No calculators are permitted in this exercise.

Ex 11.1

Worked Example for Simple Questions

Name:

A factory makes chairs.



To test the quality, they check every 15th chair they produce.

As they are only checking some of the chairs, this is a sample

Does the factory check a sample of chairs or the population?

* checking every chair

A	B
Sample	Population

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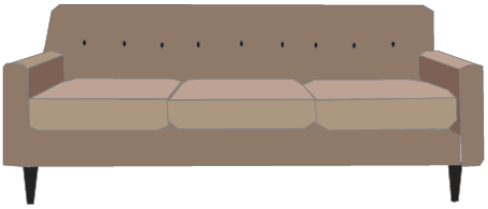
Question 1

A factory makes sofas.



To test the quality, they check every 45th sofa they produce.

Does the factory check a sample of sofas or the population?

Circle the correct option

A	**B**
Sample	Population

Question 2

A factory makes dining chairs.



To test the quality, they check every 50th chair they produce.

Does the factory check a sample of chairs or the population?

Circle the correct option

A	**B**
Sample	Population

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Question 3

A factory makes dining chairs.



To test the quality, they check every 10th chair they produce.

Does the factory check a sample of chairs or the population?

Circle the correct option

A

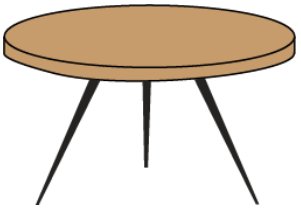
Sample

B

Population

Question 4

A factory makes coffee tables.



To test the quality, they check every 20th table they produce.

Does the factory check a sample of tables or the population?

Circle the correct option

A

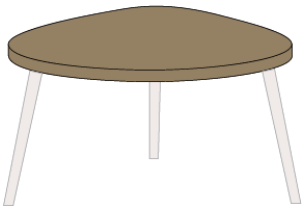
Sample

B

Population

Question 5

A factory makes coffee tables.



To test the quality, they check every table they produce.

Does the factory check a sample of tables or the population?

Circle the correct option

A

Sample

B

Population

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Worked Example for Standard Questions

Write whether the data collected is from a population or a sample.

not all employees = sample

What you want to know	Who you survey	Population or sample?
The age of every employee in a business	50 random employees of the business	sample
The age of every employee in a business	Every employee in the business	population

all employees = population

Question 6

Write whether the data collected is from a population or a sample.

What you want to know	Who you survey	Population or sample?
The shoe size of every student at your school	Every student in your school	
The shoe size of every student at your school	8 students from each class at your school	

Question 7

Write whether the data collected is from a population or a sample.

What you want to know	Who you survey	Population or sample?
The number of pets every student at your school has	Every student in your school	
The number of pets every student at your school has	5 students from each class at your school	

Question 8

Write whether the data collected is from a population or a sample.

What you want to know	Who you survey	Population or sample?
The age of every Australian	Every person in Australia	
The age of every Australian	1000 people from each state/territory	

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Question 9

Write whether the data collected is from a population or a sample.

What you want to know	Who you survey	Population or sample?
The number of siblings every student at your school has	10 students from each class at your school	
The number of siblings every student at your school has	Every student in your school	

Question 10

Write whether the data collected is from a population or a sample.

What you want to know	Who you survey	Population or sample?
The income of every Australian household	50 households from every state/territory	
The income of every Australian household	Every Australian household	

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Ex 11.3

No calculators are permitted in this exercise.

Worked Example for Simple Questions

Oliver goes to a school with 600 students.
He wants to investigate canteen use among students by taking a sample.
Which **sample** will give Oliver the most accurate results?

A

Oliver surveys 60 random students.

* a random sample will give the most accurate results as there is no bias in the sample.

B

Oliver surveys the oldest 60 students.

C

Oliver surveys 60 students who don't use the canteen.

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Question 1
Francesca goes to a school with 900 students.
She wants to investigate screen time among students by taking a sample.
Which **sample** will give Francesca the most accurate results?

Circle the correct option

A

Francesca surveys 90 students who don't have a personal device.

