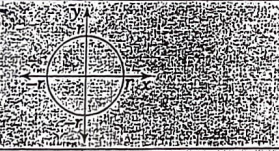
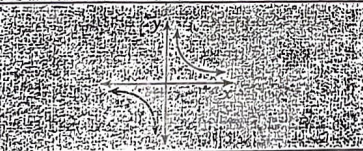
123.

Graphs

It is important that you be able to identify the different graphs you have met so far by their equations. Study the review table below and then attempt the following exercise.

Type of graph	Equation	Graph
Straight line	$y = mx + b$ or $ax + by + c = 0$	
Lines parallel to the axes	$x = a$, or $y = b$	
Parabola	$y = x^2$ $y = ax^2 + bx + c$	
Circle	$x^2 + y^2 = r^2$	
Hyperbola	$y = \frac{k}{x}$ or $xy = k$	
Exponential curve	$y = a^x$ or $y = a^{-x}$	
Cubic curve	$y = x^3$ $y = ax^3 + d$	

1 From the list of equations given on the right, choose those that represent:

a a straight line
b a circle
c a parabola
d a hyperbola
e an exponential curve
f a cubic curve

A $x^2 + y^2 = 16$	B $y = 6 - x - x^2$
C $y = 3x^3$	D $y = 2^{-x}$
E $y = x^2 - 2$	F $xy = -4$
G $y = 3^x$	H $x^2 + y^2 = 1$
I $y = \frac{5}{x}$	J $2x + 4y = 3$
K $y = 3$	L $y = \frac{1}{3}x^3 - 1$

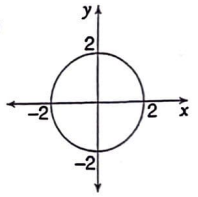
2 Sketch the graphs of the following equations, showing where each one cuts the coordinate axes.

a $y = 2x - 1$	b $y = 6 - x$	c $x + 3y = 6$
d $x = -1$	e $y = 3$	f $x = 5$
g $y = x^2 + 2$	h $y = x^2 - 4$	i $y = (x - 1)^2$
j $y = (x + 1)(x - 3)$	k $y = x^2 + 4x - 5$	l $y = x^2 + 4x$
m $y = 1 - x^2$	n $y = -(x + 1)^2$	o $y = 5 - 4x - x^2$
p $x^2 + y^2 = 4$	q $x^2 + y^2 = 100$	r $x^2 + y^2 = 2$
s $y = \frac{2}{x}$	t $xy = 4$	u $y = -\frac{3}{x}$
v $y = 4^x$	w $y = 2^{-x}$	x $y = -3^x$
y $y = 3x^3 - 3$	z $y = -3x^3 + 3$	α $y = 2x^3 + 2$

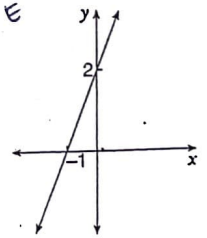
3 Match each graph with its equation from the given list.

A $xy = 9$	B $y = -x^3 + 4$
C $y = 5^x$	D $x^2 + y^2 = 4$
E $2x - y + 2 = 0$	F $y = x^3 - 4$
G $y = 3 + 2x - x^2$	H $y = 5$
I $y = x^2 - 4$	

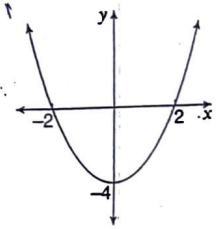
a D



b E



c I



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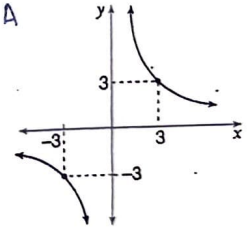

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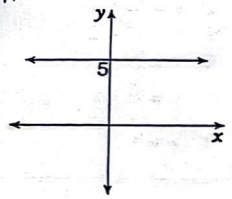
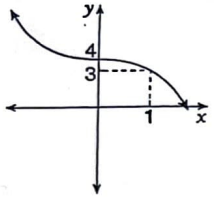
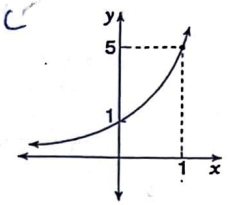


f B



g C



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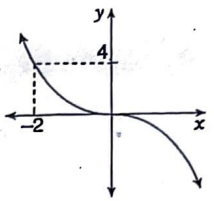

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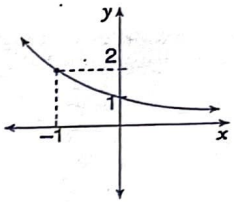

