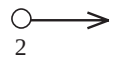
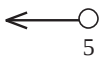
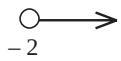
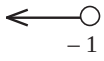
Practice Book *UNIT 16 Inequalities* Answers

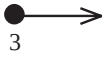
16.1 Inequalities on a Number Line

1. (a) 

(b) 

(c) 

(d) 

(e) 

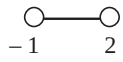
(f) 

(g) 

(h) 

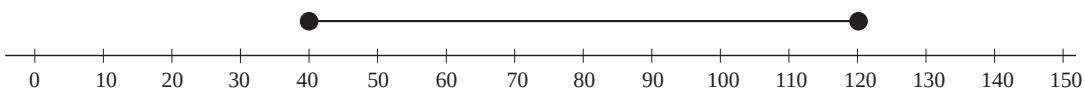
(i) 

(j) 

(k) 

(l) 

2. (a) $x \le 2$ (b) $x > 1$ (c) $x \ge -3$ (d) $x < -1$ (e) $-2 \le x \le 3$
(f) $1 < x \le 4$ (g) $-2 < x < 3$ (h) $-5 \le x \le -1$ (i) $-1 \le x < 4$

3. (a) 

(b) 40 ≤ speed (km per hour) ≤ 120

4. (a) 2, 3, 4, 5 (b) 2, 3, 4, 5, 6, 7, 8 (c) 2, 3, 4, 5, 6, 7, 8 (d) 5, 6, 7, 8

5. (a) $-2, -1, 0, 1, 2, 3$ (b) $-7, -6, -5, -4, -3, -2$
(c) $-2, -1, 0, 1$ (d) $-3, -2, -1, 0, 1, 2$

6. Many possible answers.

7. (a) 6 (b) 8 (c) 12

8. $x = 0, 1, 2, 3, 4$

16.2 Solutions of Linear Inequalities

1. (a) $x \le 1$ (b) $x > 5$ (c) $x > 5$ (d) $x \le -3$ (e) $x < 3$ (f) $x \ge -1$

2. (a) $x < 10$ (b) $x < -3$ (c) $x \le 2$ (d) $x > -4$ (e) $x > 7$ (f) $x \ge -2$

3. (a) $5 \le x \le 8$ (b) $-3 \le x \le 5$ (c) $-5 < x \le -2$ (d) $-\frac{3}{2} \le x \le 2$

4. (a) $x > -\frac{18}{5}$ (b) $x < \frac{5}{2}$

5. 3, 4, 5, 6 and 7

6. (a) $x < 2$ (b) $x > 1$

Answers

16.2

7. (a) $-4,\ -3,\ -2,\ -1,\ 0,\ 1$ (b) $x < -\frac{4}{5}$

8. (a) (i) $-5,\ -4,\ -3,\ -2,\ -1,\ 0,\ 1$ (ii) 10 (b) $n < \frac{17}{5}$

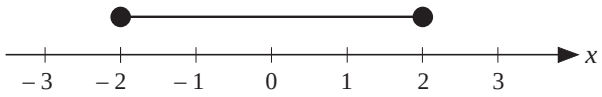
9. (a) $2n+1$ (b) n^2+3 (c) $n < 15$

10. $y < 1.5$

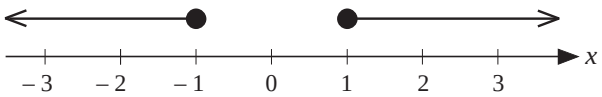
11. (a) $x \geq 2$ (b) -5

16.3 Inequalities Involving Quadratic Terms

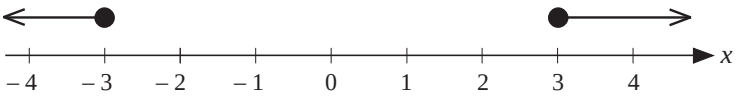
1. (a)



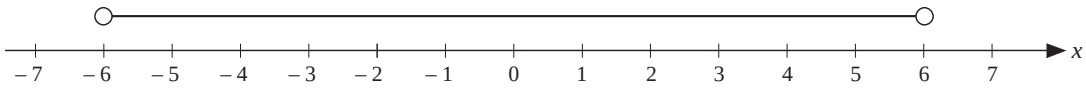
(b)