B

Francesca surveys 90 random students.

C

Francesca surveys the youngest 90 students.

Question 2
Ciel goes to a school with 950 students.
She wants to investigate phone use among students by taking a sample.
Which **sample** will give Ciel the most accurate results?

Circle the correct option

A

Ciel surveys the oldest 95 students.

B

Ciel surveys 95 students who don't have a phone.

C

Ciel surveys 95 random students.

Question 3
Dana goes to a school with 1000 students.
She wants to investigate phone use among students by taking a sample.
Which **sample** will give Dana the most accurate results?

Circle the correct option

A

Dana surveys 100 students in Year 9.

B

Daniel surveys 100 students who don't have a phone.

C

Dana surveys 100 random students.

Question 4
Emma goes to a school with 1100 students.
She wants to investigate screen time among students by taking a sample.
Which **sample** will give Emma the most accurate results?

Circle the correct option

A

Emma surveys 110 random students.

B

Emma surveys 110 students in Year 8.

C

Emma surveys 110 students who don't have a personal device.

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Question 5

Gregg goes to a school with 750 students.
He wants to investigate phone use among students by taking a sample.
Which **sample** will give Gregg the most accurate results?

Circle the correct option

A

Gregg surveys 75 random students.

B

Gregg surveys 75 students who don't have a phone.

C

Gregg surveys 75 students in Year 10.

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Worked Example for Standard Questions

Giselle uses a sample to collect data about the number of books students at her school read in a week.

Classify the following as either a good or bad sample.

Sample	Good or bad?
Asking all the students in her Music class ← only one class	bad ← not representative of all students
Asking the 4 students on her table in French class ← only one class; ↑ small sample	bad ← not representative of all students
Asking 30 random students from each year level ← represents all year levels; ↑ avoids bias	good ← representative of all students

---

Question 6

Flossi will use a sample to collect data about households that compost in her suburb.

Classify the following as either a good or bad sample.

Sample	Good or bad?
Asking 5 random households on each street in the suburb	
Asking all the households on her street	
Asking the 2 households on either side of her home	

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Question 7

Vincent will use a sample to collect data about the number of basketball shoes owned by players at his basketball club.

Classify the following as either a good or bad sample.

Sample	Good or bad?
Asking 5 players in his basketball team	
Asking 3 random players from every basketball team	
Asking all the players in the U10 team	

Question 8

Jarvis uses a sample to collect data about students' favourite foods at the canteen.

Classify the following as either a good or bad sample.

Sample	Good or bad?
Asking 20 random students each day for 5 days what they purchased	
Asking 20 people from his class what they purchased	
Getting 100 random transactions from different days on the canteen cash register	

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Question 9

Oscar will use a sample to collect data about how many students have a phone at his school.

Classify the following as either a good or bad sample.

Sample	Good or bad?
Asking 25% of each year level, selected at random	
Asking 10 of his friends	
Asking all the students in Year 9	

Question 10

Harry will use a sample to collect data about the types of transport used by students at his school.

Classify the following as either a good or bad sample.

Sample	Good or bad?
Asking 10 students in his Science class	
Asking all students in Year 10	
Asking 10% of each year level, selected at random	

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Ex 11.5

A calculator is permitted throughout this exercise.

Worked Example for Simple Questions

A bakery makes bread loaves with a mean weight of 725 grams.

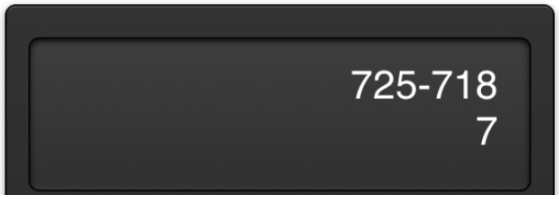


Pedro takes a sample of loaves with a sample mean of 718 grams.

What is the sample error?

Sample error = actual mean - sample mean
= 725 − 718
= 7 grams

7 grams



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Question 1

A manufacturer makes boxes of Weet Bricks cereal with a mean weight of 910 grams.



