

**Problem 1.** Suppose  $X = [-8, -12, 5, -6, 2]$ . Find the mean of  $X$ .

- (a) 6.6  
 (b) -0.6  
 (c) -3.8  
 (d) -1.4  
 (e) None of the above.

$$\bar{X} = \frac{-8 - 12 + 5 - 6 + 2}{5} = -3.8$$

**Problem 2.** Suppose  $X = [2, -3, 4, -5, 6]$ . Find the median of  $X$ .

- (a) 0.8  
 (b) 2  
 (c) 4  
 (d) -3  
 (e) None of the above.

**Problem 3.** Suppose  $X = [-2, -4]$ . Find  $SD(X)$ .

- (a) -1  
 (b) 0.71  
 (c) 1  
 (d) 1.41  
 (e) None of the above

$$\bar{X} = \frac{-2 - 4}{2} = -3$$

$$\textcircled{1} [-2 - (-3), -4 - (-3)] = [1, -1]$$

RMS

square:  $[1, 1]$

mean: 1

root: 1

SD = 1

**Problem 4.** Suppose  $X = [0, 2, 7]$ . Find  $SD(X)$ .

- (a) 2.94  
 (b) 3.61  
 (c) 5.10  
 (d) 2.55  
 (e) None of the above

$$\bar{X} = \frac{9}{3} = 3$$

$$\textcircled{1} [0 - 3, 2 - 3, 7 - 3] = [-3, -1, 4]$$

RMS

square:  $[9, 1, 16]$

mean: 8.66

root: 2.94

SD is 2.94

Suppose we have a data set  $X$  with mean  $\mu = 76$  and standard deviation  $SD = 4$ . Use this information for problems 5-7.

**Problem 5.** Suppose  $y = 70$  is a value in  $X$ . Find the standardized value  $z$ .

- (a) 1.5
- (b) 2.5
- (c) -2.5
- (d) -1.5
- (e) None of the above

$$z = \frac{70 - 76}{4} = \frac{-6}{4} = -1.5$$

**Problem 6.** Suppose  $y = 81$  is a value in  $X$ . In what percentile does  $y$  lie? (Round to no decimal places, i.e., 64.12-th percentile will be 64-th percentile)

- (a) 89-th percentile
- (b) 70-th percentile
- (c) 94-th percentile
- (d) 67-th percentile
- (e) None of the above

$$z = \frac{81 - 76}{4} = \frac{5}{4} = 1.25, \text{ area is: } 89.44\%$$

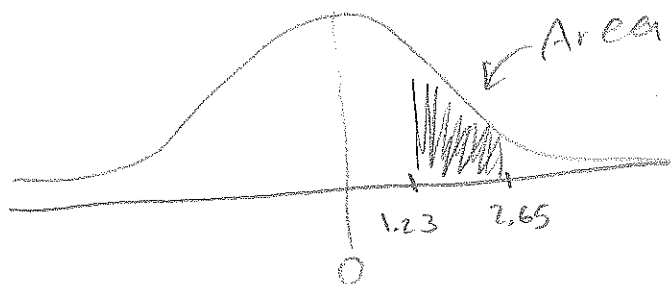
**Problem 7.** Suppose  $y$  is a value in  $X$  which standardizes to  $z = -1.5$ . Find  $y$ .

- (a) 68
- (b) 70
- (c) 72
- (d) 74
- (e) None of the above

$$(-1.5)(4) + 76 = 70$$

**Problem 8.** Find the area under the standard normal curve where  $z$  ranges from 1.23 to 2.65.

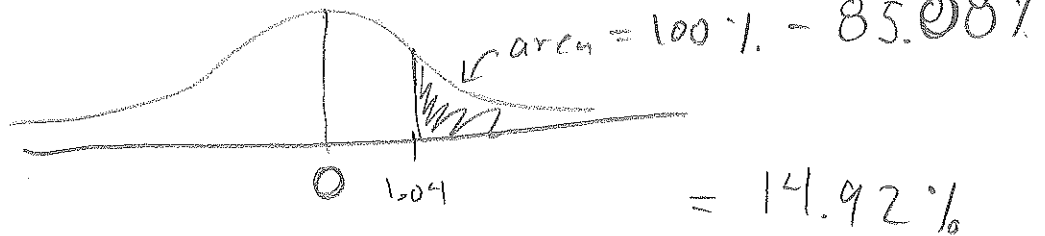
- (a) 10.53%
- (b) 21.34%
- (c) 99.60%
- (d) 89.07%
- (e) None of the above