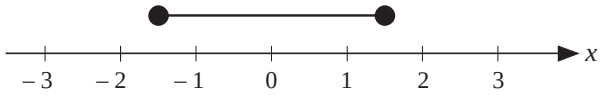
(c)



(d)



(e)



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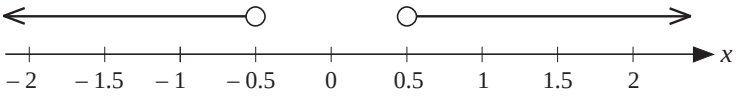


2. (a) $-1 \leq x \leq 1$ (b) $x \geq 4$ or $x \leq -4$ (c) $-2 \leq x \leq 2$
   (d) $-\frac{1}{3} \leq x \leq \frac{1}{3}$ (e) $x \geq \frac{5}{2}$ or $x \leq -\frac{5}{2}$ (f) $x \geq \frac{5}{4}$ or $x \leq -\frac{5}{4}$
   (g) $-3 < x < 3$ (h) $x \geq 7$ or $x \leq -7$ (i) $x \geq 3$ or $x \leq -3$

3. (a) $x \leq 1$ or $x \geq -2$ (b) $-2 \leq x \leq 3$ (c) $1 < x < 2$
   (d) $x < -5$ or $x > 4$ (e) $x \leq -5$ or $x \geq 0$ (f) $0 < x < 1$

Answers

16.3

4. (a) $x \geq 1$ or $x \leq -2$ (b) $2 \leq x \leq 3$ (c) $0 < x < 4$

   (d) $x < -2$ or $x > \frac{1}{2}$ (e) $-4 \leq x \leq -2$ (f) $x \geq 3$ or $x \leq 0$

   (g) $0 < x < 3$ (h) $x \geq \frac{1}{6}$ or $x \leq -1$

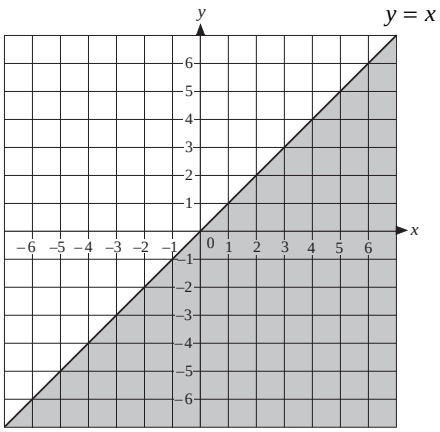
5. (a) 6 cm (b) 3 cm

6. (a) $2n(7 - 2n)$ (b) 1, 2 and 3

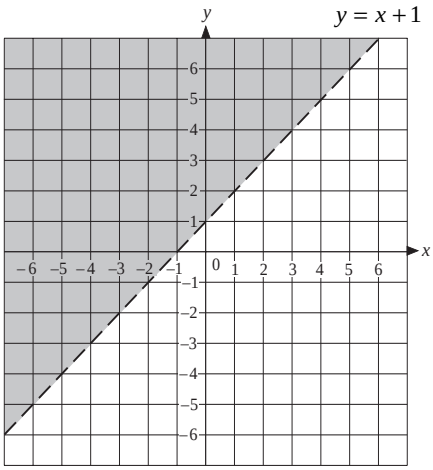
7. $-5 < x < 5$

16.4 Graphical Approach to Inequalities

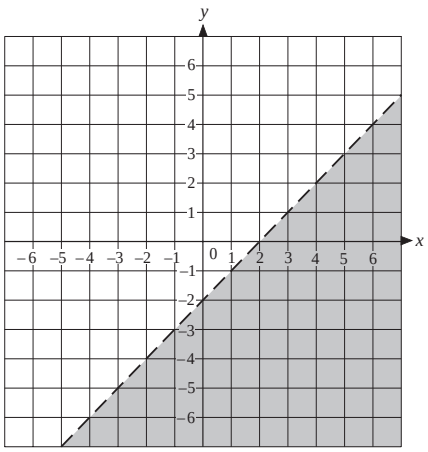
1. (a)



