

Final Exam Practice for chapter 15 and chapter 16

Solve the problem.

1) A pair of six-sided dice are rolled. The observation is the number that comes up on each die. The event described by E: "at least one die will come up as an even number" is

1) C

- A) $\{(1, 2), (1, 4), (1, 6), (2, 1), (2, 3), (2, 4), (2, 5), (2, 6), (3, 2), (3, 4), (3, 6), (4, 1), (4, 2), (4, 3), (4, 5), (4, 6), (5, 2), (5, 4), (5, 6), (6, 1), (6, 2), (6, 3), (6, 4), (6, 5)\}$.
- B) $\{(2, 2), (2, 4), (2, 6), (4, 2), (4, 4), (4, 6), (6, 2), (6, 4), (6, 6)\}$.
- C) $\{(1, 2), (1, 4), (1, 6), (2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6), (3, 2), (3, 4), (3, 6), (4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6), (5, 2), (5, 4), (5, 6), (6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)\}$.
- D) $\{(1, 2), (1, 4), (1, 6), (2, 1), (2, 3), (2, 5), (3, 2), (3, 4), (3, 6), (4, 1), (4, 3), (4, 5), (5, 2), (5, 4), (5, 6), (6, 1), (6, 3), (6, 5)\}$.
- E) none of these

A pair of honest dice is rolled, and the number on each die is noted.

2) What is the probability of rolling a total that is neither 7 nor 11?

$$\frac{28}{36} = \frac{7}{9}$$

2) A

A) $\frac{7}{9}$

Event: Roll 7

B) $\frac{5}{6}$

$A = \{(1, 6), (2, 5), (3, 4), (4, 3), (5, 2), (6, 1)\}$

C) $\frac{1}{2}$

Event: Roll 11

D) $\frac{17}{18}$

E) none of these

$B = \{(6, 5), (5, 6)\}$

(total size A and B = 8)

total size neither A nor B = 28

Solve the problem.

3) If a fair coin is tossed twice, the probability of both tosses coming up the same is

3) C

A) $\frac{3}{4}$

$\{HH, HT, TH, TT\}$

B) $\frac{1}{3}$

C) $\frac{1}{2}$

$$\frac{2}{4} = \frac{1}{2}$$

D) $\frac{1}{4}$

E) none of these

4) Suppose that an honest coin is tossed ten times. What is the probability that at least twice it comes up heads?

4) A

A) $\frac{1013}{1024}$

$$N = 2^{10} = 1024$$

B) $\frac{4}{5}$

A: No Heads (all tails)

C) $\frac{507}{512}$

size A = 1

D) $\frac{1}{512}$

B: one tail, 9 heads

E) none of these

size B = 10

size A and B = 11, $1024 - 11 = 1013$

- 5) Consider the following table which represents data related to helmet use and head injuries to snowboarders. What is the sample size for this data?

5) 3562

	head injuries	not injured
wore helmet	96	656
no helmet	480	2330

- 6) If one person is randomly selected from the data in question 5, what is the probability of selecting a person who wore a helmet?

6) 0.21

$$\frac{96 + 656}{3562} = \frac{752}{3562} \approx 0.21$$

- 7) If one person is randomly selected from the data in question 5, what is the probability of selecting a person who wore a helmet and had a head injury?

7) 0.027

$$\frac{96}{3562} \approx 0.027$$

- 8) If the chances of rain tomorrow are 20%, then the odds of rain tomorrow can be given as

8) B

- A) 2 to 1.
 B) 2 to 8.
 C) 2 to 12.
 D) 2 to 10.
 E) none of these

$$0.20 = \frac{2}{10} \leftarrow F$$

$\nearrow U + F$

$$U = 10 - 2 = 8$$

- 9) Suppose that the odds against winning the grand prize in the lottery are 80,000,000 to 1. What is the probability of winning the lottery?

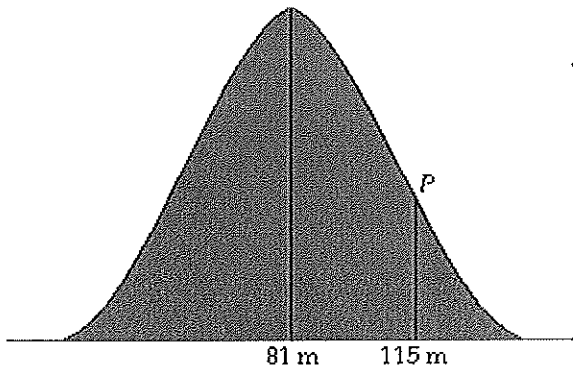
9) B

- A) $\frac{79,999,999}{80,000,000}$
 B) $\frac{1}{80,000,001}$
 C) $\frac{1}{80,000,000}$
 D) $\frac{1}{79,999,999}$
 E) none of these

$$U \text{ to } F = 80,000,000 \text{ to } 1$$

$$\frac{F}{U + F} = \text{choice B}$$

Consider the normal distribution given below and assume that P is a point of inflection of the curve.



$$\mu = 81, \quad \sigma = 115 - 81 = 34$$

$$Q_3 = 81 + 0.675(34)$$

$$= 103.95$$

10) Find the third quartile Q_3 of the distribution rounded to the nearest meter.

- A) 150 m B) 58 m C) 104 m D) 149 m E) 115 m

10) C

Solve the problem.

11) The standard deviation of a normal distribution is $\sigma = 20$. What is the interquartile range for this distribution?

