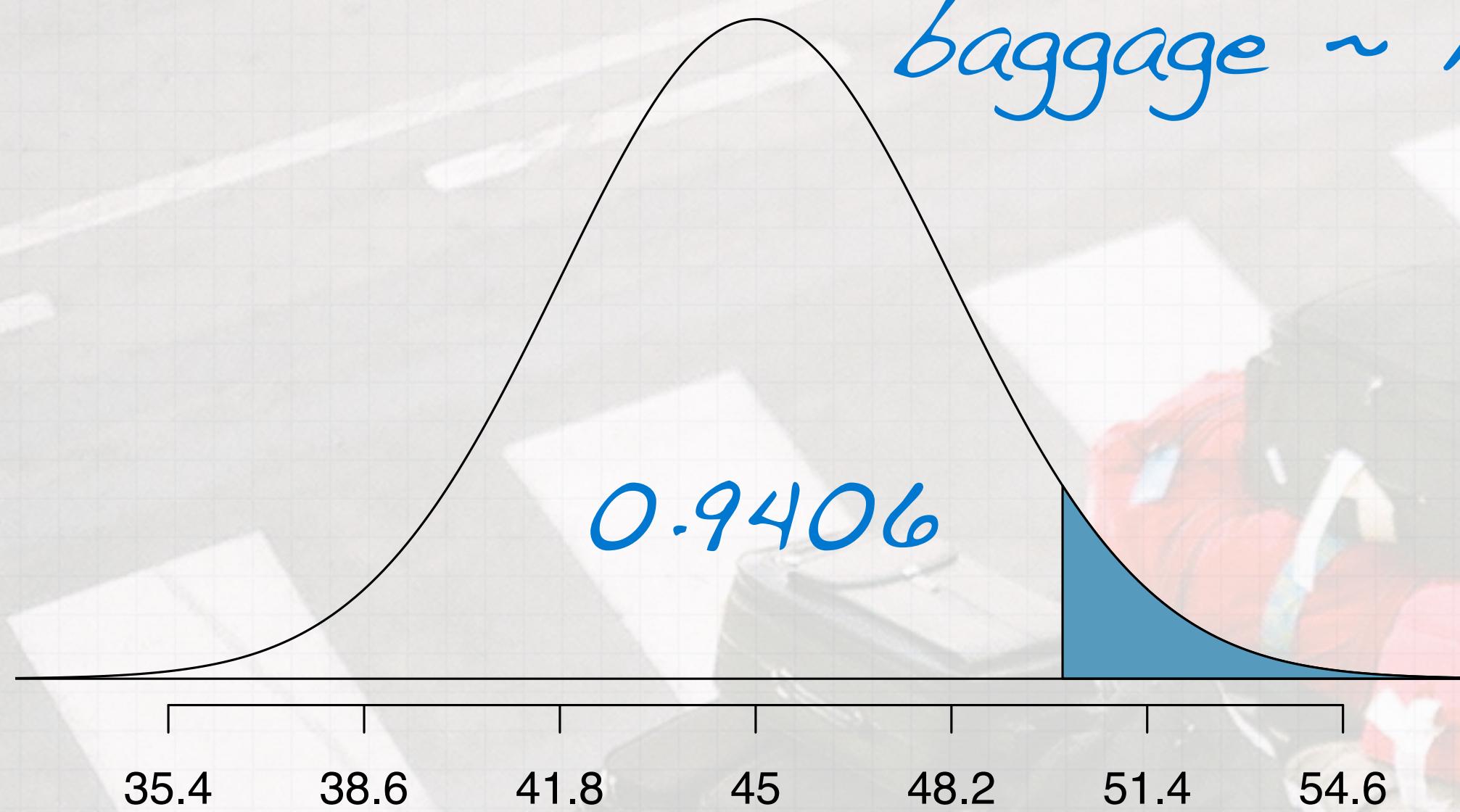
[http://bitly.com/dist\\_calc](http://bitly.com/dist_calc)



