

## Implications and Deductions Worksheet 2 Solutions

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### Question 1

Since  $18 = 3 \cdot 6$ , every multiple of 18 is divisible by 6. Being negative does not force  $n$  to be  $-18$ , nor does it force  $n$  to be a multiple of 36.

The answer is **B**.

### Question 2

The statement tells us that late submission is enough to lose 5 marks. It does not say that losing 5 marks can happen only by late submission. The only forced conclusion here is that Talia's assignment lost marks.

The answer is **B**.

### Question 3

Since  $x > 4$ , multiplying by 2 gives  $2x > 8$ , so  $2x - 5 > 3$ . Therefore  $y > 3$ .

The answer is **B**.

### Question 4

Folder F is red, so it is kept in Cabinet A. No folder in Cabinet A is labelled *draft*, so Folder F is not labelled *draft*.

The answer is **C**.

### Question 5

Since  $m^2$  is odd,  $m$  must be odd. Since  $m^2$  is divisible by 9,  $m$  must be divisible by 3. But  $m$  need not be divisible by 9, positive, or satisfy  $m^2 = 9$ .

The answer is **B**.

### Question 6

The first three statements follow from  $p > q > 0$ . However,  $p - q$  need not be greater than 1; for example,  $p = 2$  and  $q = 1.5$  satisfy  $p > q > 0$  but  $p - q = 0.5$ .

The answer is **D**.

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### Question 7

Nora booked the private room, so she receives a confirmation email. Anyone who receives a confirmation email should bring ID, so Nora should bring ID.

The answer is **A**.

### Question 8

From  $B$  being true and  $B \Rightarrow C$ , we may deduce that  $C$  is true. Knowing  $B$  is true does not force  $A$  to be true or false.

The answer is **B**.

### Question 9

The implication only goes from marked fragile to handled by a supervisor. Since Parcel K is handled by a supervisor, we cannot reverse the direction and conclude that it is marked fragile.

The answer is **B**.

### Question 10

For the product  $(x - 3)(x + 2)$  to be zero, at least one factor must be zero. Hence  $x = 3$  or  $x = -2$ . The value is not forced to be 3 alone.

The answer is **A**.

### Question 11

The rain implies a museum visit, and the museum visit implies that each student needs a notebook. Nothing in the statement says the trip is cancelled.

The answer is **D**.

### Question 12

An implication by itself is hypothetical. It says what would follow if the first part were true, but it does not say that dragons actually have such wings or that dragons actually fly.

The answer is **C**.

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### Question 13

If  $t < -2$ , then  $t$  is more than 2 units away from zero on the negative side, so  $t^2 > 4$ . The exact value of  $t$  is not forced.

The answer is **A**.

### Question 14

Zara is a member of the chess club, and all members of the chess club are students at Oak School. The violin statement only says that some Oak School students play violin, not that Zara does.

The answer is **A**.

### Question 15

From  $x > 1$  and  $x > 1 \Rightarrow y > 0$ , we deduce  $y > 0$ . Then from  $y > 0 \Rightarrow z < 5$ , we deduce  $z < 5$ .

The answer is **C**.

### Question 16

The rule says that completing both forms guarantees an interview. It does not say that everyone who gets an interview must have completed both forms.

The answer is **D**.

### Question 17

Since  $b$  is a multiple of 5, write  $b = 5k$  for some integer  $k$ . Then  $a = 2b = 10k$ , so  $a$  is a multiple of 10.

The answer is **D**.

### Question 18

The freezer door being left open implies that the alarm sounds. The alarm sounding implies that the manager is notified. Therefore the manager is notified.

The answer is **A**.

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### Question 19

Expanding gives  $x^2 + 2x + 1 \geq 0$ . Adding 3 to both sides gives  $x^2 + 2x + 4 \geq 3$ .

The answer is **A**.

### Question 20

Code R starts with A, so it is checked manually, and therefore recorded in the log. But the implications do not say that every logged code must have started with A.

The answer is **D**.

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