$$99.60\% - 89.07\% = 10.53\%$$

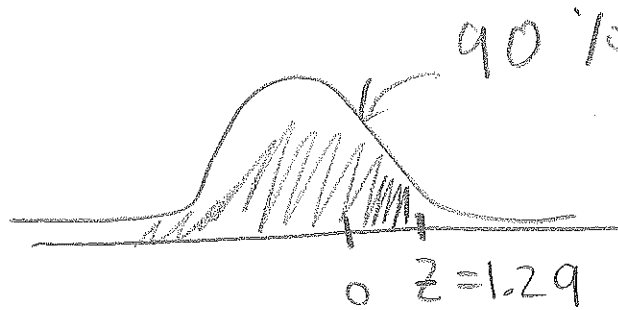
**Problem 9.** Find the area under the standard normal curve where  $z$  is greater than 1.04.

- (a) 85.08%
- (b) 0.85%
- (c) 0.14%
- (d) 14.92%
- (e) None of the above



**Problem 10.** The distribution of heights of U.S. adult men is given by an average of 69.2 inches with a standard deviation of 2.8 inches. If Harry is in the 90-th percentile, then how tall is Harry?

- (a) 72.3 inches
- (b) 70.8 inches
- (c) 73.4 inches
- (d) 72.8 inches
- (e) None of the above



$$\text{then } (1.29)(2.8) + 69.2 = 72.78 \approx \underline{72.3}$$

Use the following information for problems 11-12: A local store averaged daily sales of \$10,000 with a standard deviation of \$1,600 over the course of the last quarter. Economists predict an upcoming recession where consumer spending is expected to decrease by 5%. Suppose the store uses this information to calculate expected sales number over the next quarter.

**Problem 11.** How much does the store expect in daily sales, on average, over the next quarter?

- (a) \$500
- (b) \$5000
- (c) \$8500
- (d) \$9500
- (e) None of the above

$$(10,000)(0.95) = \underline{9500}$$

**Problem 12.** On any given day of the next quarter, what is the (expected) probability that the store will earn over \$11,000?

- (a) 98.68%
- (b) 83.89%
- (c) 73.24%
- (d) 73.57%
- (e) None of the above



$$z = \frac{11000 - 9500}{(1600)(0.95)} = \frac{1500}{1520} = 0.98,$$

$$100\% - 83.65\% = \underline{16.35\%}$$

**Problem 13.** Given data with mean  $\mu$  and standard deviation SD, to what value does  $\mu$  standardize?

- (a) 0
- (b) 1
- (c)  $\mu$
- (d) SD
- (e) None of the above

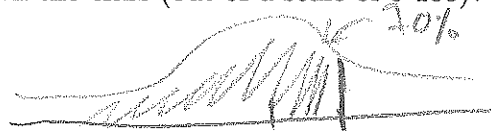
**Problem 14.** If given a data set with mean  $\mu$  and standard deviation SD, to what value will  $\mu - 1.3SD$  standardize?

- (a) 2.6
- (b) -1.3
- (c) -2.6
- (d) 1.3
- (e) None of the above

$$z = \frac{\cancel{\mu} - 1.3SD - \cancel{\mu}}{SD} = \frac{-1.3SD}{SD} = \underline{-1.3}$$

**Problem 15.** If the class average is 70 with a standard deviation of 7 and Marty is in the 70-th percentile, then what is Marty's grade in the class (out of a scale of 0-100)?

- (a) 70
- (b) 74
- (c) 77
- (d) 80
- (e) None of the above



$z = 0.42$  corresponds to 69.85%

$$(0.45)(7) + 70 = \underline{77}$$