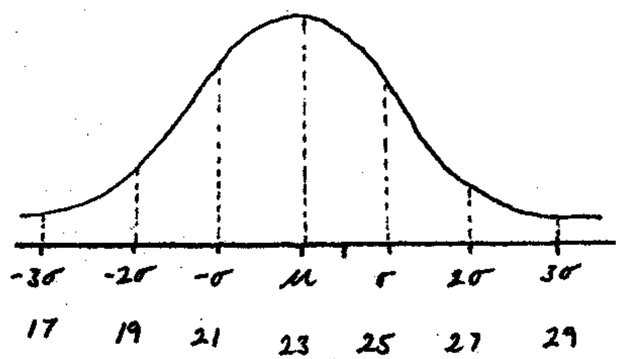
- The following table of probabilities was obtained from Excel.

x	P(X<=x)	x	P(X<=x)	x	P(X<=x)
15	0.0000	20	0.0668	25	0.8413
16	0.0002	21	0.1587	26	0.9332
17	0.0013	22	0.3085	27	0.9772
18	0.0062	23	0.5000	28	0.9938
19	0.0228	24	0.6915	29	0.9987



(i) 0.0228

(ii) 0.0228

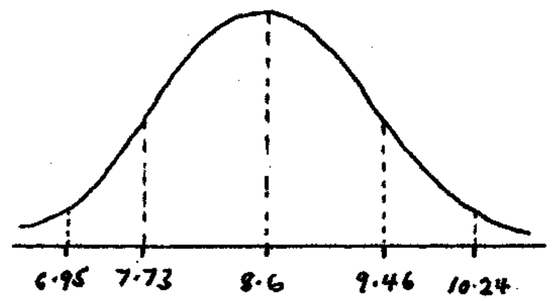
(iii) 1 - 0.1587 = 0.8413

(iv) 0.9772 - 0.6915
= 0.2857

Use the table to find the following when X~ Normal(m = 23, s = 2):
(i) pr(X <= 19); (ii) pr(X < 19); (iii) pr(X > 21);
(iv) pr(24 <= X <= 27)

- The following table of probabilities was obtained from STATA: *Normal with mean = **8.6** and standard deviation = **1.28**.*

P(X<=x)	x
0.1000	6.9596
0.2500	7.7367
0.7500	9.4633
0.9000	10.2404



The number of liters of soft serve ice cream sold by an ice cream van driver in an afternoon is found to be Normally distributed with a **mean** of **8.6** litres and a **standard deviation** of **1.28** liters.

(i) What is the least amount of soft serve ice cream that is needed so that the driver can satisfy demand on 90% of afternoons? 10.2404

(ii) What is the interquartile range for the ice cream sales. 9.4633 − 7.7367 = 1.7266

i) $Z = \frac{6-5.1}{0.87} = 1.0345$

$P(X > 6) = 1 - 0.848$
$= 0.152$

- Use either STATA or a graphics calculator (tables) to solve the following problems where X~Normal(m = 5.1, s = 0.87):

(i) What is the probability that X is greater than 6?
(ii) What is the probability that X is between 3.7 and 5.6?
(iii) What value of x gives pr(X<=x) = 0.6?

(ii) $Z = \frac{3.7-5.1}{0.87} = -1.6092$ $Z = \frac{5.6-5.1}{0.87} = 0.5747$

$P(3.7 \leq X \leq 5.6) = 0.716 - 0.054 = 0.662$

(iii) $P(Z < 0.25) = 0.599$

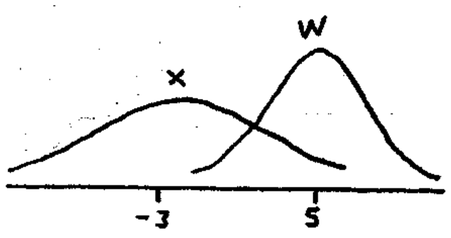
$X = 0.25 \times 0.87 + 5.1$
$= 5.318$

- X has a mean of -3 and a standard deviation of 5 and W has a mean of 5 and a standard deviation of 3. Let X and W be independent random variables and let Y = 3X - 3W.

$sd(Y) = sd(3X - 3W) = \sqrt{sd(3X)^2 + sd(-3W)^2}$
$= \sqrt{(3 \times 5)^2 + (3 \times 3)^2}$

(i) mean $= 3(-3) - 3(5) = -24$

$sd = \sqrt{3^2(5)^2 + (-3)^2(3)^2} = \sqrt{306} = 17.49$



(i) What are the mean and standard deviation of Y?

(ii) What can we say about the shape of the distribution of Y?
- centered much lower than both X and W
- distribution is more spread out than X and W

- **(HW_3_2)** Suppose that X~ Normal(*m=3, sd=4*) compute the Z-scores for the following numbers and state how many SD's ~~is~~ are each of these numbers away from *m*:

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

$Z = \frac{-3-3}{4} = -1.5$ $Z = \frac{-1-3}{4} = -1$

- -5 −2 (2 sd's away)
- 11 2 (2 sd's away)
- 5 0.5 (0.5 sd's away)
- 1.4 -0.4 (0.4 sd's away)
- What is the probability P(-3<X<-1)? Is it different from P(-3<=X<=-1)? Why? No - distribution is continuous

$P(-3 < X < -1) = 0.159 - 0.067$
$= 0.092$