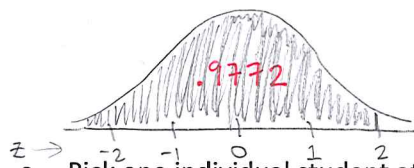


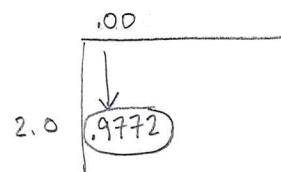
1. At a certain community college, pick a student at random and record their age,  $x$ . The distribution is approximately normal with a mean of 33 years and a standard deviation of 5 years.  $\mu = 33$   $\sigma = 5$

a. Is the random variable age categorical or quantitative? If quantitative, is it discrete or continuous?

b. Pick one individual student at random. Find the probability that this student is younger than 43. Shade a region under a labeled normal curve to represent your answer.



$$z = \frac{43 - 33}{5} = 2$$

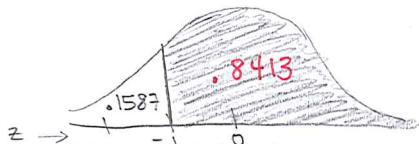


$$P(X < 43)$$

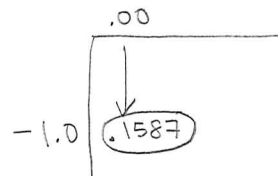
$$P(Z < 2)$$

$$.9772$$

c. Pick one individual student at random. Find the probability that this student is older than 28. Shade a region under a labeled normal curve to represent your answer.



$$z = \frac{28 - 33}{5} = -1$$



$$P(X > 28)$$

$$P(Z > -1)$$

$$1 - .1587$$

$$.8413$$

d. Pick one individual student at random. Find the probability that this student is between 28 and 43. Shade a region under a labeled normal curve to represent your answer.



$$z = \frac{28 - 33}{5} = -1$$

$$z = \frac{43 - 33}{5} = 2$$

$$\text{left area}$$

$$.9772$$

$$.1587$$

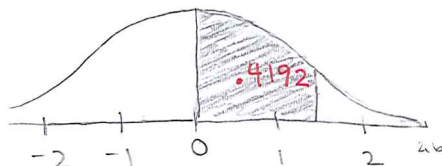
$$P(28 < X < 43)$$

$$P(-1 < Z < 2)$$

$$.9772 - .1587$$

$$.8185$$

e. Pick one individual student at random. Find the probability that this student is between 33 and 40. Shade a region under a labeled normal curve to represent your answer.



$$z = \frac{33 - 33}{5} = 0$$

$$z = \frac{40 - 33}{5} = 1.4$$

$$\text{left area}$$

$$.50$$

$$.9192$$

$$P(33 < X < 40)$$

$$P(0 < Z < 1.4)$$

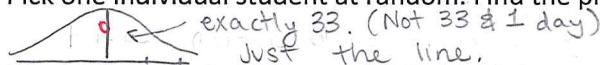
$$.9192 - .50$$

$$.4192$$

f. Pick one individual student at random. Find the probability that this student is older than 53.

$$z = \frac{53 - 33}{5} = 4 \text{ on chart off to the side } .9999683; 1 - .9999683 \approx 0$$

g. Pick one individual student at random. Find the probability that this student is exactly 33.



0 is an area with no width, so 0.

h. What percentile is a 38-year-old student in?

shade less than; left

$$z = \frac{38 - 33}{5} = 1$$

$$\text{left area}$$

$$.8413$$

$$P(Z < 1) = .8413$$

$$P(X < 38) = .8413$$

$\Rightarrow$  84th percentile

i. How old is a student in the 90th percentile?

Shade the left 90%.

$z$  is between 1.28 and 1.29

$$1.28 = \frac{X - 33}{5}$$

$$X = 39.4 \text{ years old}$$