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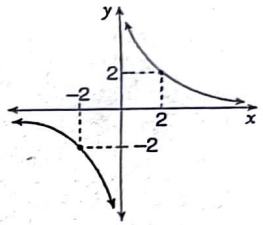

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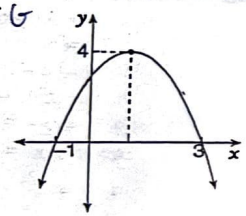

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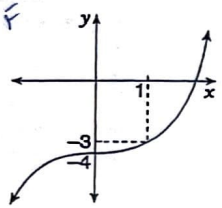

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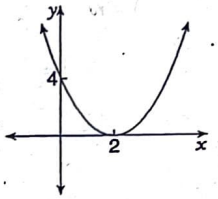

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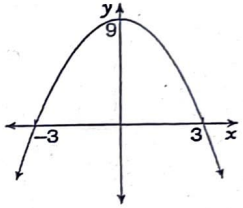

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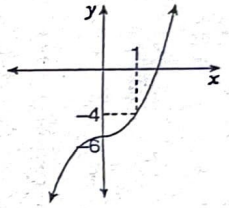
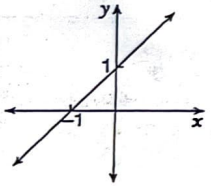


4 Determine the equation of each graph.

a



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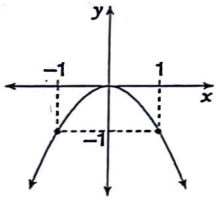

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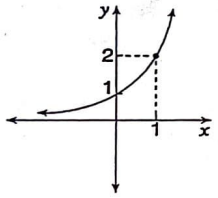

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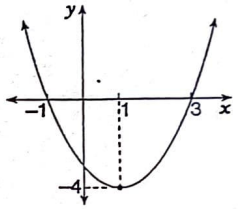

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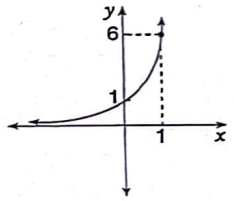

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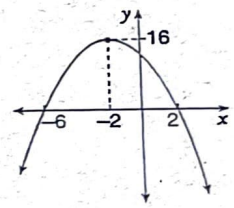

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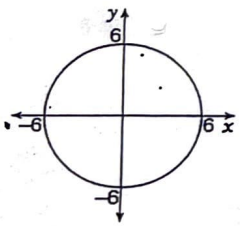

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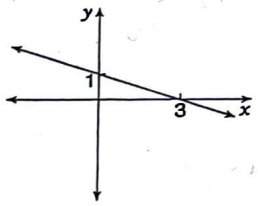

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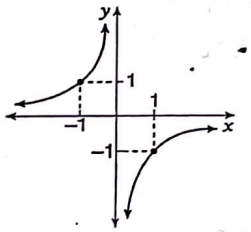

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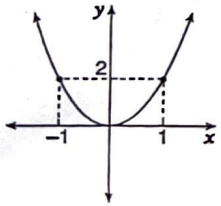

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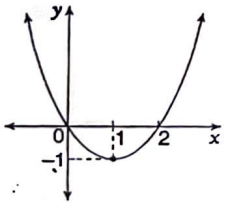

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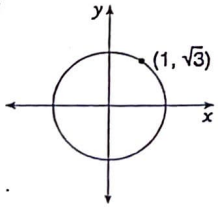
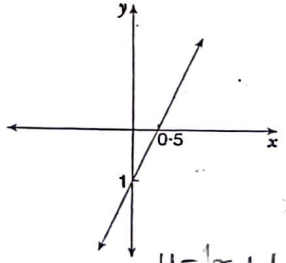


Answers

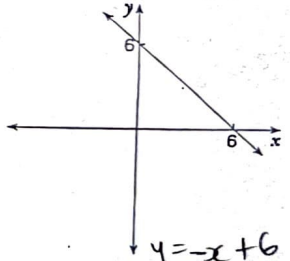
1 a J, K b A, H c B, E d F, I e D, G f C, L

