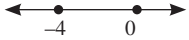
Fully-worked Solutions

Practice 7

Formative Practice

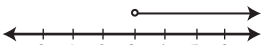
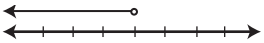
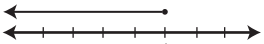
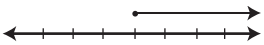
1 A Correct
B Correct
C Wrong
D Correct
Asnwer: **C**

2

	Number line	Relation between two numbers
(a)		$4 < 6, 6 > 4$
(b)		$-2 < 1, 1 > -2$
(c)		$-8 < -5, -5 > -8$
(d)		$-4 < 0, 0 > -4$

3 (a) $-5 < 3$ (b) $-2 > -8$
4 (a) False (c) True
(b) True (d) False

5

	Inequality	Number line	
(a)	$x > 3$		✓
(b)	$x \leq -1$		✗
(c)	$4 \geq x$		✓
(d)	$-5 \geq x$		✗

6 (a) If $m < x < n$, then $m < n$. → Converse property
(b) If $m > n$, then $n < m$. → Transitive property

(c) If $m > n$, then $\frac{1}{m} < \frac{1}{n}$. → Multiplicative inverse
(d) If $m > n$, then $-m < -n$. → Additive inverse

7 (a) $>$ (b) $<$ (c) $>$ (d) $<$
8 (a) ✗ (b) ✓ (c) ✓ (d) ✗

9 (a) $3 < 8$
$3 + 2 < 8 + 2$
$5 < 10$
(b) $2 > -4$
$2 - 5 > -4 - 5$
$-3 > -9$
(c) $\frac{5}{9} > \frac{1}{3}$
$\frac{5}{9} \times 9 > \frac{1}{3} \times 9$
$5 > 3$
(d) $-6 < -3$
$-6 \div (-3) > -3 \div (-3)$
$2 > 1$

10 (a) $h > 5$
$h + 1 \boxed{>} 5 + 1$
(b) $m < -3$
$m - 2 \boxed{<} -3 - 2$
(c) $-\frac{1}{2}p \leq -4$
$-\frac{1}{2}p \times (-2) \boxed{\geq} -4 \times (-2)$
(d) $-3t \geq 27$
$\frac{-3t}{-3} \boxed{\leq} \frac{27}{-3}$

11 $m \geq 80$
$80 \leq m$
Answer: **D**
12 $y > 150$
13 (a) The rate of dividend paid by Company OWC each year is less than 8%.
(b) A polygon has at least 3 sides.

14 (a) $-\frac{1}{4}x \geq -2$

$-\frac{1}{4}x \times (-4) \leq -2 \times (-4)$

$x \leq 8$ [No]

(b) $-\frac{1}{4}x \geq -2$

$-\frac{1}{4}x \times 4 \geq -2 \times 4$

$-x \geq -8$ [Yes]

(c) $-\frac{1}{4}x \geq -2$

$-\frac{1}{4}x + 2 \geq -2 + 2$

$2 - \frac{1}{4}x \geq 0$ [Yes]

(d) $-\frac{1}{4}x \geq -2$

$-\frac{1}{4}x \times (-1) \leq -2 \times (-1)$

$\frac{1}{4}x \leq 2$

$2 \geq \frac{1}{4}x$ [No]

15 (a) $7m < -21$

$m < -3$

(b) $-\frac{1}{3}k \geq -4$

$-\frac{1}{3}k \times (-3) \leq -4 \times (-3)$

$k \leq 12$

(c) $11 \leq 3 - r$

$r \leq -8$

(d) $3x + 7 > 4$

$3x > -3$

$x > -1$

16 $\frac{1}{2}k - 4 < k - 2$

$\frac{1}{2}k - k < -2 + 4$

$-\frac{1}{2}k < 2$

$-\frac{1}{2}k \times (-2) > 2 \times (-2)$

$k > -4$

Answer: **A**

17 (a) ✗ (b) ✗

(c) ✓ (d) ✓

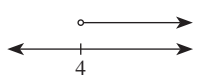
18 $4x - 23 \geq 37$

$4x \geq 60$

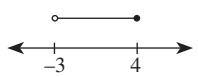
$x \geq 15$

The smallest value of x is 15.

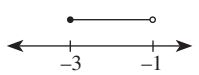
19 (a)



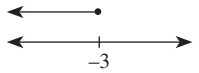
(b)



(c)



(d)



20 (a) (i) $a + 9 > 7$

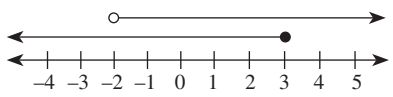
$a > -2$

(ii) $2a - 5 \leq 1$

$2a \leq 6$

$a \leq 3$

(b)



