

## Chapter 4

### Exercise 4A

- 1 a  $y \leq 3$   
b  $-1 \leq y \leq 3$   
c  $y \geq -2$
- 2 a  $y \geq 5$   
b  $y \leq 6$   
c  $y \geq 15$   
d  $-3 \leq y \leq 3$   
e  $-6 \leq y \leq 2$   
f  $-4 \leq y \leq 6$
- 3 a  $x \neq 5$   
b  $x \neq -9$   
c  $x > 8$   
d  $x < -\frac{5}{2}$   
e  $x \neq 0$   
 $x \neq \frac{1}{2}$   
f  $x > 5$   
 $x < -5$   
g  $-3 \leq x \leq 2$   
h  $x < 7$   
i  $x > -\frac{3}{2}$   
j  $x \neq 2$   
 $x \neq 1$

### Exercise 4B

- 1 a  $(x + 3)$   
b  $3x + 4$   
c  $3x - 3$   
d  $\sin(4x)$   
e  $2x + 3$   
f  $3x^2 + 13$   
g  $(x + 3)^2 = x^2 + 6x + 9$   
h  $\cos(2x)$
- 2 a  $(x + 3)^2$   
b  $3x + 4$

- c  $3x - 5$   
d  $4\sin x$   
e  $2x$   
f  $(3x - 2)^2 + 5 = 9x^2 - 12x + 9$   
g  $x^2 - 2x + 5$   
h  $\sin(1 - 2x^2)$

3  $k = -\frac{1}{2}$

4  $x = -\frac{1}{3}$

5  $\frac{1}{3x-2}$   
 $x \neq \frac{2}{3}$

6 a  $\sqrt{3x + 1}$   
 $x \geq -\frac{1}{3}$

7 a  $\frac{1}{3x-4}$   
 $x \neq \frac{4}{3}$

8  $x$

9  $x$

10  $\frac{5x+13}{x+2}$

11 a  $\frac{1}{4x(x+3)}$   
b  $x \neq 0$   
 $x \neq -3$

12 a function  $(3x + 1)^2 + 1$  is never less than 1 hence no real roots.

b  $k = -1$

13  $0.020106t^{\frac{2}{3}}$

14  $c(d(x)) = 2000(35 - x)$   
 $r(d(x)) = x(4000 - 200x)$   
profit =  $-70000 + 6000x - 200x^2$

### Exercise 4C

- 1 a  $\frac{x+1}{5}$   
b  $\frac{3-x}{2}$   
c  $3(x + 1)$   
d  $\frac{x+7}{6}$   
e  $16 - 2x$

f  $\frac{7-x}{5}$

g  $2x - 1$

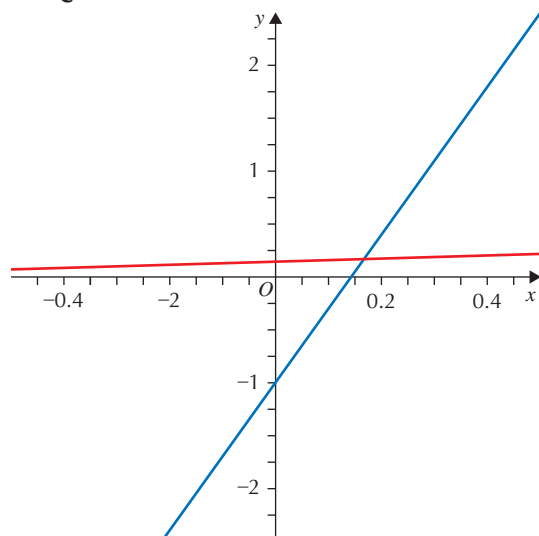
h  $4x - 1$

2 a  $\frac{x+1}{7}$

b  $7\left(\frac{1+x}{7}\right) - 1 = x$

$\frac{1+(7x-1)}{7} = x$

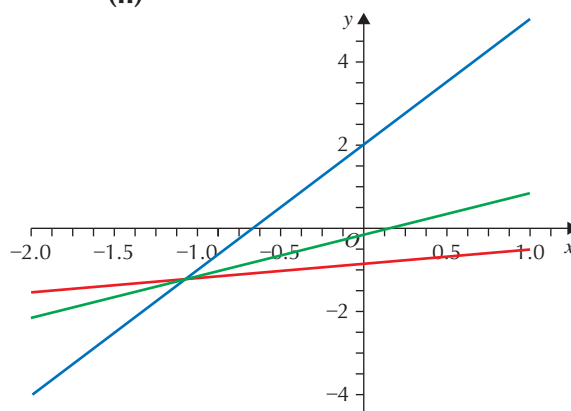
c



3

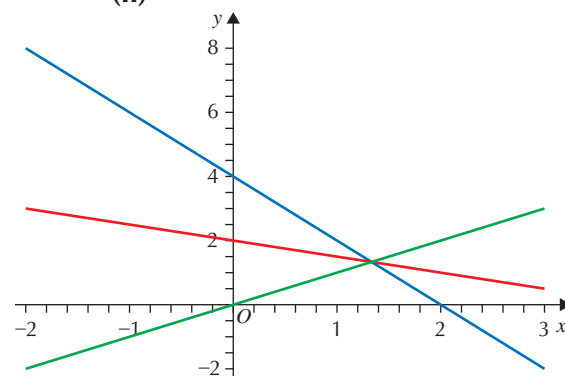
a (i)  $\frac{1}{3}(x - 2)$

(ii)



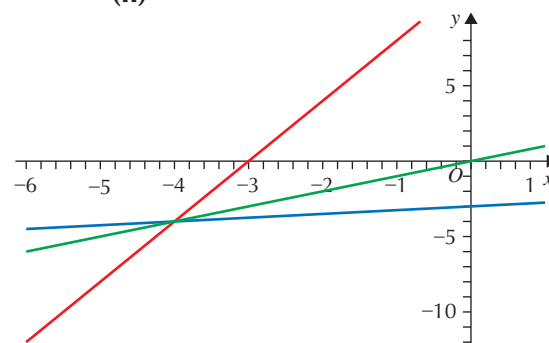
b (i)  $\frac{4-x}{2}$

(ii)



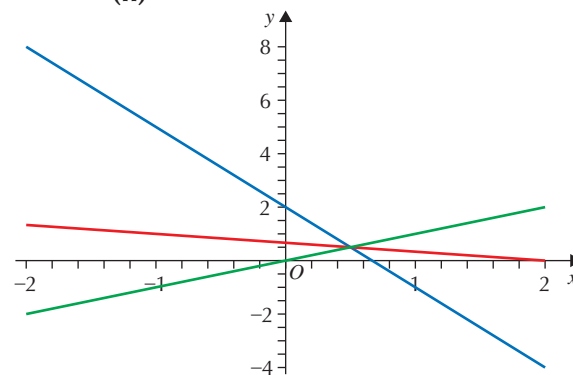
c (i)  $4(x + 3)$

(ii)



d (i)  $\frac{2-x}{3}$

(ii)



4 Inverse  $f$  = reflection of  $f$  in  $y = x$

● ANSWERS

**Exercise 4D**

**1 a**  $y > -5$

**b**  $y < 4$

**c**  $y > 2$

**2 a**  $x > -3$

**b**  $x > 4$

**c**  $x > \frac{5}{2}$

**3**  $2^4 2^x = 16 \cdot 2^x$

**4**  $3 - 5\log_2 x$

**5**  $2 - 3\log_4 x$

**6**  $\log_2(8x^3)$