(b)

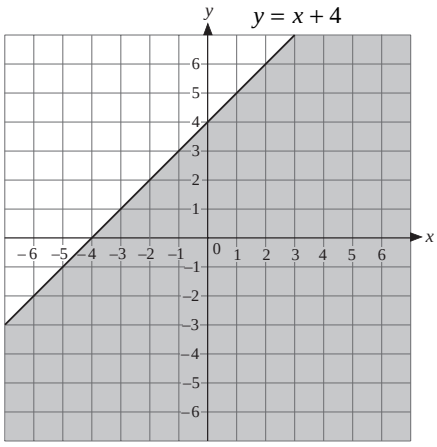


(c)



$y = x - 2$

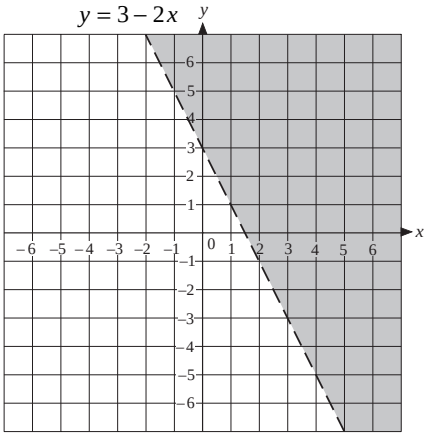
(d)



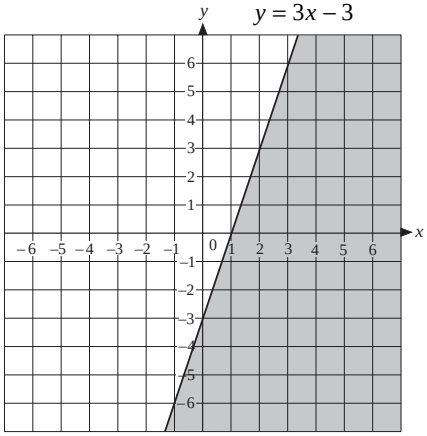
Answers

16.4

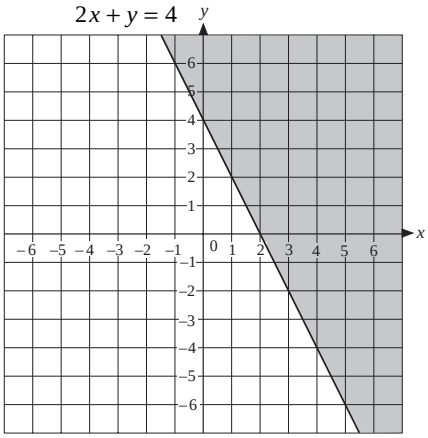
(e)



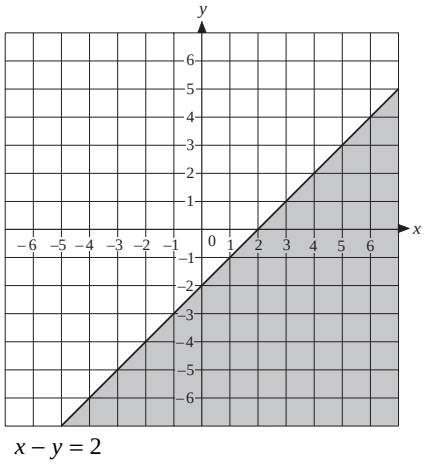
(f)



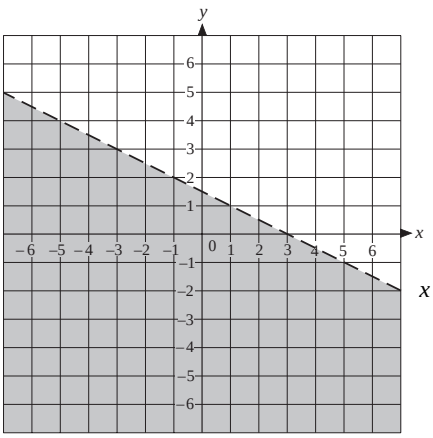
(g)



