

Implications and Deductions Worksheet 2

Question 1

Suppose n is an integer which is a negative multiple of 18.

Which of the following is a valid deduction?

- A n is positive.
- B n is divisible by 6.
- C n is a multiple of 36.
- D $n = -18$.

Question 2

If an assignment is submitted after the deadline, then it loses 5 marks. Talia's assignment lost 5 marks.

Which conclusion can be validly deduced?

- A Talia's assignment was submitted after the deadline.
- B Talia's assignment lost marks.
- C No other assignment lost marks.
- D Every submitted assignment lost 5 marks.

Question 3

Suppose x and y are real numbers with $x > 4$ and $y = 2x - 5$.

Which of the following follows?

- A $y = 3$.
- B $y > 3$.
- C $y < 3$.
- D $x < 5$.

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Question 4

Every red folder is kept in Cabinet A. No folder in Cabinet A is labelled *draft*. Folder F is red. What can be validly concluded?

- A Folder F is not in Cabinet A.
- B Folder F is labelled *draft*.
- C Folder F is not labelled *draft*.
- D Every folder not labelled *draft* is red.

Question 5

Suppose m is an integer and m^2 is an odd multiple of 9. Which conclusion is forced?

- A m is a multiple of 9.
- B m is odd and divisible by 3.
- C m is positive.
- D $m^2 = 9$.

Question 6

Let p and q be real numbers with $p > q > 0$. Which of the following is **not** forced?

- A $\frac{p}{q} > 1$.
- B $p^2 > q^2$.
- C $p + q > 0$.
- D $p - q > 1$.

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Question 7

Anyone who books the private room receives a confirmation email. Anyone who receives a confirmation email should bring ID. Nora booked the private room.

Which conclusion follows from the chain of deductions?

- A Nora should bring ID.
- B Nora owns the private room.
- C Everyone who brings ID booked the private room.
- D Nora did not receive a confirmation email.

Question 8

Suppose $A \Rightarrow B$ and $B \Rightarrow C$. We also know that B is true.

Which deduction is valid?

- A A is true.
- B C is true.
- C $C \Rightarrow A$ is true.
- D A is false.

Question 9

If a parcel is marked fragile, then it is handled by a supervisor. Parcel K is handled by a supervisor.

Which conclusion is **not** validly deduced?

- A Parcel K is handled by a supervisor.
- B Parcel K is marked fragile.
- C At least one parcel is handled by a supervisor.
- D Any fragile parcel is handled by a supervisor.

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Question 10

Suppose x is real and $(x - 3)(x + 2) = 0$.

Which conclusion can be deduced?

- A $x = 3$ or $x = -2$.
- B $x = 3$.
- C $x > 0$.
- D $x \neq -2$.

Question 11

If it rains during the school trip, then the group visits the museum. If the group visits the museum, then each student needs a notebook. It rains during the school trip.

Which statement is **not** validly deduced?

- A The group visits the museum.
- B Each student needs a notebook.
- C It rains during the school trip.
- D The school trip is cancelled.

Question 12

Suppose we accept the implication: if dragons have strong enough working wings, then dragons can fly.

What can be concluded from this implication alone?

- A Dragons have strong enough working wings.
- B Dragons can fly now.
- C If dragons have strong enough working wings, then dragons can fly.
- D No animal except a dragon can fly.

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Question 13

Suppose t is a real number and $t < -2$.

Which of the following is a valid deduction?

- A $t^2 > 4$.
- B $t > -2$.
- C $t + 2 > 0$.
- D $t = -3$.

Question 14

All members of the chess club are students at Oak School. Some students at Oak School play the violin. Zara is a member of the chess club.

Which conclusion follows?

- A Zara is a student at Oak School.
- B Zara plays the violin.
- C All students at Oak School are in the chess club.
- D Every chess club member plays the violin.

Question 15

Suppose $x > 1 \Rightarrow y > 0$ and $y > 0 \Rightarrow z < 5$. We also know that $x > 1$.

Which conclusion is forced?

- A $z > 5$.
- B $y \leq 0$.
- C $z < 5$.
- D $x = 1$.

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Question 16

Every applicant who completed both forms gets an interview. Ravi is an applicant, and Ravi got an interview.

Which conclusion does **not** follow?

- A Ravi is an applicant.
- B Ravi got an interview.
- C At least one applicant got an interview.
- D Ravi completed both forms.

Question 17

Suppose a and b are integers with $a = 2b$, and b is a multiple of 5.

Which conclusion is valid?

- A a is odd.
- B b is a multiple of 2.
- C a is a multiple of 5 but not of 10.
- D a is a multiple of 10.

Question 18

If the freezer door is left open, then the alarm sounds. If the alarm sounds, then the manager is notified. The freezer door is left open.

Which conclusion follows?

- A The manager is notified.
- B The freezer is empty.
- C The alarm is broken.
- D The manager left the freezer door open.

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Question 19

For every real number x , we know $(x + 1)^2 \geq 0$.

Which conclusion follows?

- A $x^2 + 2x + 4 \geq 3$.
- B $x^2 + 2x + 4 < 0$.
- C $x + 1 \geq 0$.
- D $x^2 + 2x + 1 = 0$.

Question 20

Every code that starts with A is checked manually. Every manually checked code is recorded in the log. Code R starts with A.

Which conclusion is **not** validly deduced?

- A Code R is checked manually.
- B Code R is recorded in the log.
- C Code R starts with A.
- D Every code recorded in the log starts with A.