Rex takes a sample of boxes with a sample mean of 903 grams.

What is the sample error?

grams

Question 2

A bakery makes bread loaves with a mean weight of 700 grams.



Jesse takes a sample of loaves with a sample mean of 685 grams.

What is the sample error?

grams

Question 3

A manufacturer makes boxes of Weet Bricks cereal with a mean weight of 910 grams.



Bindi takes a sample of boxes with a sample mean of 897 grams.

What is the sample error?

grams

Question 4

A bakery makes bread loaves with a mean weight of 702 grams.



Jesse takes a sample of loaves with a sample mean of 712 grams.

What is the sample error?

grams

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Question 5

A manufacturer makes boxes of Weet Bricks cereal with a mean weight of 910 grams.



Janet takes a sample of boxes with a sample mean of 913 grams.

What is the sample error?

grams

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Worked Example for Standard Questions

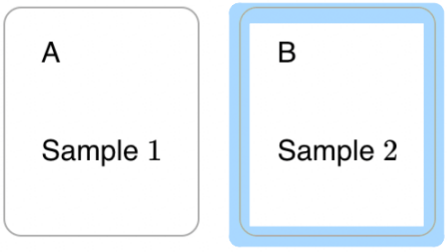
A fruit processing factory takes two samples of 45 tins of peaches and calculates their mean weight.

Sample 1: mean weight $=$ 411.8 grams

Sample 2: mean weight $=$ 408.1 grams

* Sample error is the difference between the sample mean and the population mean

If the population mean weight is 410 grams, which sample has the **greater** sample error?



Sample 1: sample error = 411·8 − 410
= 1·8 grams

Sample 2: sample error = 410 − 408·1
= 1·9 grams

Question 6

A small goods factory takes two samples of 40 packets of sliced ham and calculates their mean weight.

Sample 1: mean weight $=$ 98.3 grams

Sample 2: mean weight $=$ 101.4 grams

If the population mean weight is 100 grams, which sample has the **greater** sample error?

Circle the correct option

A	**B**
Sample 1	Sample 2

Question 7

A cake factory takes two samples of 30 cakes and calculates their mean weight.

Sample 1: mean weight $=$ 664 grams

Sample 2: mean weight $=$ 654 grams

If the population mean weight is 660 grams, which sample has the **greater** sample error?

Circle the correct option

A	**B**
Sample 1	Sample 2

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Question 8

A pasta factory takes two samples of 25 packets of pasta and calculates their mean weight.

Sample 1: mean weight $= 504$ grams

Sample 2: mean weight $= 496.5$ grams

If the population mean weight is 500 grams, which sample has the **greater** sample error?

Circle the correct option

A

Sample 1

B

Sample 2

Question 9

A biscuit factory takes two samples of 40 packets of biscuits and calculates their mean weight.

Sample 1: mean weight $= 334$ grams

Sample 2: mean weight $= 325.5$ grams

If the population mean weight is 330 grams, which sample has the **greater** sample error?

Circle the correct option

A

Sample 1

B

Sample 2

Question 10

A potato processing factory takes two samples of 60 packets of chips and calculates their mean weight.

Sample 1: mean weight $= 168$ grams

Sample 2: mean weight $= 161$ grams

If the population mean weight is 165 grams, which sample has the **greater** sample error?

Circle the correct option

A

Sample 1

B

Sample 2

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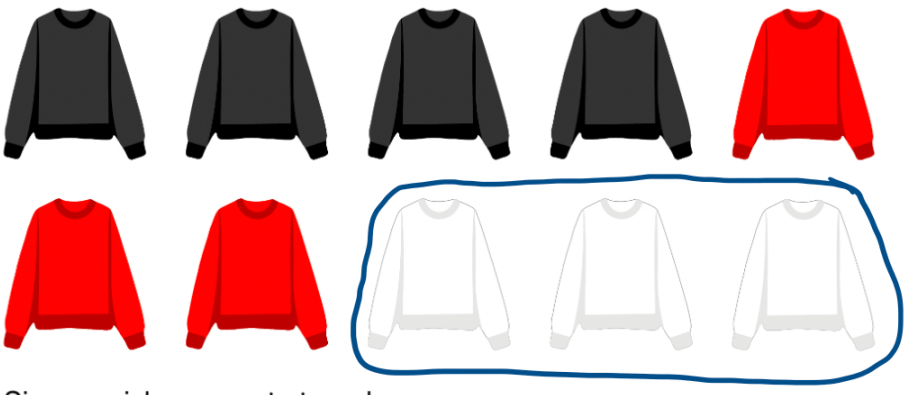
Ex 11.7

A calculator is permitted throughout this exercise.