(h)



(i)



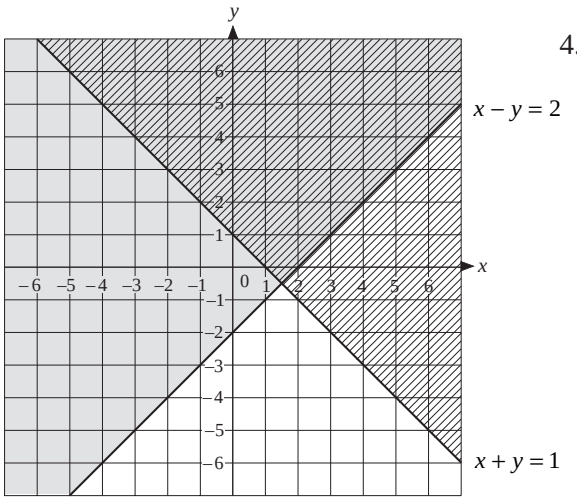
2. (a) (i) $y = x + 2$ (ii) $y \le x + 2$ (b) (i) $y = 2 - 2x$ (ii) $y \le 2 - 2x$

   (c) (i) $y = 3x$ (ii) $y < 3x$ (d) (i) $y = 2 - \frac{x}{3}$ (ii) $y < 2 - \frac{x}{3}$

Answers

16.4

3.



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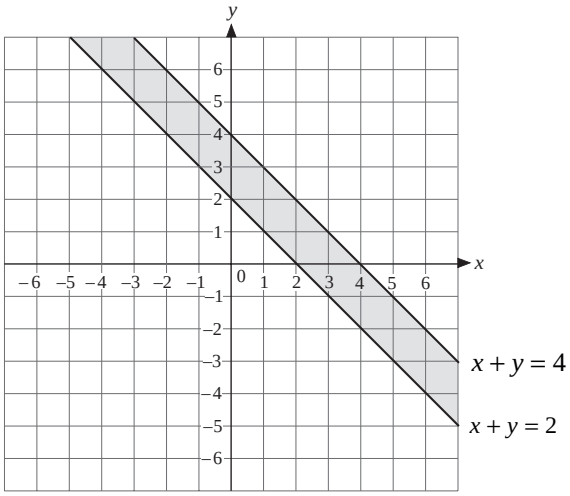
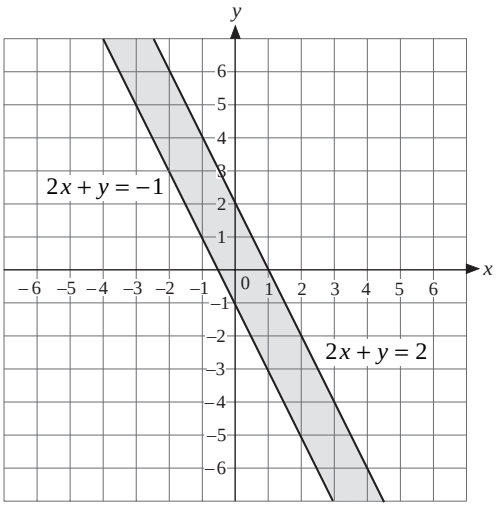
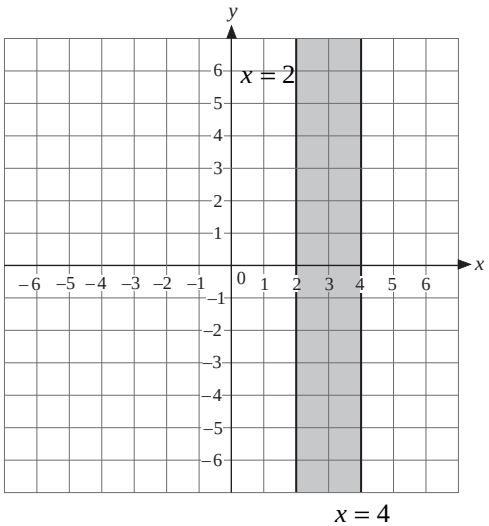


5.