*baggage* ~  $N(\text{mean} = 45, \text{SD} = 3.2)$



*baggage  $\sim \mathcal{N}(\text{mean} = 45, SD = 3.2)$*



$$Z = \frac{50 - 45}{3.2} = 1.56$$

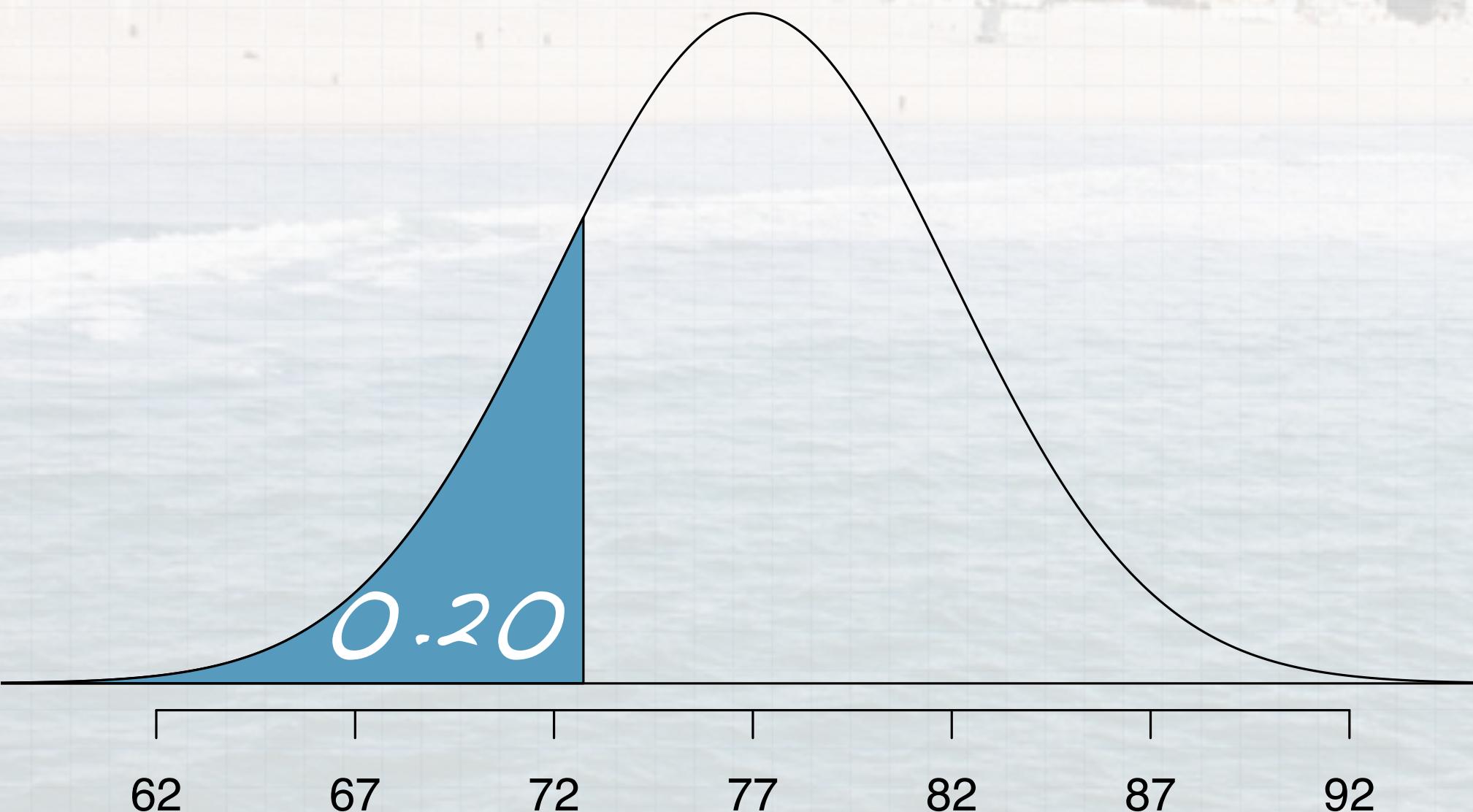
$$\begin{aligned} P(Z > 1.56) &= 1 - 0.9406 \\ &= 0.0594 \end{aligned}$$

Z	Second decimal place of Z						
	0.00	0.01	0.02	0.03	0.04	0.05	0.06
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515

The average daily high temperature in June in LA is 77 °F with a standard deviation of 5 °F. Suppose that the temperatures in June closely follow a normal distribution.

