Question 1. Decipher the following ciphertext into plaintext: **XQVHH QSDWK VDKHD G** and determine the key.

Solution. Starting with the ciphertext given by

```
X Q V H H   Q S D W K   V D K H D   G
= = = = =   = = = = =   = = = = =   =
Y R W I I   R T E X L   W E L I E   H
Z S X J J   S U F Y M   X F M J F   I
A T Y K K   T V G Z N   Y G N K G   J
B U Z L L   U W H A O   Z H O L H   K
C V A M M   V X I B P   A I P M I   L
D W B N N   W Y J C Q   B J Q N J   M
E X C O O   X Z K D R   C K R O K   N
F Y D P P   Y A L E S   D L S P L   O
G Z E Q Q   Z B M F T   E M T Q M   P
H A F R R   A C N G U   F N U R N   Q
I B G S S   B D O H V   G O V S O   R
J C H T T   C E P I W   H P W T P   S
K D I U U   D F Q J X   I Q X U Q   T
L E J V V   E G R K Y   J R Y V R   U
M F K W W   F H S L Z   K S Z W S   V
N G L X X   G I T M A   L T A X T   W
O H M Y Y   H J U N B   M U B Y U   X
P I N Z Z   I K V O C   N V C Z V   Y
Q J O A A   J L W P D   O W D A W   Z
R K P B B   K M X Q E   P X E B X   A
S L Q C C   L N Y R F   Q Y F C Y   B
T M R D D   M O Z S G   R Z G D Z   C
U N S E E   N P A T H   S A H E A   D <-
V O T F F   O Q B U I   T B I F B   E
W P U G G   P R C V J   U C J G C   F
```

The plaintext is then `UNSEE NPATH SAHEA D`

For the key, observe that because X gets mapped to U, then

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓	⇓
X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W

So our key is X.