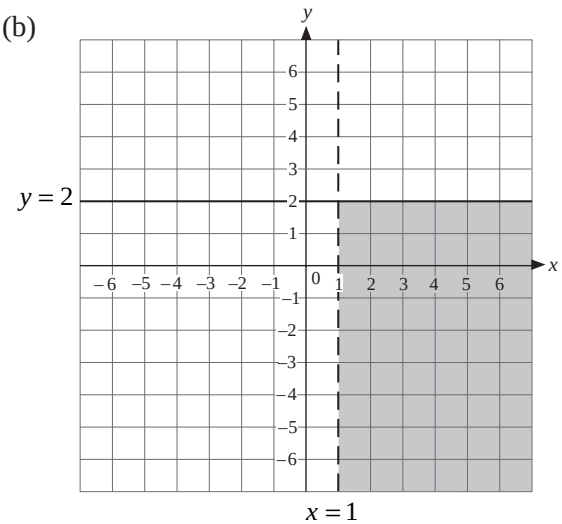


16.5 Dealing with More than One Inequality

1. (a)



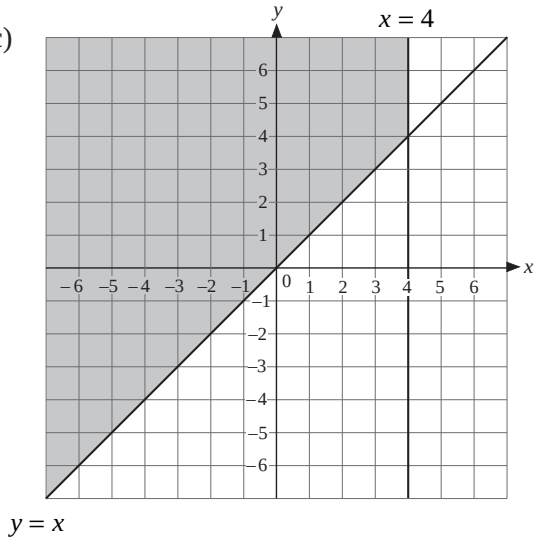
(b)



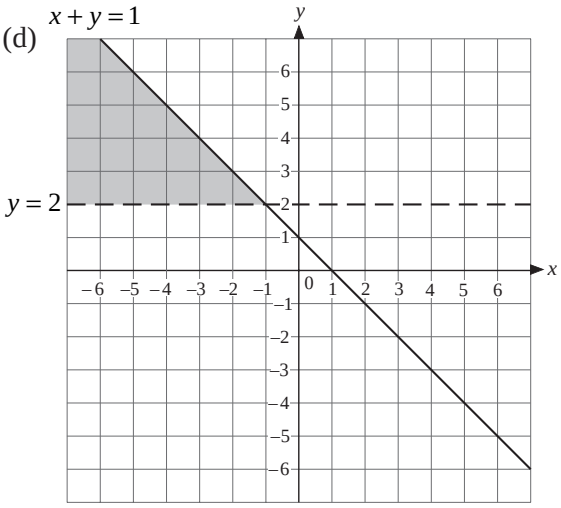
Answers

16.5

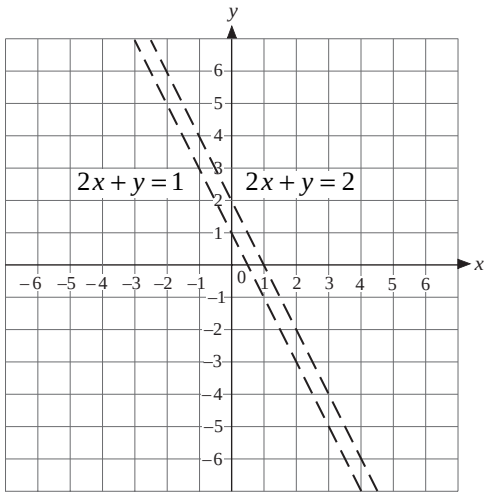
(c)



