

## Section 2.6 Exercises

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2.35 Let  $P$  : 18 is odd and  $Q$  : 25 is even. Then  $P \iff Q$  can be written as 18 is odd if and only if 25 is even. Furthermore  $P \iff Q$  is true.

2.37 For the open sentences  $P(x) : |x - 3| < 1$  and  $Q(x) : x \in (2, 4)$  over the domain  $\mathbb{R}$  the biconditional  $P(x) \iff Q(x)$  can be stated in a few different ways including the following.

1.  $|x - 3| < 1$  if and only if  $x \in (2, 4)$ .
2.  $|x - 3| < 1$  is equivalent to  $x \in (2, 4)$ .

2.39 For the following open sentences  $P(x)$  and  $Q(x)$  over a domain  $S$ , determine all values of  $x \in S$  for which the biconditional  $P(x) \iff Q(x)$  is true.

- (a)  $P(x) : |x| = 4; Q(x) : x = 4; S = \{-4, -3, 1, 4, 5\}$ . This has the following corresponding truth table.

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x	-4	3	1	4	5
P(x)	T	F	F	T	F
Q(x)	F	F	F	T	F

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From this truth table we can observe that  $P(x) \iff Q(x)$  is false when  $x = -4$  and true for all other vales of  $x \in S$ .