# Question ID e29586d5



| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Problem-Solving and Data Analysis | Probability and conditional probability | ■■■ |

**ID: e29586d5**

Number of Contestants by Score and Day

| | 5 out of 5 | 4 out of 5 | 3 out of 5 | 2 out of 5 | 1 out of 5 | 0 out of 5 | Total |
|---|---|---|---|---|---|---|---|
| **Day 1** | 2 | 3 | 4 | 6 | 2 | 3 | 20 |
| **Day 2** | 2 | 3 | 5 | 5 | 4 | 1 | 20 |
| **Day 3** | 3 | 3 | 4 | 5 | 3 | 2 | 20 |
| **Total** | 7 | 9 | 13 | 16 | 9 | 6 | 60 |

The same 20 contestants, on each of 3 days, answered 5 questions in order to win a prize. Each contestant received 1 point for each correct answer. The number of contestants receiving a given score on each day is shown in the table above.

No contestant received the same score on two different days. If a contestant is selected at random, what is the probability that the selected contestant received a score of 5 on Day 2 or Day 3, given that the contestant received a score of 5 on one of the three days?

**ID: e29586d5 Answer**

Rationale

The correct answer is $\frac{5}{7}$. It is given that no contestant received the same score on two different days, so each of the contestants who received a score of 5 is represented in the "5 out of 5" column of the table exactly once. Therefore, the probability of selecting a contestant who received a score of 5 on Day 2 or Day 3, given that the contestant received a score of 5 on one of the three days, is found by dividing the total number of contestants who received a score of 5 on Day 2 or Day 3 $(2+3=5)$ by the total number of contestants who received a score of 5, which is given in the table as 7. So the probability is $\frac{5}{7}$. Note that 5/7, .7142, .7143, and 0.714 are examples of ways to enter a correct answer.

Question Difficulty: Hard

# Question ID d4413871



| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Problem-Solving and Data Analysis | Probability and conditional probability | ■■■ |

**ID: d4413871**

| | Blood type | | | |
|---|---|---|---|---|
| Rhesus factor | A | B | AB | O |
| + | 33 | 9 | 3 | 37 |
| – | 7 | 2 | 1 | *x* |

Human blood can be classified into four common blood types—A, B, AB, and O. It is also characterized by the presence $(+)$ or absence $(-)$ of the rhesus factor. The table above shows the distribution of blood type and rhesus factor for a group of people. If one of these people who is rhesus negative $(-)$ is chosen at random, the probability that the person has blood type B is $\frac{1}{9}$. What is the value of *x* ?

**ID: d4413871 Answer**

Rationale

The correct answer is 8. In this group, $\frac{1}{9}$ of the people who are rhesus negative have blood type B. The total number of people who are rhesus negative in the group is $7+2+1+x$, and there are 2 people who are rhesus negative with blood type B. Therefore, $\frac{2}{(7+2+1+x)}=\frac{1}{9}$. Combining like terms on the left-hand side of the equation yields $\frac{2}{(10+x)}=\frac{1}{9}$. Multiplying both sides of this equation by 9 yields $\frac{18}{(10+x)}=1$, and multiplying both sides of this equation by $(10+x)$ yields $18=10+x$. Subtracting 10 from both sides of this equation yields $8=x$.

Question Difficulty: Hard

# Question ID 6626cac3



| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Problem-Solving and Data Analysis | Probability and conditional probability | ■■■ |

**ID: 6626cac3**

| | Phone | Email |
|---|---|---|
| **Dinner dance** | 55% | 80% |
| **Football game** | 20% | 10% |
| **Picnic** | 20% | 5% |
| **Pool party** | 5% | 5% |
| **Total** | 100% | 100% |

An alumni association survey asked each high school graduate to select the one activity he or she preferred for the association's next event. Some of the people responded by phone, and the others responded by email. The table above shows the distribution of preferred activity, in percent, for each response type used. For the survey, the number of email responses was twice the number of phone responses. If a person who preferred a picnic is selected at random, what is the probability that the person responded by email?

**ID: 6626cac3 Answer**

Rationale

The correct answer is $\frac{1}{3}$. It's given that the number of email responses is twice the number of phone responses. Therefore, if the number of phone responses is p, then the number of email responses is $2p$. The table shows that 20% of people who responded by phone preferred a picnic. It follows that the expression $0.20p$ represents the number of these people. The table also shows that 5% of the people who responded by email preferred a picnic. The expression $0.05(2p)$, or $0.1p$, represents the number of these people. Therefore, a total of $0.20p + 0.1p$, or $0.3p$ people preferred a picnic. Thus, the probability of selecting at random a person who responded by email from the people who preferred a picnic is $\frac{0.1p}{0.3p}$, or $\frac{1}{3}$. Note that 1/3, .3333, and 0.333 are examples of ways to enter a correct answer.

Question Difficulty: Hard

# Question ID 585de39a



| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Problem-Solving and Data Analysis | Probability and conditional probability | ■■■ |

**ID: 585de39a**

On May 10, 2015, there were 83 million Internet subscribers in Nigeria. The major Internet providers were MTN, Globacom, Airtel, Etisalat, and Visafone. By September 30, 2015, the number of Internet subscribers in Nigeria had increased to 97 million. If an Internet subscriber in Nigeria on September 30, 2015, is selected at random, the probability that the person selected was an MTN subscriber is 0.43. There were $p$ million MTN subscribers in Nigeria on September 30, 2015. To the nearest integer, what is the value of $p$ ?

