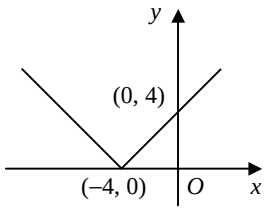
FUNCTIONS — *Answers*

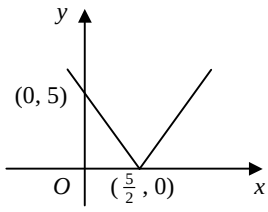
1 **a** 2 **b** 1 **c** 6 **d** –2 **e** 4 **f** –3

2 **a** = g(–3) = 5 **b** = f(1) = 0 **c** = f(9) = 96 **d** = g(5) = 11 **e** = g(0) = 1 **f** = f(1) = 0

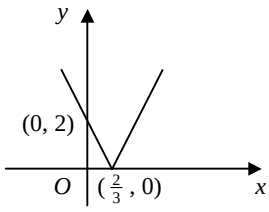
3 **a**



b



c



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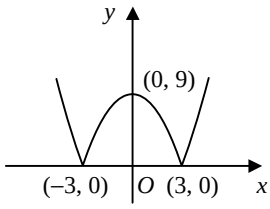

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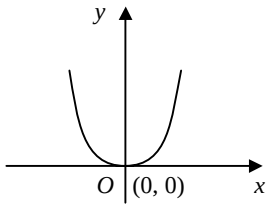
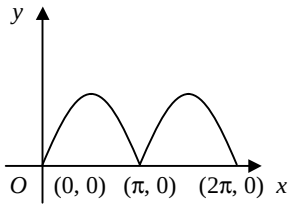
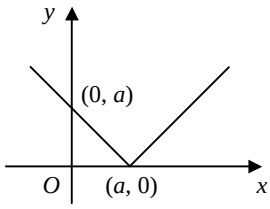


f



g



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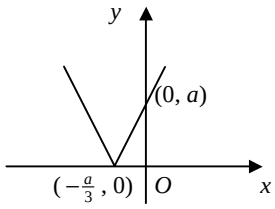
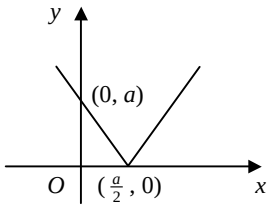
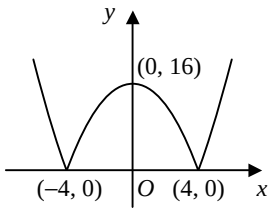