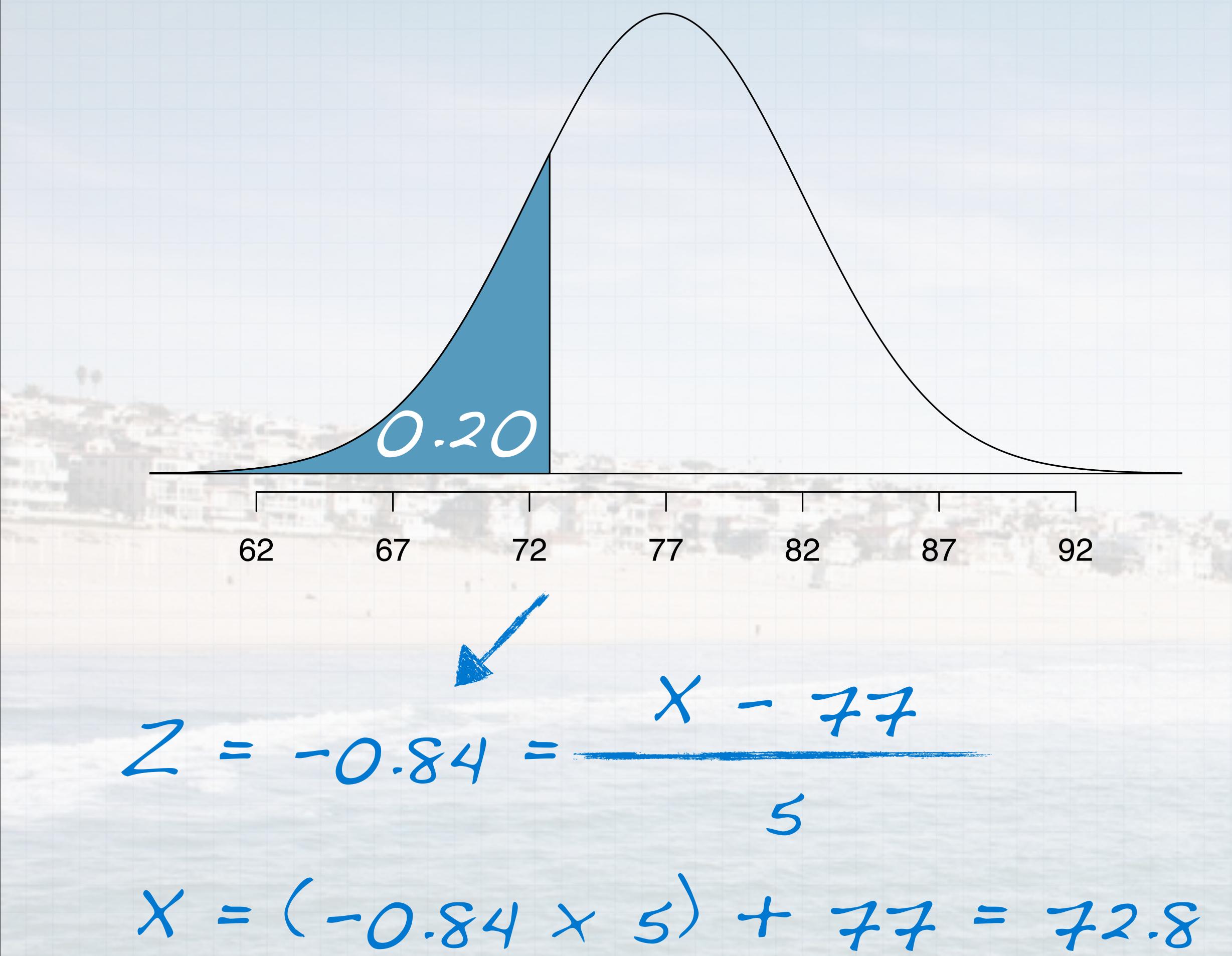
How cold are the coldest 20% of the days during June in LA?

*temperatures ~ N(mean = 77, SD = 5)*



R

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> qnorm(0.20, mean = 77, sd = 5)  
[1] 72.79
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Second decimal place of $Z$							$Z$
0.06	0.05	0.04	0.03	0.02	0.01	0.00	
0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	-3.4
0.0004	0.0004	0.0004	0.0004	0.0005	0.0005	0.0005	-3.3
0.0006	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	-3.2
0.0008	0.0008	0.0008	0.0009	0.0009	0.0009	0.0010	-3.1
0.0011	0.0011	0.0012	0.0012	0.0013	0.0013	0.0013	-3.0
0.0015	0.0016	0.0016	0.0017	0.0018	0.0018	0.0019	-2.9
0.0021	0.0022	0.0023	0.0023	0.0024	0.0025	0.0026	-2.8
0.1685	0.1711	0.1736	0.1762	0.1788	0.1814	0.1841	-0.9
0.1949	0.1977	0.2005	0.2033	0.2061	0.2090	0.2119	-0.8
0.2236	0.2266	0.2296	0.2327	0.2358	0.2389	0.2420	-0.7