Worked Example for Simple Questions

Simone has a drawer of 4 black, 3 red and 3 white sweaters.



Simone picks one out at random.

What is the probability of her choosing a **white** sweater?

$$Pr(\text{white}) = \frac{\text{number of white sweaters}}{\text{total number of sweaters}}$$

$$= \frac{3}{4+3+3}$$

$$= \frac{3}{10}$$

$\frac{3}{10}$

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Question 1

Sam has a drawer of 1 black, 2 green, 2 red and 3 blue sweaters.



Sam picks one out at random.

What is the probability of him choosing a **black** sweater?

Fraction: $\frac{\square}{\square}$

Question 2

Kendall has a drawer of 4 blue, 3 red and 2 white sweaters.



Kendall picks one out at random.

What is the probability of her choosing a **white** sweater?

Fraction: $\frac{\square}{\square}$

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Question 3

Nancy has a drawer of 3 pink, 2 green and 2 yellow sweaters.



Nancy picks one out at random.

What is the probability of her choosing a **yellow** sweater?

Fraction: $\frac{\square}{\square}$

Question 4

Esmie has a drawer of 3 blue and 2 pink sweaters.



Esmie picks one out at random.

What is the probability of her choosing a **pink** sweater?

Fraction: $\frac{\square}{\square}$

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Question 5

Aoife has a drawer of 3 pink, 2 green and 2 yellow sweaters.



Aoife picks one out at random.

What is the probability of her choosing a **pink** sweater?

Fraction: $\frac{\square}{\square}$

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Worked Example for Standard Questions

A bag contains 6 white marbles and 4 blue marbles.

A marble is chosen at random.



What is the probability that the marble is white?

Give your answer in its simplest form.

$$\Pr(\text{white}) = \frac{\text{number of white marble}}{\text{total number of marbles}}$$

$$= \frac{6}{6+4}$$

$$= \frac{6}{10}$$ simplify

$$= \frac{3}{5}$$

$\frac{3}{5}$

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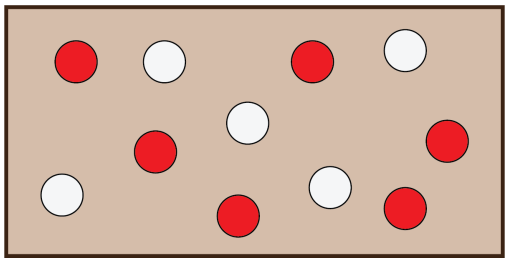
Question 6

In a box, there are 5 white counters and 6 red counters.

A counter is chosen at random.



What is the probability that the counter is white?

Give your answer in its simplest form.

Fraction: $\frac{\square}{\square}$

Question 7

Emma chooses a tile from this bag without looking.



What is the probability Emma chooses a tile with a ★?

Give your answer in its simplest form.

Fraction: $\frac{\square}{\square}$

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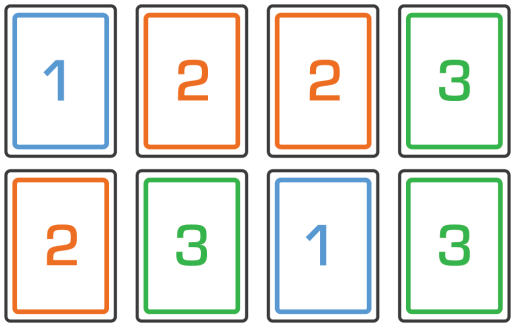
Question 8

Emiko has 8 cards with numbers on them.

