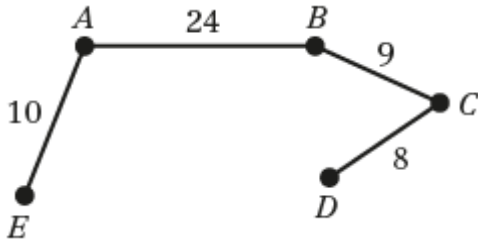


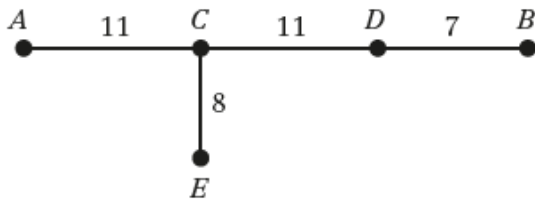
Exercise 5B

1 a Initial upper bound = $2 \times 51 = 102$

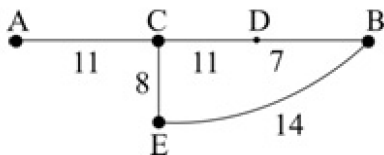


- b Use DE as a shortcut
Route length = $51 + 28 = 79$
- c Route $ABCDEA$ length 79

2 a

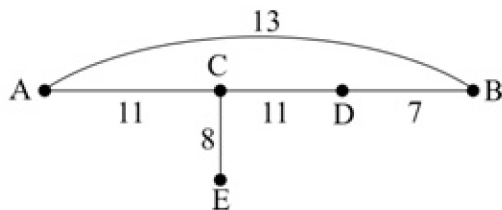


- b Initial upper bound = $2 \times 37 = 74$
- c For example
 - i use BE as a shortcut



or

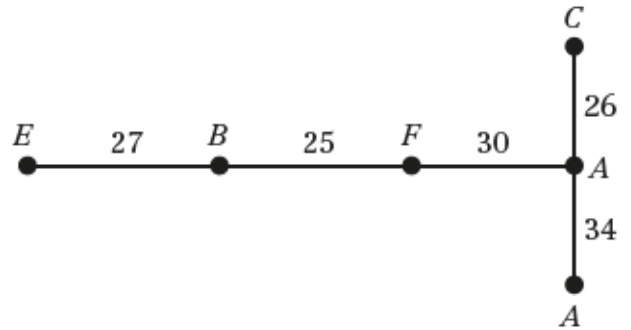
- ii use AB as a shortcut



Other answers also possible

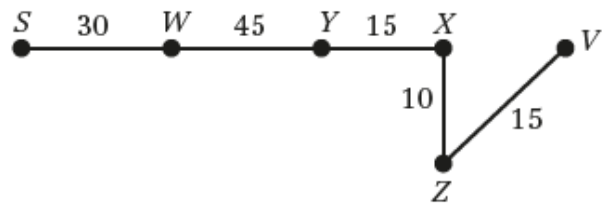
- d i Using BE route is $ACEBDCA$ length 62
- ii Using AB route is $ACECDBA$ length 58

3 a Initial upper bound = $2 \times 142 = 284$



- b Many possibilities: for example DE or EC or DF and EC
- c DE gives $ACAFBEDA$ length 231
 EC gives $ADAFBECA$ length 217
 DF and EC gives $ACEDFDA$ length 190

4 a



Initial upper bound = $2 \times 115 = 230$

- b For example arc VS
- c Route $SWYXZVS$ length 190