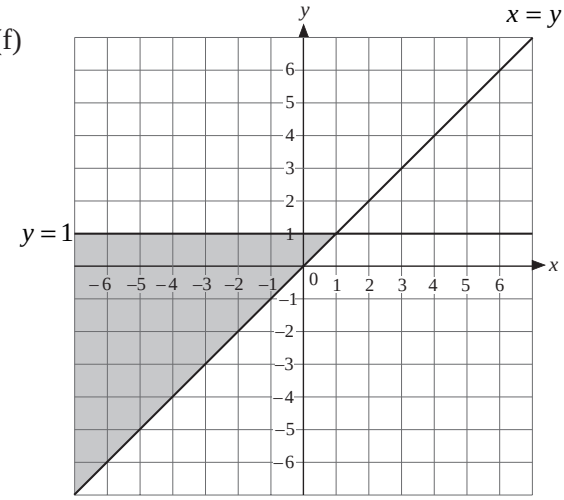
(d)



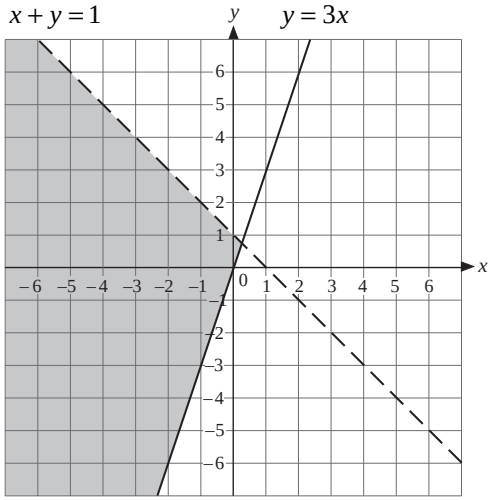
(e)



(f)



(g)



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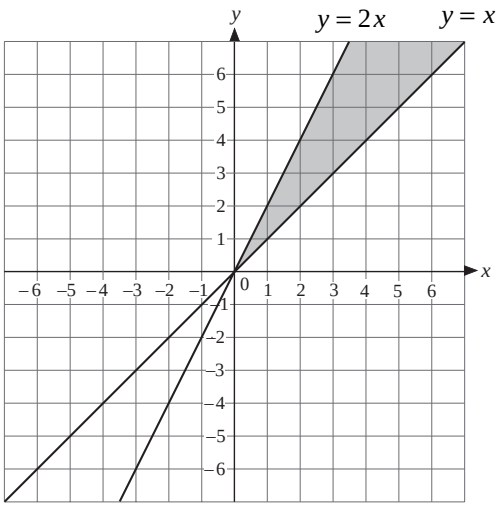
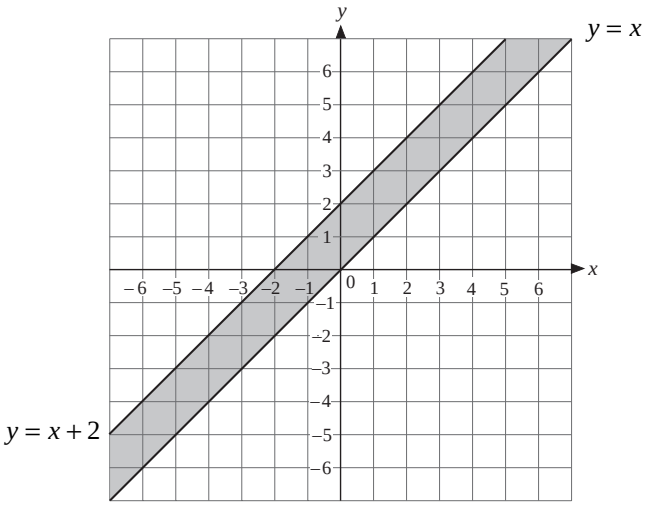


