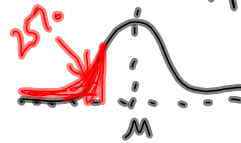


Z-Scores Continued

Example: The Hobbit track team's results for the 200m dash are $N(30, 1.2)$ seconds. The coach says if your time on the qualifying trials is in the lowest 25%, you can go to Regionals. What time do you have to beat?

$N(30, 1.2)$
 normal μ σ

What z-score corresponds to 25%?



	0.09	0.08	0.07	0.06	0.05
-0.9	0.1611	0.1635	0.1660	0.1685	0.1711
-0.8	0.1867	0.1894	0.1922	0.1949	0.1977
-0.7	0.2148	0.2177	0.2206	0.2236	0.2266
-0.6	0.2451	0.2483	0.2514	0.2546	0.2578
-0.5	0.2776	0.2810	0.2843	0.2877	0.2912

Look for an area of 0.25 (or close to it) and find the z-score associated with it.

25% \Rightarrow z-score of -0.67

$$z = \frac{x - \mu}{\sigma}$$

$$-0.67 = \frac{x - 30}{1.2} \quad \leftarrow \text{solve for } x!$$

$$-0.67(1.2) = x - 30$$

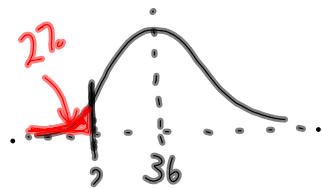
$$-0.804 = x - 30$$

$$x = 29.196 \text{ s}$$

need this time to qualify for regionals.

Guarantees

Example Suppose a company produces a new blow dryer called the Whiz-Dry & determines the expected useful life of this dryer to be $N(36, 4)$ months. The company wants to offer a guarantee on these dryers but they don't want to replace more than 2% of the dryers sold. What guarantee should they give?



What z-score gives an area of 2% or 0.02?

	0.09	0.08	0.07	0.06	0.05	0.04
-2.3	0.0084	0.0087	0.0089	0.0091	0.0094	0.0096
-2.2	0.0110	0.0113	0.0116	0.0119	0.0122	0.0125
-2.1	0.0143	0.0146	0.0150	0.0154	0.0158	0.0162
-2.0	0.0183	0.0188	0.0192	0.0197	0.0202	0.0207
-1.9	0.0233	0.0239	0.0244	0.0250	0.0256	0.0262
-1.8	0.0294	0.0301	0.0307	0.0314	0.0322	0.0329
-1.7	0.0367	0.0375	0.0384	0.0392	0.0401	0.0409
-1.6	0.0455	0.0465	0.0475	0.0485	0.0495	0.0505

We want a z-score of -2.05.

$$z = \frac{x - \mu}{\sigma}$$

$$-2.05 = \frac{x - 36}{4}$$

$$4(-2.05) = x - 36$$

$$-8.20 = x - 36$$

$$x = 27.8 \text{ month}$$

← The company should offer a 27 month.

(If you make the warranty for 28 months, you would have to replace slightly more than 2%)