**ID: 585de39a Answer**

Rationale

The correct answer is 42. It's given that in Nigeria on September 30, 2015, the probability of selecting an MTN subscriber from all Internet subscribers is 0.43, that there were p million, or $p(1{,}000{,}000)$, MTN subscribers, and that there were 97 million, or 97,000,000, Internet subscribers. The probability of selecting an MTN subscriber from all Internet subscribers can be found by dividing the number of MTN subscribers by the total number of Internet subscribers. Therefore, the equation $\frac{p(1{,}000{,}000)}{97{,}000{,}000} = 0.43$ can be used to solve for p. Dividing 1,000,000 from the numerator and denominator of the expression on the left-hand side yields $\frac{p}{97} = 0.43$. Multiplying both sides of this equation by 97 yields $p = (0.43)(97) = 41.71$, which, to the nearest integer, is 42.

Question Difficulty: Hard

# Question ID 6a715bed



| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Problem-Solving and Data Analysis | Probability and conditional probability | ■■■ |

**ID: 6a715bed**

The table summarizes the distribution of age and assigned group for $90$ participants in a study.

| | 0–9 years | 10–19 years | 20+ years | Total |
|---|---|---|---|---|
| **Group A** | 7 | 14 | 9 | 30 |
| **Group B** | 6 | 4 | 20 | 30 |
| **Group C** | 17 | 12 | 1 | 30 |
| **Total** | 30 | 30 | 30 | 90 |

One of these participants will be selected at random. What is the probability of selecting a participant from group A, given that the participant is at least $10$ years of age? (Express your answer as a decimal or fraction, not as a percent.)

**ID: 6a715bed Answer**

Correct Answer: .3833, 23/60

Rationale

The correct answer is $\frac{23}{60}$. It's given that one of the participants will be selected at random. The probability of selecting a participant from group A given that the participant is at least $10$ years of age is the number of participants in group A who are at least $10$ years of age divided by the total number of participants who are at least $10$ years of age. The table shows that in group A, there are $14$ participants who are $10–19$ years of age and $9$ participants who are $20+$ years of age. Therefore, there are $14 + 9$, or $23$, participants in group A who are at least $10$ years of age. The table also shows that there are a total of $30$ participants who are $10–19$ years of age and $30$ participants who are $20+$ years of age. Therefore, there are a total of $30 + 30$, or $60$, participants who are at least $10$ years of age. It follows that the probability of selecting a participant from group A given that the participant is at least $10$ years of age is $\frac{23}{60}$. Note that 23/60, .3833, and 0.383 are examples of ways to enter a correct answer.

Question Difficulty: Hard

# Question ID 5dc386fb



| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Problem-Solving and Data Analysis | Probability and conditional probability | ■■■ |

**ID: 5dc386fb**

The table below shows the distribution of US states according to whether they have a state-level sales tax and a state-level income tax.

2013 State-Level Taxes

| | State sales tax | No state sales tax |
|---|---|---|
| State income tax | 39 | 4 |
| No state income tax | 6 | 1 |

To the nearest tenth of a percent, what percent of states with a state-level sales tax do not have a state-level income tax?

A. 6.0%

B. 12.0%

C. 13.3%

D. 14.0%

**ID: 5dc386fb Answer**

Correct Answer: C

Rationale

Choice C is correct. The sum of the number of states with a state-level sales tax is $39 + 6 = 45$. Of these states, 6 don't have a state-level income tax. Therefore, $\frac{6}{45} = 0.1333...$, or about 13.3%, of states with a state-level sales tax don't have a state-level income tax.

Choice A is incorrect. This is the number of states that have a state-level sales tax and no state-level income tax. Choice B is incorrect. This is the percent of states that have a state-level sales tax and no state-level income tax. Choice D is incorrect. This is the percent of states that have no state-level income tax.

Question Difficulty: Hard

# Question ID ecd09c38



| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Problem-Solving and Data Analysis | Probability and conditional probability | ■■■ |

**ID: ecd09c38**

Employees working for a customer service line at an electric company recorded all the calls last Monday and noted whether the caller asked for repairs and whether the caller asked about a bill. The results are summarized in the table below.

| | Asked for repairs | Did not ask for repairs | Total |
|---|---|---|---|
| Asked about a bill | 48 | 623 | 671 |
| Did not ask about a bill | 130 | 90 | 220 |
| Total | 178 | 713 | 891 |

If a caller last Monday who asked about his or her bill is selected at random, which of the following is closest to the probability that the customer also asked for repairs?

A. 0.05

B. 0.07

C. 0.20

D. 0.27

**ID: ecd09c38 Answer**

Correct Answer: B

Rationale

Choice B is correct. According to the table, a total of 671 customers asked about a bill. Of these, 48 also asked for repairs. Therefore, if a customer who asked about a bill is selected at random, the probability that the customer also asked for repairs is $\frac{48}{671} \approx 0.07$.

Choice A is incorrect. This is the probability that a customer selected at random from all customers who called on Monday both asked for repairs and asked about a bill. Choice C is incorrect. This is the probability that a customer selected at random from all customers who called on Monday asked for repairs, regardless of whether or not the customer asked about a bill. Choice D is incorrect. This is the probability that a customer selected at random from those who asked for repairs also asked about a bill.

Question Difficulty: Hard