- A) 13.5
B) 27
C) 33.75
D) 6.75
E) none of these

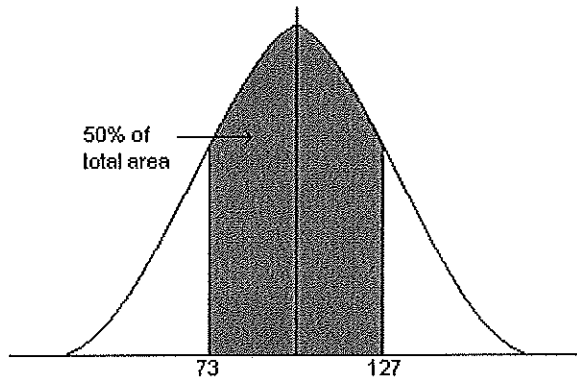
$$Q_3 - Q_1 = 2(.675)\sigma$$

$$= 1.35\sigma$$

$$= 1.35(20) = 27$$

11) B

Refer to the following normal curve, with mean μ and standard deviation σ .



12) A data value of 60 corresponds to a standardized value of

- A) -40.
B) -2.
C) 0.
D) -1.
E) none of these

$$\mu = \frac{73 + 127}{2} = 100$$

$$Q_1 = 100 - 0.675\sigma \Leftrightarrow 73 = 100 - 0.675\sigma$$

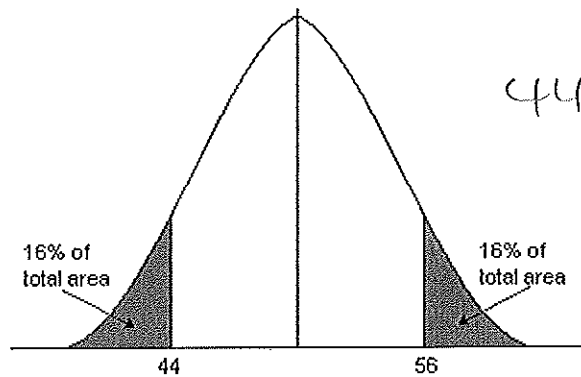
$$\Rightarrow \sigma = 40$$

$$z = \frac{60 - 100}{40} = -1$$

12) D

Refer to the following normal curve, with mean μ and standard deviation σ .

$$z = \frac{41 - 50}{6} = -1.5$$



$$44 = \mu - \sigma = 50 - \sigma \Rightarrow \sigma = 6$$

13) A data value of 41 corresponds to a standardized value of

- A) -1.5.
- B) -0.5.
- C) -1.
- D) -2.
- E) none of these

13) A

$$\mu = \frac{44 + 56}{2} = 50$$

14) If the standardized value of x is 0.5, then $x =$

- A) 50.5.
- B) 52.5.
- C) 51.
- D) 53.
- E) none of these

14) D

$$.5 = \frac{x - 50}{6}$$

$$x = 53$$

250 students in a math class take the final exam. The scores on the exam have an approximately normal distribution with mean $\mu = 75$ and standard deviation $\sigma = 10$.

15) Approximately how many students had test scores with standardized values between -2 and 0.675?

- A) 147
- B) 125
- C) 204
- D) 181
- E) 85

15) D

$$0.725(250) = 181.25$$

16) The number of students scoring 75 points or more is approximately

- A) 158.
- B) 75.
- C) 125.
- D) 83.
- E) none of these

16) C

$$z = \frac{75 - 75}{10} = 0$$

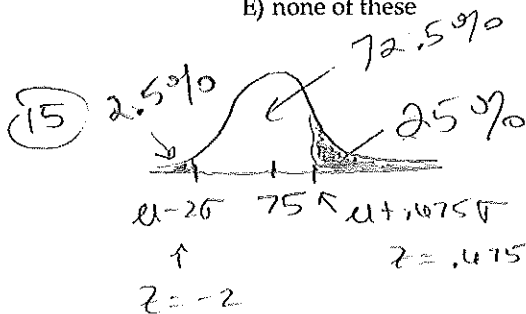
$$75 = \text{median} \quad (.50)(250) = 125$$

17) Carol scored 85 points on the exam. In approximately what percentile of the class does this score place her?

- A) 95th percentile
- B) 84th percentile
- C) 68th percentile
- D) 34th percentile
- E) none of these

17) B

$$z = \frac{85 - 75}{10} = 1$$



18) Approximately how many students had test scores between 68.25 and 85?

18) C

- A) 107
- B) 188
- C) 147
- D) 85
- E) none of these

$$\frac{68.25 - 75}{10} = -0.675$$

$$\frac{85 - 75}{10} = 1$$

$$.59(250) = 147.5$$

As part of a study, 800 college football players are randomly chosen and their weights taken. The distribution of the weights is approximately normal. The average weight is 235 pounds and the standard deviation is 25 pounds.

19) Approximately how many players had weights between 235 and 252 pounds?

19) C

- A) 37
- B) 50
- C) 200
- D) 100
- E) none of these

$$z = \frac{235 - 235}{25} = 0$$

$$z = \frac{252 - 235}{25} = .68$$

$$.25(800) = 200$$

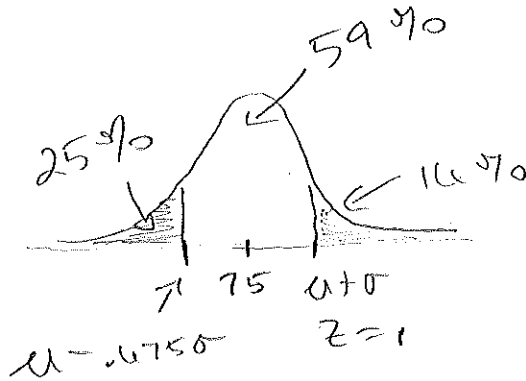
20) The standard deviation of a normal distribution is $\sigma = 30$. What is the interquartile range for this distribution?

20) A

- A) 40.5
- B) 60
- C) 20.25
- D) 10.125
- E) none of these

Note: Range is $(6\sigma = 180)$

(18)



(19)