She chooses one card at random.



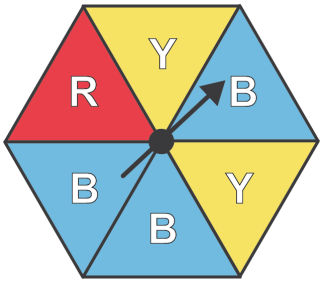
What is the probability Emiko chooses a card with a number 1?

Give your answer in its simplest form.

Fraction: $\frac{\square}{\square}$

Question 9

The spinner below is spun once.



What is the probability the spinner lands on blue (B)?

Give your answer in its simplest form.

Fraction: $\frac{\square}{\square}$

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Question 10

Daisy spins this spinner.



What is the probability the spinner lands on a heart?

Give your answer in its simplest form.

Fraction: $\frac{\square}{\square}$

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Using Complementary Events to find Probabilities

Ex 11.9

A scientific calculator is permitted throughout this exercise.

Worked Example for Simple Questions

The probability of Wayne scoring a goal is 0.62.

What is the probability of Wayne **not** scoring a goal?

$Pr(\text{not scoring}) = 1 - Pr(\text{scoring})$

$= 1 - 0.62$

$= 0.38$

Answer:

0·38



Question 1

The probability of Andrew winning a raffle is 0.15.

What is the probability of Andrew **not** winning a raffle?

Question 2

The probability of Margo winning a game of darts is 0.13.

What is the probability of Margo **not** winning a game of darts?

Question 3

The probability of Steph scoring a goal is 0.67.

What is the probability of Steph **not** scoring a goal?

Question 4

The probability that it will rain today is 0.25.

What is the probability that it will **not** rain today?

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Question 5

The probability of Caleb scoring a goal is 0.75.

What is the probability of Caleb **not** scoring a goal?

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Using Complementary Events to find Probabilities

Worked Example for Standard Questions

The probability of Amos kicking a goal is $\frac{1}{5}$.

What is the probability of Amos **not** kicking a goal?

$\frac{4}{5}$

$\Pr(\text{not kicking goal}) = 1 - \Pr(\text{kicking goal})$

$= 1 - \frac{1}{5}$

$= \frac{5}{5} - \frac{1}{5}$

$= \frac{4}{5}$

Question 6

The probability of **not** being sunny tomorrow is 0.34.

What is the probability of it being sunny tomorrow?

Question 7

The probability of Zia **not** getting to school on time is 0.18.

What is the probability of Zia getting to school on time?

Question 8

The probability of Ruby winning a game of chess is $\frac{1}{6}$.

What is the probability of Ruby **not** winning a game of chess?

Question 9

The probability of it being sunny tomorrow is 0.56.

What is the probability of it **not** being sunny tomorrow?

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Question 10

The probability of Rick **not** winning a race is $\frac{5}{7}$.

What is the probability of Rick winning a race?

$$\frac{\square}{\square}$$

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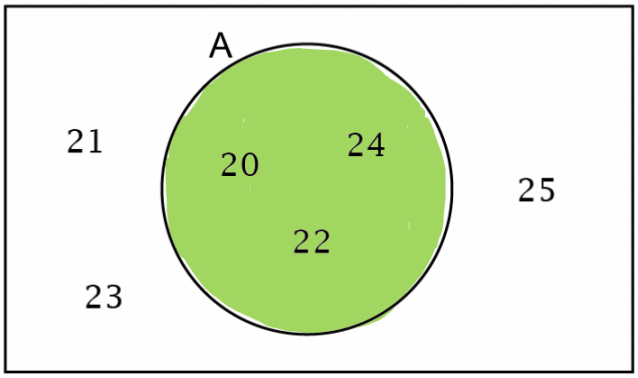
Ex 11.11

No calculators are permitted in this exercise.

Worked Example for Simple Questions

Here is a Venn diagram.



