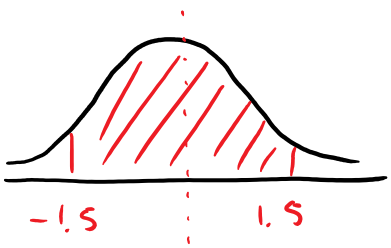
Section 6: cont'd

Thursday, March 30, 2017 1:16 PM

standard normal table:

calculate $P(-1.5 < z < 1.5)$



0.4332

$P(-1.5 < z < 1.5) = 2(0.4332)$
$= 0.8664$
or 87%

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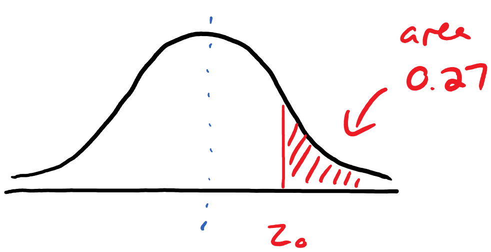
find z_0 if $P(z > z_0) = 0.27$



area
0.23
$= 0.5 - 0.27$

recall: total area is <u>one</u>
half of it is $\frac{1}{2}$

closest we can get to 0.23 in the body of the table is 0.2291

	0.01
0.6	0.2291

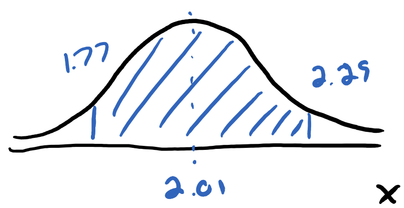
$$\boxed{z_0 = 0.61}$$

lectures handout:

1. volumes with mean 2.01 L and SD 0.13 L

   a) probability of volume between 1.77 and 2.29 L

probability that $1.77 < x < 2.29$

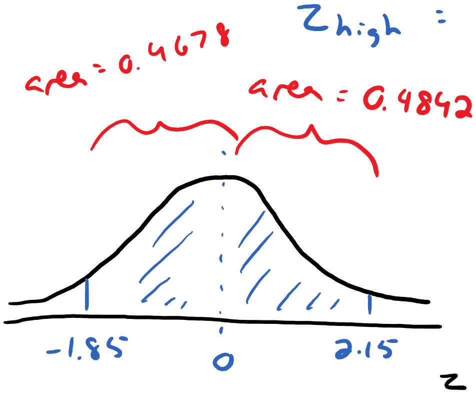


$$z_{low} = \frac{x - \mu}{\sigma} = \frac{1.77 - 2.01}{0.13}$$

$$= -1.85$$

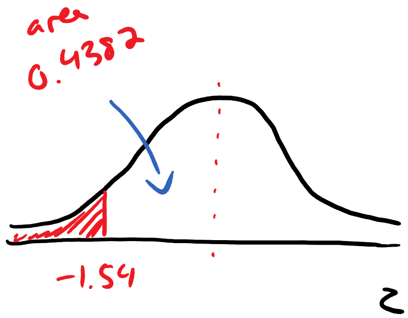
$$z_{high} = \frac{x - \mu}{\sigma} = \frac{2.29 - 2.01}{0.13}$$

$$= 2.15$$



$$P = 0.4678 + 0.4842$$
$$= 0.952 \text{ or } 95\%$$

c) probability that $x < 1.81$ L

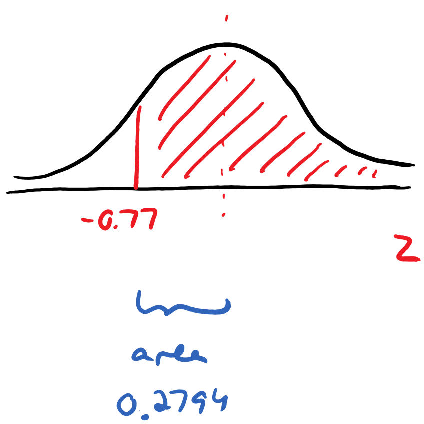


$$z = \frac{x - \mu}{\sigma} = \frac{1.81 - 2.01}{0.13} = -1.54$$

$$P = 0.5 - 0.4382 = 0.0618 \quad \text{or} \quad \boxed{6.2\%}$$

d) $P(x > 1.91\text{ L})$

$$z = \frac{x - \mu}{\sigma} = \frac{1.91 - 2.01}{0.13} = -0.77$$

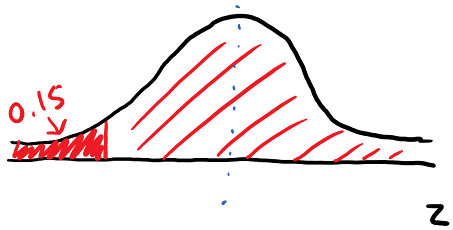


$$P = 0.5 + 0.2794 = 0.7794$$

or 78%

③ length of drill bit — mean 4.2 cm, SD 1.1 cm

find length that is longer than the shortest 15% of drill bit lengths



$\underbrace{\qquad}_{0.5 - 0.15 = 0.35}$

reverse look-up:

from table z-value is 1.04

$z = -1.04$ because it is to the <u>left</u> of zero

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

$$\begin{aligned} x &= \mu + z\sigma \\ &= 4.2 + (-1.04)(1.1) \\ &= 3.056 \text{ cm} \\ &= 3.1 \text{ cm} \end{aligned}$$

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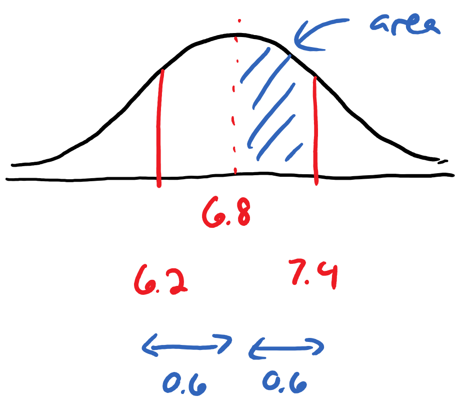
(4) time to inspect a ball bearing

mean 6.8 s

What is SD if 26.62 % of inspection times are between 6.2 and 7.4 seconds?



area = 13.31 %
= 0.1331

reverse lookup:

$z = 0.34$ (and -0.34)

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

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

$$= \frac{7.4 - 6.8}{0.34}$$

$$= 1.8 \ s$$