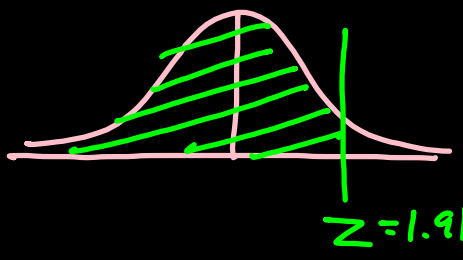
March 2, 2022

Normal Distribution



ACT $\mu = 21$
$\sigma = 4.7$

Billy Bob scored 30.
What is his percentile rank?

$\frac{30-21}{4.7} = \frac{9}{4.7} \approx 1.91$

Z-score = # of standard deviations from the mean

0.9719 ≈ 97th

$$Z = \frac{\text{Raw Score} - \text{Mean}}{\text{St. Dev}}$$

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

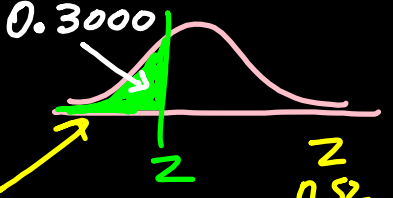
Jenna scored at the 30th percentile.
What was her score on the Act?

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

$$4.7 \cdot -0.52 = \frac{x - 21}{4.7} \cdot 4.7$$

$$-2.44 = x - 21$$
$$+21 \quad +21$$

$$18.56 = x$$
$$\approx 19$$



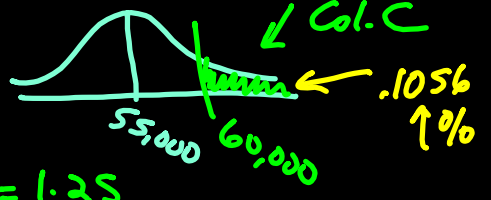
Col. C
Smaller portion

z	C
0.52	.3015
0.53	.2981

45
30
15
19

Tire Store has 200 tires in stock. Mean life of these tires is 55,000 miles with a standard deviation of 4000 miles. How many of the tires in stock should last more than 60,000 miles?

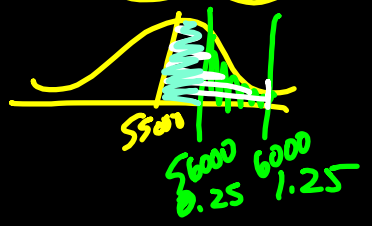
$$z = \frac{x - \mu}{\sigma}$$



$$z = \frac{60{,}000 - 55{,}000}{4000} = \frac{5000}{4000} = 1.25$$

$$= 200 * 0.1056$$
$$= 21.12$$
$$\approx 21 \text{ tires}$$

How many tires will last between 56,000 & 60,000 miles.



$$z = \frac{56{,}000 - 55{,}000}{4000}$$

$$z = 0.25$$

0.0987

$$\frac{60000 - 55000}{4000}$$

$$= 1.25$$

0.3944

$$0.3944 - 0.0987 = 0.2957$$

$$0.2957 * 200 = \boxed{\quad} \text{ tires}$$