Set A is: * All the numbers in the circle

A	B	C
$\{20, 22, 24\}$	$\{21, 23, 25\}$	$\{20, 21, 22, 23, 24, 25\}$

This is A', the complement of A

This is the universal set, everything in the Venn diagram

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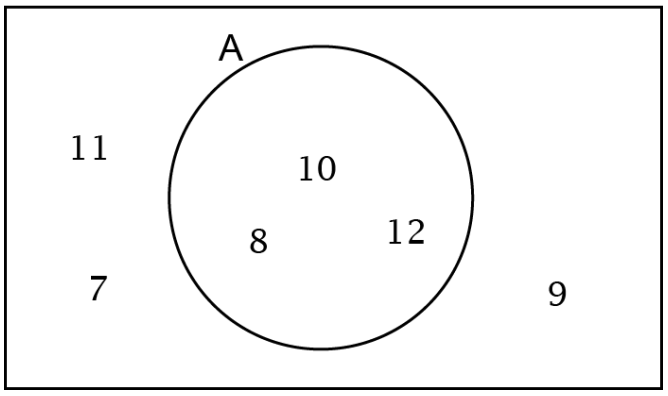
Venn Diagrams

Question 1

Here is a Venn diagram.



Set A is:

Circle the correct option

A

$\{7, 8, 9, 10, 11, 12\}$

B

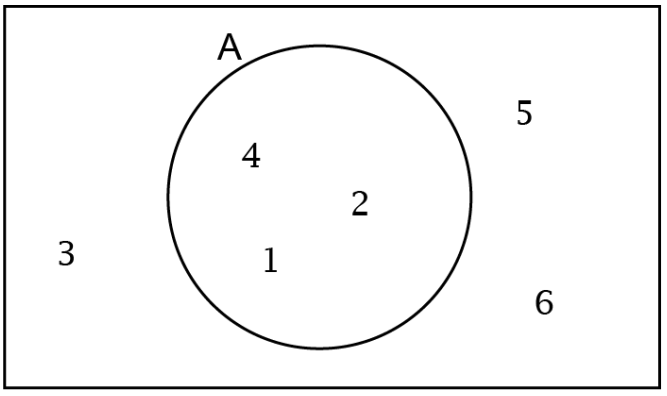
$\{7, 9, 11\}$

C

$\{8, 10, 12\}$

Question 2

Here is a Venn diagram.



Set A', the complement of A, is:

Circle the correct option

A

$\{1, 2, 4\}$

B

$\{1, 2, 3, 4, 5, 6\}$

C

$\{3, 5, 6\}$

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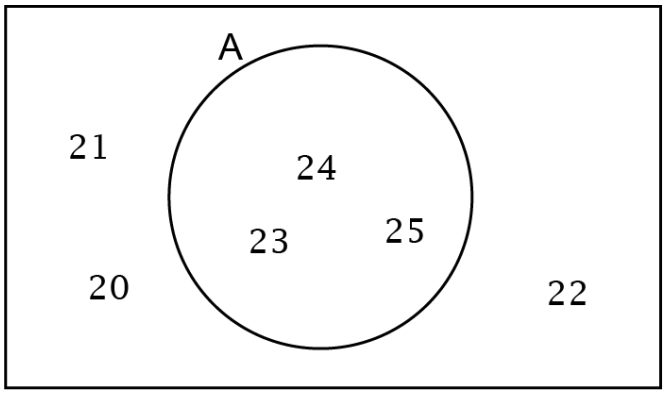
Question 3

Here is a Venn diagram.



Set A', the complement of A, is:

Circle the correct option

A

$\{23, 24, 25\}$

B

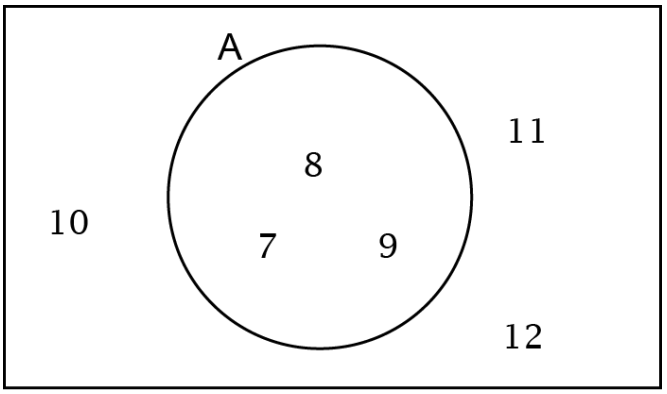
$\{20, 21, 22, 23, 24, 25\}$

C

$\{20, 21, 22\}$

Question 4

Here is a Venn diagram.