(c) $-2 < a \leq 3$

21 $-3k < 15$

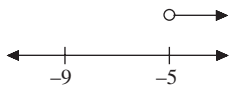
$-3k \div (-3) > 15 \div (-3)$

$k > -5$

$8k + 3 > 7k - 6$

$8k - 7k > -6 - 3$

$k > -9$



Answer: **A**

22 (a) $-1 \leq \frac{1}{2}(2 - k)$

$-2 \leq 2 - k$

$k \leq 4$

$2k + 7 < 3(k + 3)$

$2k + 7 < 3k + 9$

$2k - 3k < 9 - 7$

$-k < 2$

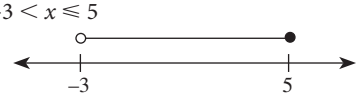
$k > -2$

$\therefore -2 < k \leq 4$

(b) $-1, 0, 1, 2, 3, 4$

Summative Practice

1 $-3 < x \leq 5$



Answer: **B**

2 $2 \leq x$

$x \geq 2$

Answer: **B**

3 $-3 < 6 - x \leq 4$

$-3 < 6 - x$

$x < 9$

$6 - x \leq 4$

$-x \leq -2$

$x \geq 2$

$\therefore 2 \leq x < 9$

Answer: **A**

4 $7 \leqslant w - 4 < 10$

$7 + 4 \leqslant w < 10 + 4$

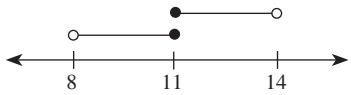
$11 \leqslant w < 14$

$19 < 2w + 3 \leqslant 25$

$19 - 3 < 2w \leqslant 25 - 3$

$16 < 2w \leqslant 22$

$8 < w \leqslant 11$



Integer $w = 11$

Answer: **C**

5 $7 - 2y < 1$

$-2y < -6$

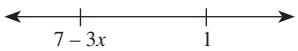
$-2y \div (-2) > -6 \div (-2)$

$y > 3$

The smallest value of y is 4.

Answer: **C**

6



(a) $7 - 3x < 1$

(b) $-3x < -6$

$-3x \div (-3) > -6 \div (-3)$

$x > 2$

$\therefore x = 3, 4, 5, 6, \ldots$

7 $2k - 3 < 5$

$2k < 8$

$k < 4$

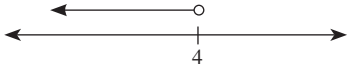
$k + 4 \leqslant 14 - 9k$

$k + 9k \leqslant 14 - 4$

$10k \leqslant 10$

$k \leqslant 1$

Solution: $k < 4$



8 (a) $\frac{1}{2}m + 1 > \frac{5}{8} - \frac{3}{4}m$

$\frac{1}{2}m + \frac{3}{4}m > \frac{5}{8} - 1$

$\frac{5}{4}m > -\frac{3}{8}$

$m > -\frac{3}{8}\left(\frac{4}{5}\right)$

$m > -\frac{3}{10}$

(b) $5a - 7 \geqslant 2(4 - a)$

$5a - 7 \geqslant 8 - 2a$

$7a \geqslant 15$

$a \geqslant \frac{15}{7}$

9 I: $x + 4 \leqslant -x$

$2x \leqslant -4$

$x \leqslant -2$

II: $2 - x \leqslant 0$

$-x \leqslant -2$

$x \geqslant 2$

III: $-\frac{1}{2}x \geqslant -1$

$x \leqslant 2$

IV: $\frac{x-1}{2} \geqslant 1$

$x - 1 \geqslant 2$

$x \geqslant 3$

V: $\frac{1}{3} \geqslant \frac{1}{6}x$

$6 \geqslant 3x$

$2 \geqslant x$

$x \leqslant 2$

VI: $2 \geqslant \frac{x+4}{3}$

$6 \geqslant x + 4$

$2 \geqslant x$

$x \leqslant 2$

VII: $x \geqslant 2x - 2$

$-x \geqslant -2$

$x \leqslant 2$

VIII: $-1 \leqslant x - 3$

$2 \leqslant x$

$x \geqslant 2$

$-\frac{1}{2}x \geqslant -1, \frac{1}{3} \geqslant \frac{1}{6}x, x \geqslant 2x - 2, 2 \geqslant \frac{x+4}{3}$

10 (a) $2(x + 17) \leqslant 52 - x$

(b) $2x + 34 \leqslant 52 - x$

$2x + x \leqslant 52 - 34$

$3x \leqslant 18$

$x \leqslant 6$

The largest value of x is 6.

11 $-3 < \frac{4 - r}{2}$

$-6 < 4 - r$

$r < 10$

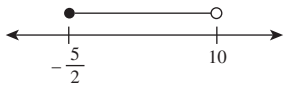
$\frac{1}{2}(2r + 1) \geqslant -2$

$2r + 1 \geqslant -4$

$2r \geqslant -5$

$r \geqslant -\frac{5}{2}$

$\therefore -\frac{5}{2} \leqslant r < 10$



12 (a) (i) $-7 < 4x + 1$

$-8 < 4x$

$-2 < x$

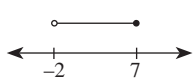
(ii) $x - 3 \leqslant 11 - x$

$x + x \leqslant 11 + 3$

$2x \leqslant 14$

$x \leqslant 7$

(b)



$-2 < x \leqslant 7$