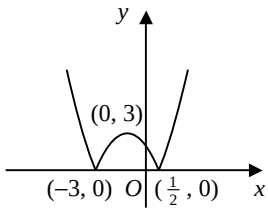
i



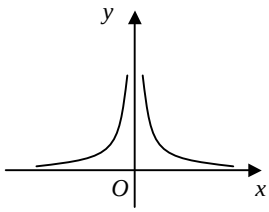
j



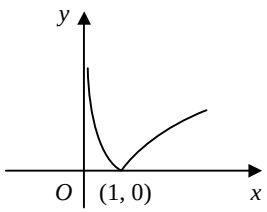
k



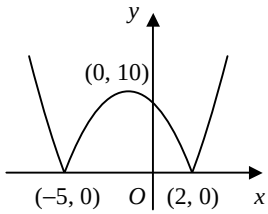
l



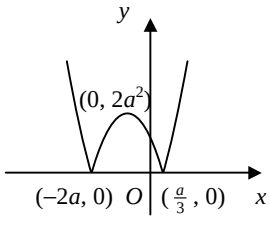
m



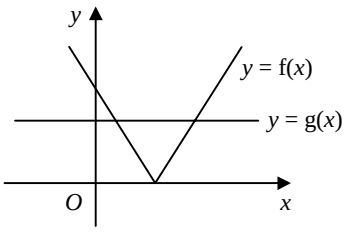
n $y = |(5 + x)(2 - x)|$



o $y = |(3x - a)(x + 2a)|$



4 **a** **i**

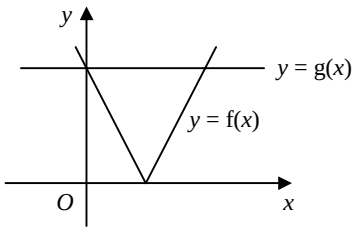


ii $2x - 3 = 2 \Rightarrow x = \frac{5}{2}$

$-(2x - 3) = 2 \Rightarrow x = \frac{1}{2}$

$\therefore x = \frac{1}{2}, \frac{5}{2}$

b **i**

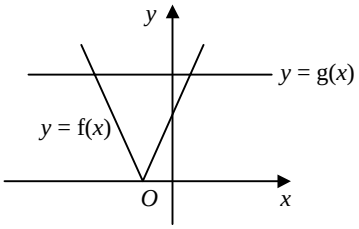


ii $7 - 3x = 7 \Rightarrow x = 0$

$-(7 - 3x) = 7 \Rightarrow x = 4\frac{2}{3}$

$\therefore x = 0, 4\frac{2}{3}$

c **i**

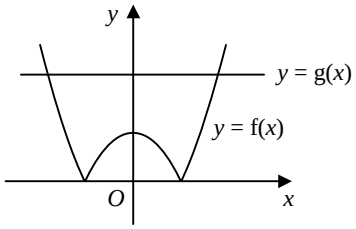


ii $4x + 3a = 5a \Rightarrow x = \frac{1}{2}a$

$-(4x + 3a) = 5a \Rightarrow x = -2a$

$\therefore x = -2a, \frac{1}{2}a$

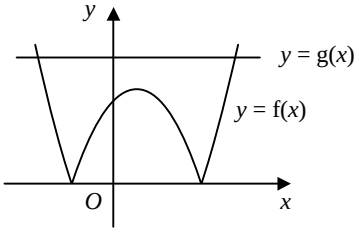
d **i**



ii $x^2 - 4 = 9 \Rightarrow x^2 = 13$

$\therefore x = \pm\sqrt{13}$

e **i** $f(x) = |(x - 2)^2 - 16|$

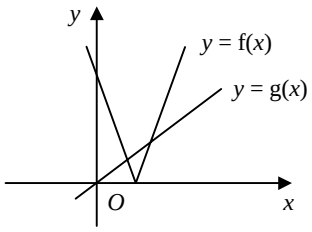


ii $x^2 - 4x - 12 = 20 \Rightarrow x^2 - 4x - 32 = 0$

$\Rightarrow (x + 4)(x - 8) = 0$

$\therefore x = -4, 8$

f **i**



ii $2a - 5x = x \Rightarrow x = \frac{1}{3}a$

$-(2a - 5x) = x \Rightarrow x = \frac{1}{2}a$

$\therefore x = \frac{1}{3}a, \frac{1}{2}a$

5 **a** $x - 5 = 3 \Rightarrow x = 8$

$-(x - 5) = 3 \Rightarrow x = 2$

$\therefore\ x = 2, 8$

b $x + 1 = 15 \Rightarrow x = 14$

$-(x + 1) = 15 \Rightarrow x = -16$

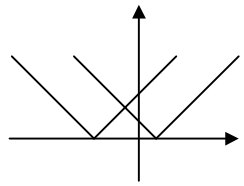
$\therefore\ x = -16, 14$

c $2x - 7 = 4 \Rightarrow x = \frac{11}{2}$

$-(2x - 7) = 4 \Rightarrow x = \frac{3}{2}$

$\therefore\ x = \frac{3}{2}, \frac{11}{2}$

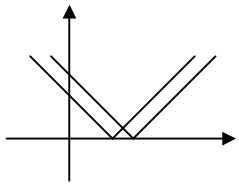
d



$-(x - 2) = x + 4 \Rightarrow x = -1$

$\therefore\ x = -1$

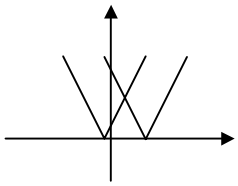
e



$x - 5 = 7 - x \Rightarrow x = 6$

$\therefore\ x = 6$

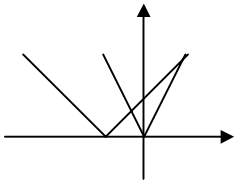
f



$2x + 1 = 9 - 2x \Rightarrow x = 2$

$\therefore\ x = 2$

g