Set A is:

Circle the correct option

A

$\{7, 8, 9, 10, 11, 12\}$

B

$\{7, 8, 9\}$

C

$\{10, 11, 12\}$

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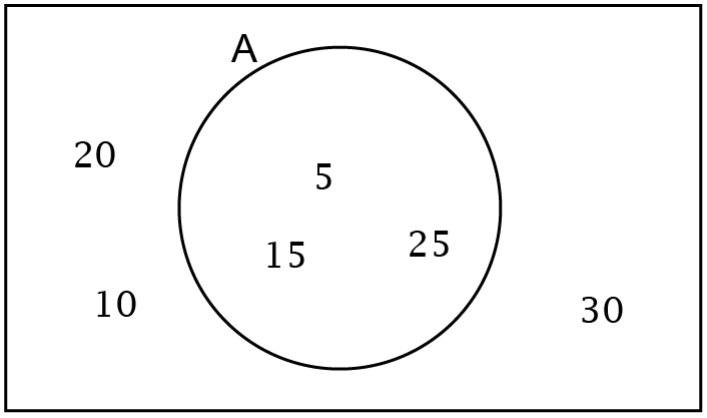
Question 5

Here is a Venn diagram.



Set A is:

Circle the correct option

A

$\{10, 20, 30\}$

B

$\{5, 10, 15, 20, 25, 30\}$

C

$\{5, 15, 25\}$

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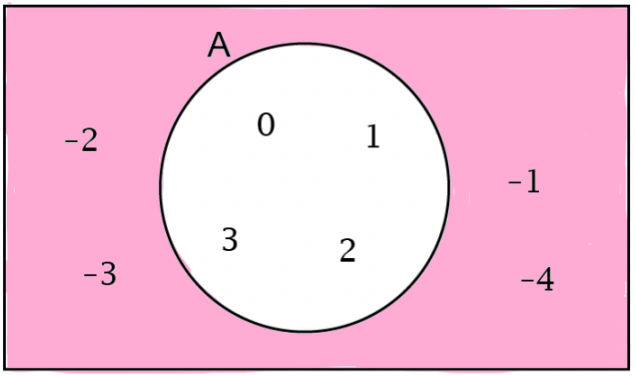
Worked Example for Standard Questions

Here is a Venn diagram.



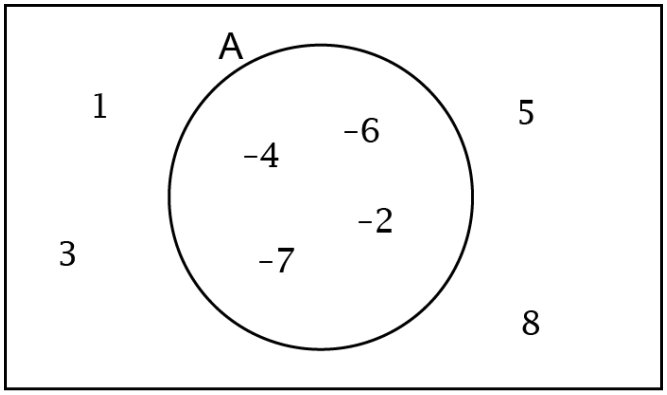
A′ is all the numbers not in A (not in the circle)

What is set A′?

$A' = \{ -1, -2, -3, -4 \}$

Question 6

Here is a Venn diagram.

