Implications and Deductions Worksheet 1 Solutions

Question 1

A multiple of 12 is automatically divisible by 3, since $12 = 4 \cdot 3$. It need not be a multiple of 24, prime, or exactly 12.
The answer is **B**.

Question 2

Priya is travelling from London to Edinburgh, but the statement does not say that she has already arrived in Edinburgh. So that conclusion is not forced.
The answer is **C**.

Question 3

If $x > 7$, then x is certainly greater than 0. The value of x is not forced to be 8, it need not be less than 10, and x^2 is greater than 49, not less than 49.
The answer is **D**.

Question 4

Every student in Room A has handed in the form, and Maya is a student in Room A. Therefore Maya has handed in the form.
The answer is **A**.

Question 5

An odd integer may be positive or negative. For example, -3 is odd but not positive. So m being positive is not a valid deduction.
The answer is **D**.

Question 6

The implication says that if the alarm is sounding, then the building must be evacuated. Since the alarm is sounding, the required conclusion follows directly.
The answer is **B**.

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Question 7

Since $a > b$, subtracting b from both sides gives $a - b > 0$. The other options reverse the inequality or contradict positivity.
The answer is **A**.

Question 8

The statement tells us what premium tickets include, but it says nothing about travelling first class. That conclusion does not follow.
The answer is **D**.

Question 9

If k^2 is divisible by 9, then k^2 has two factors of 3, so k must have at least one factor of 3. Hence k is divisible by 3.
The answer is **A**.

Question 10

The bakery opened at 6:30 am, which is before 7 am. Therefore the implication gives that it sells breakfast pastries today.
The answer is **A**.

Question 11

When $x = 2$, the first three conclusions are true. However, $(x - 1)x = 2(x - 1)$ also holds when $x = 1$, so $x = 2$ is not the only value satisfying the equation.
The answer is **D**.

Question 12

The statement gives that the laptop is plugged in, switched on, and therefore its charging light is on. It says nothing about whether the battery is full.
The answer is **D**.

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Question 13

Substituting $x = 2$ into $y = 3x + 1$ gives $y = 3(2) + 1 = 7$. This conclusion is forced.
The answer is **C**.

Question 14

Every book on the top shelf is a history book, and the blue book is on the top shelf. Therefore the blue book is a history book.
The answer is **A**.

Question 15

From $x^2 > 16$, we know $|x| > 4$, so $x > 4$ or $x < -4$. But $x > 4$ alone is not forced, since $x = -5$ also satisfies $x^2 > 16$.
The answer is **C**.

Question 16

The statement says all cats in the shelter have been vaccinated. It does not say that every vaccinated animal is a cat.
The answer is **D**.

Question 17

Since A is true and $A \Rightarrow B$, we can deduce B. Since $B \Rightarrow C$, we can then deduce C.
The answer is **A**.

Question 18

The team won the final, so it receives a trophy. Since receiving a trophy implies appearing in the newspaper, the team appears in the newspaper.
The answer is **A**.

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Question 19

A prime number greater than 2 must be odd, at least 3, and not divisible by 2. But it need not be exactly 3, since 5 is also a prime number greater than 2.
The answer is **D**.

Question 20

Green Deli sells only vegetarian sandwiches. The implication says that in this case every sandwich it sells contains no meat.
The answer is **B**.