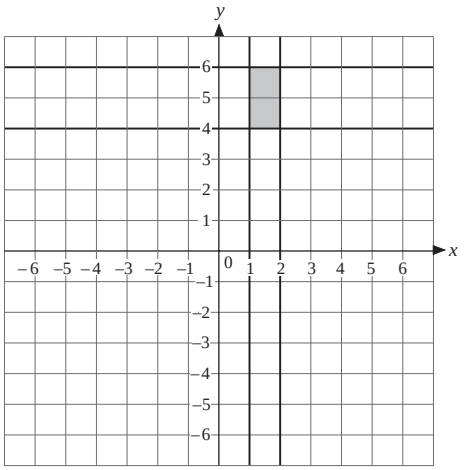
Answers

16.5

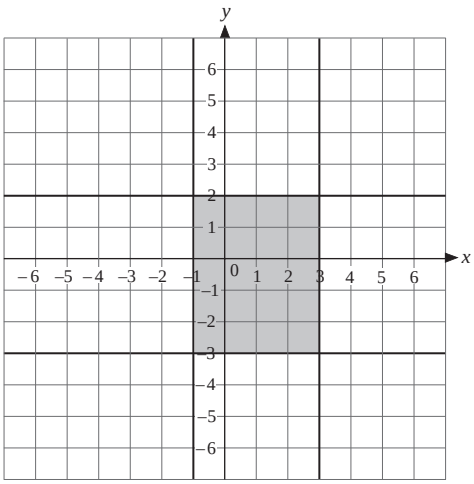
(i)



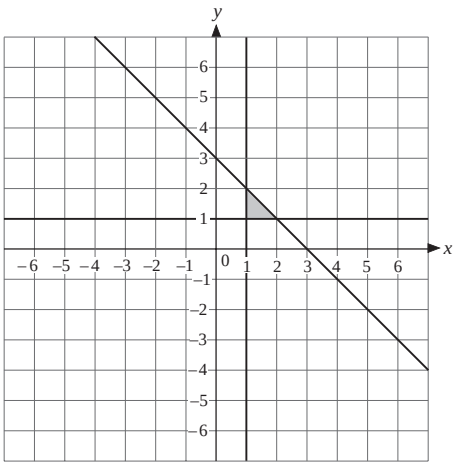
2. (a)



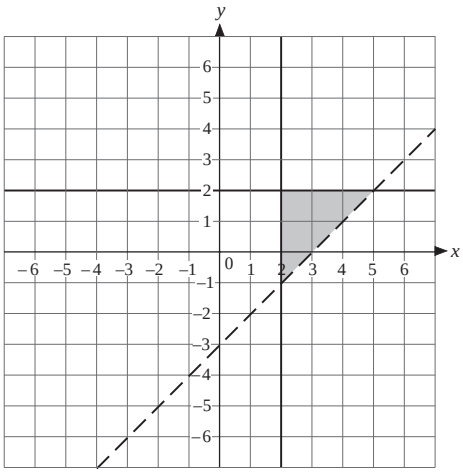
(b)



(c)



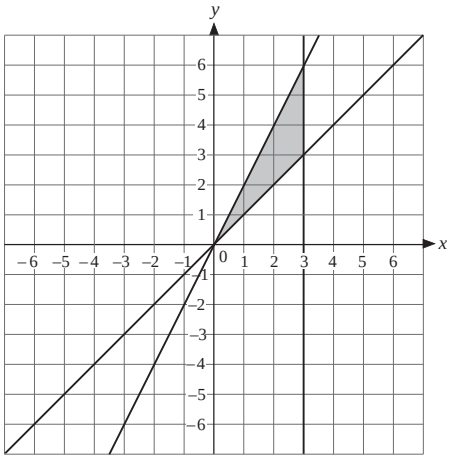
(d)



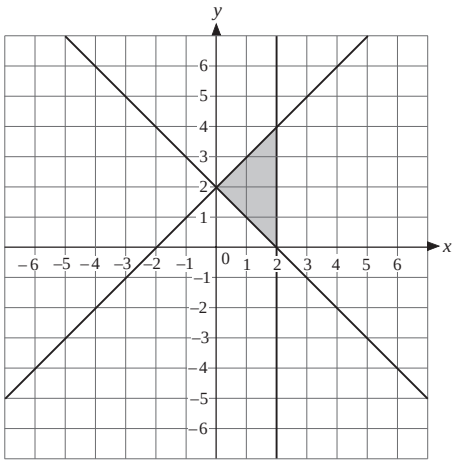
Answers

16.5

(e)