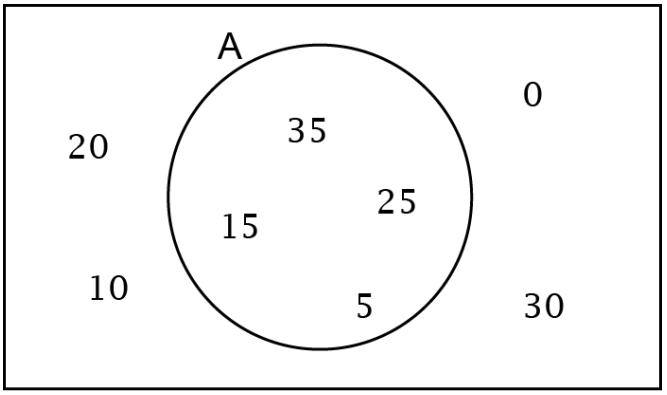


What is set A?

$A = \{ \square, \square, \square, \square \}$

Question 7

Here is a Venn diagram.



What is set A′?

$A' = \{ \square, \square, \square, \square \}$

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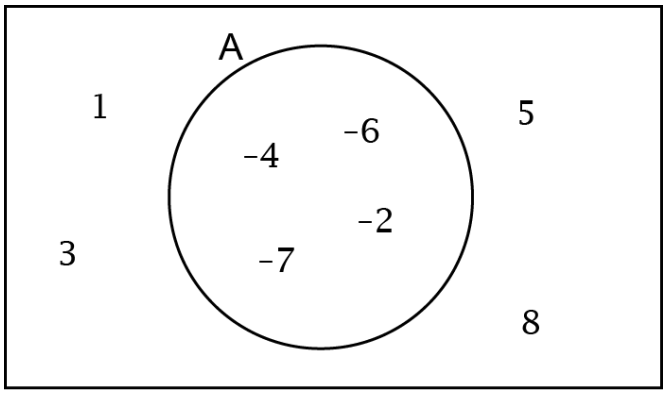
Question 8

Here is a Venn diagram.

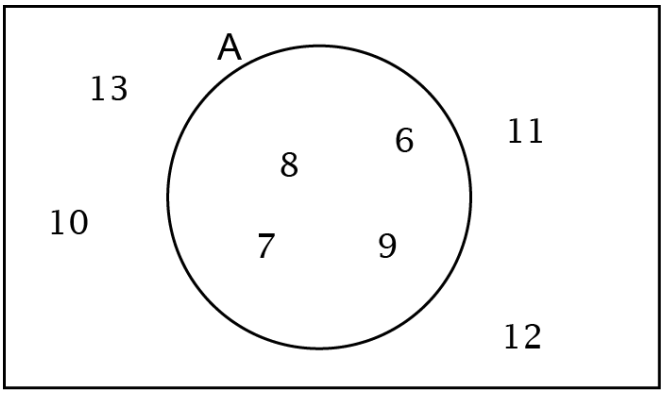


What is set A'?

$A' = \{ \square , \square , \square , \square \}$

Question 9

Here is a Venn diagram.

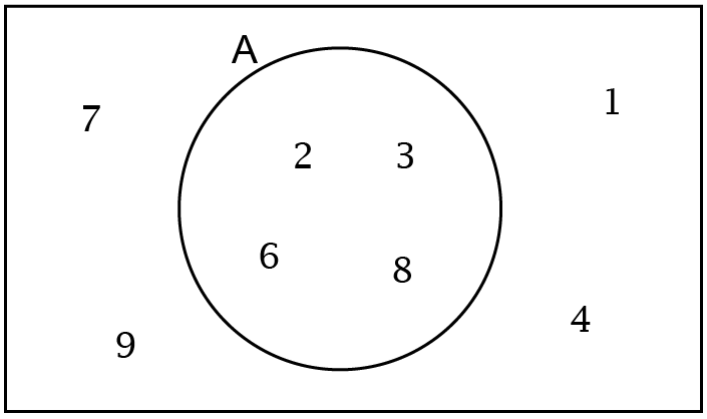


What is set A'?

$A' = \{ \square , \square , \square , \square \}$

Question 10

Here is a Venn diagram.



What is set A?

$A = \{ \square , \square , \square , \square \}$

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