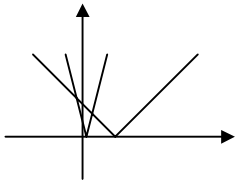


$x + 3 = 2x \Rightarrow x = 3$

$x + 3 = -2x \Rightarrow x = -1$

$\therefore\ x = -1, 3$

h

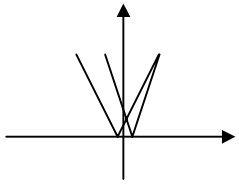


$4x - 1 = 2 - x \Rightarrow x = \frac{3}{5}$

$-(4x - 1) = 2 - x \Rightarrow x = -\frac{1}{3}$

$\therefore\ x = -\frac{1}{3}, \frac{3}{5}$

i

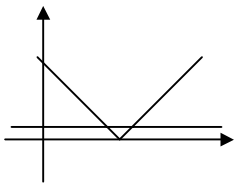


$3x - 4 = 2x + 3 \Rightarrow x = 7$

$-(3x - 4) = 2x + 3 \Rightarrow x = \frac{1}{5}$

$\therefore\ x = \frac{1}{5}, 7$

6 **a**

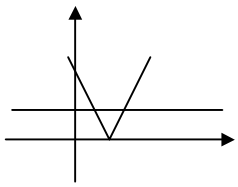


$x - 20 = 2 \Rightarrow x = 22$

$-(x - 20) = 2 \Rightarrow x = 18$

$\therefore\ 18 < x < 22$

b

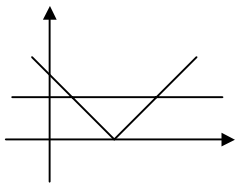


$2x - 11 = 5 \Rightarrow x = 8$

$-(2x - 11) = 5 \Rightarrow x = 3$

$\therefore\ 3 \leq x \leq 8$

c

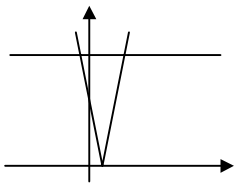


$x - 17 = 12 \Rightarrow x = 29$

$-(x - 17) = 12 \Rightarrow x = 5$

$\therefore\ x < 5$ or $x > 29$

d

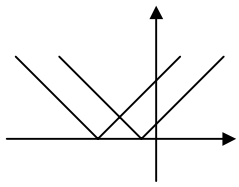


$5x - 22 = 40 \Rightarrow x = 12\frac{2}{5}$

$-(5x - 22) = 40 \Rightarrow x = -3\frac{3}{5}$

$\therefore\ -3\frac{3}{5} < x < 12\frac{2}{5}$

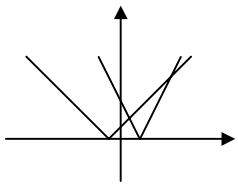
e



$x + 4 = -(x + 1) \Rightarrow x = -\frac{5}{2}$

$\therefore\ x \leq -\frac{5}{2}$

f

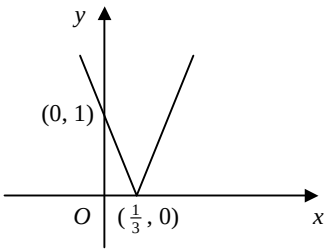


$x + 2 = 2x - 5 \Rightarrow x = 7$

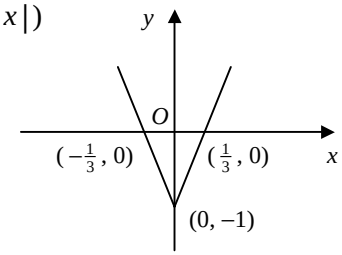
$x + 2 = -(2x - 5) \Rightarrow x = 1$

$\therefore\ 1 < x < 7$

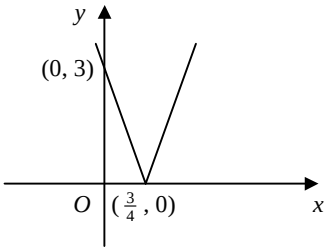
7 **a** $y = |f(x)|$



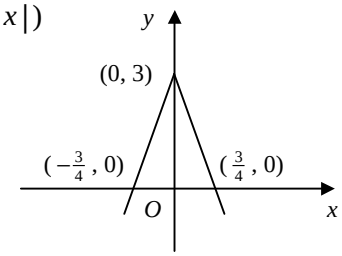
$y = f(|x|)$



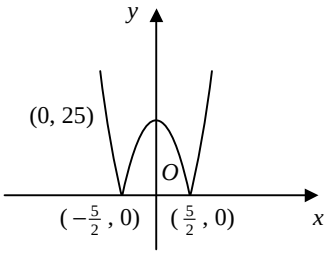
b $y = |f(x)|$



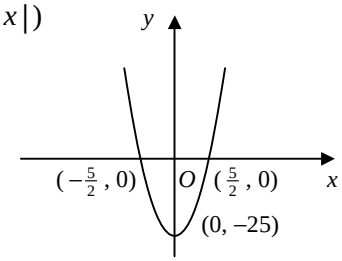
$y = f(|x|)$



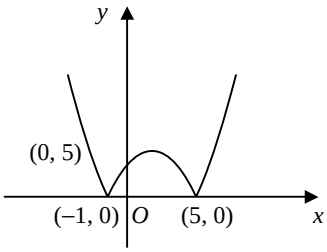
c $y = |f(x)|$



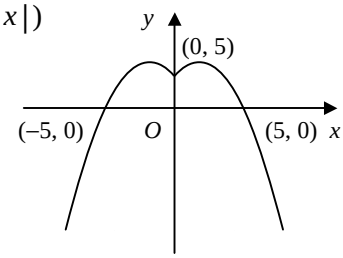
$y = f(|x|)$



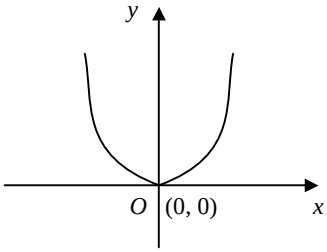
d $y = |f(x)|$



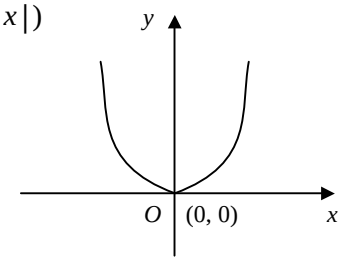
$y = f(|x|)$



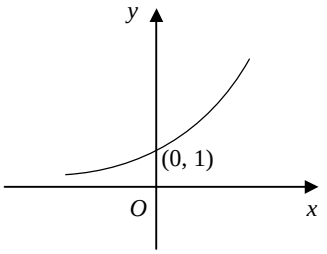
e $y = |f(x)|$



$y = f(|x|)$



f $y = |f(x)|$



$y = f(|x|)$