(f)



3. (a) $x \geq -3, \quad y \geq -1, \quad y \leq 3 - x$

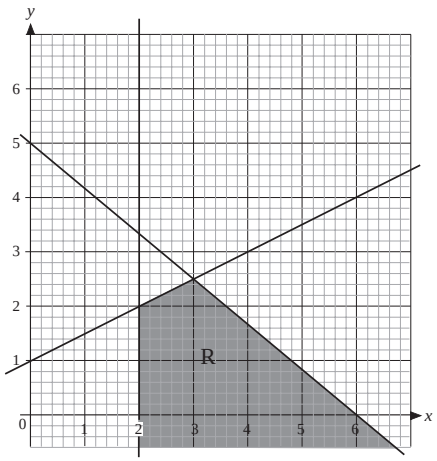
(b) $x \leq 3, \quad x \geq -1, \quad y \leq x, \quad y \geq x - 3$

(c) $y \geq -2, \quad y \leq x, \quad y \leq 6 - x$

(d) $y \geq -3, \quad x \leq 3, \quad y \leq 2x + 2$

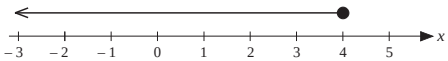
4. $x \leq 3, \quad x + y \geq 4, \quad y < 2x + 1$

5. (a)



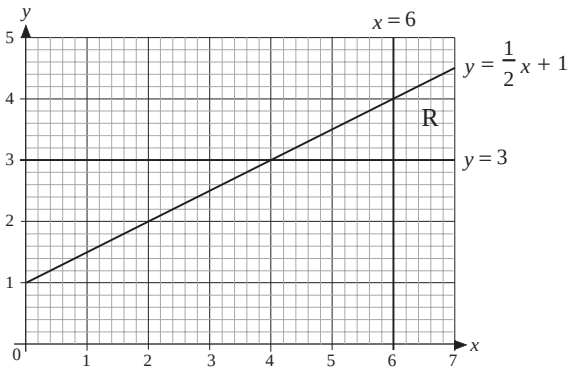
(b) (i) $x < 4$

(ii)



6. (a) $x > -\frac{18}{5}$

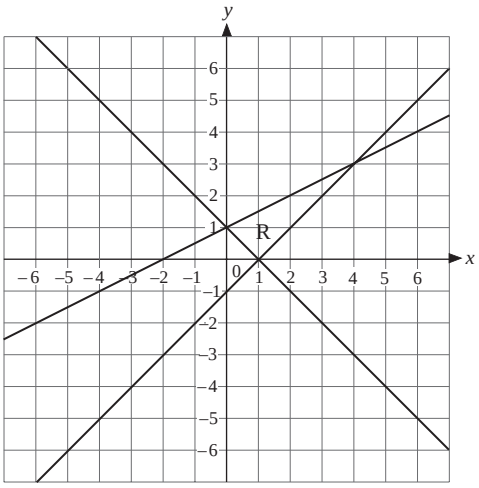
(b)



Answers

16.5

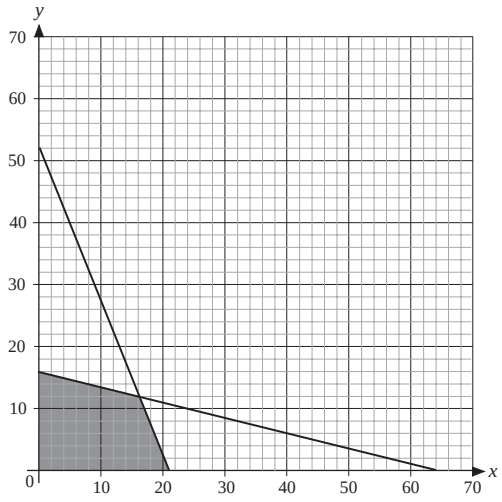
7. (a)



(b) One of:

(0, 1), (1, 0), (1, 1), (2, 1),
(2, 2), (3, 2), (4, 3)

8. (c)



(d) $x = 16$, $y = 12$, giving $w = 1320$