2 a



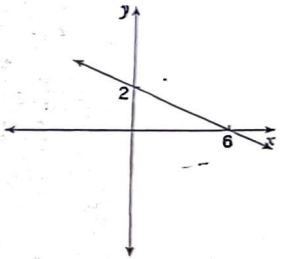
$y = \frac{1}{2}x + 1$

b

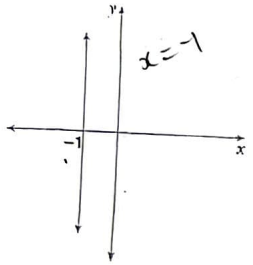


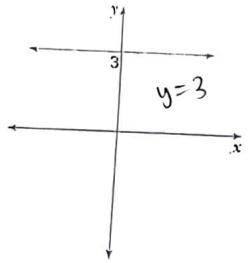
$y = -x + 6$

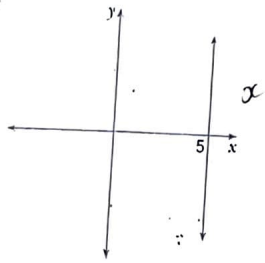
c

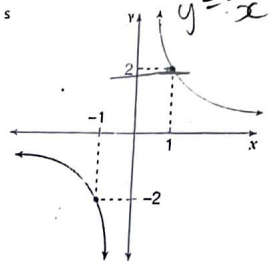


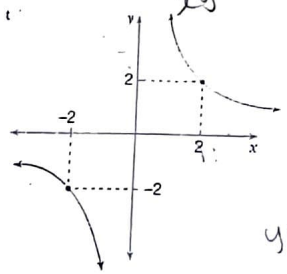
$y = -\frac{1}{3}x + 2$

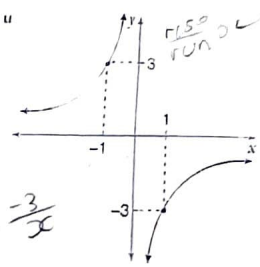
d 

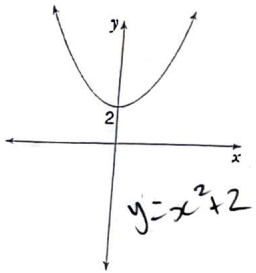
e 

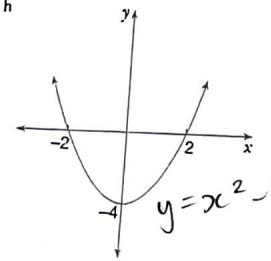
f 

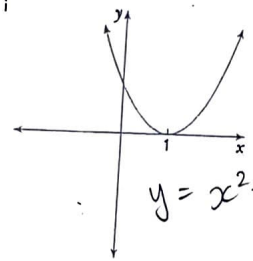
s 

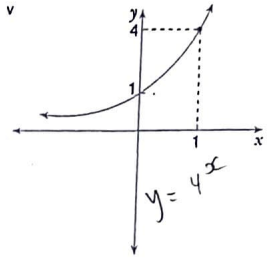
t 

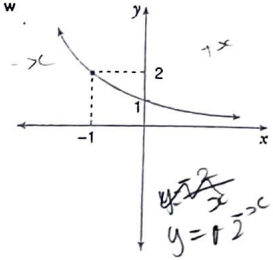
u 

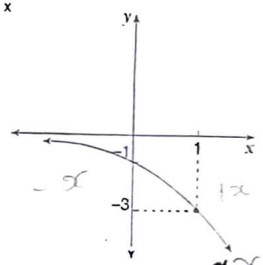
g 

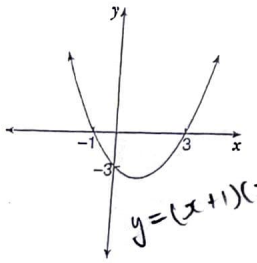
h 

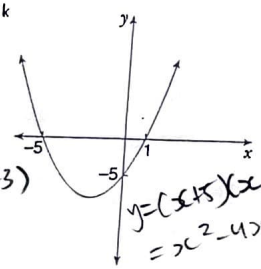
i 

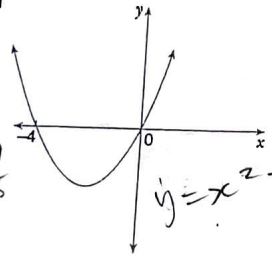
v 

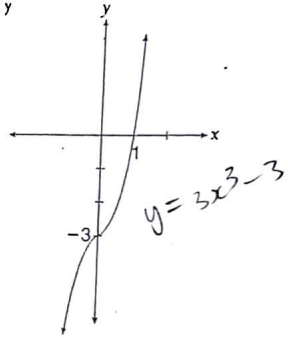
w 

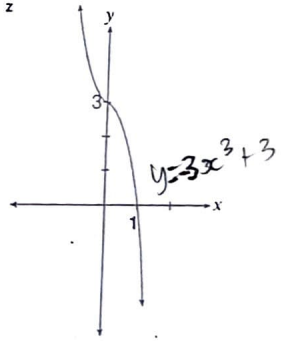
x 

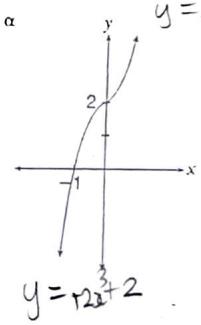
j 

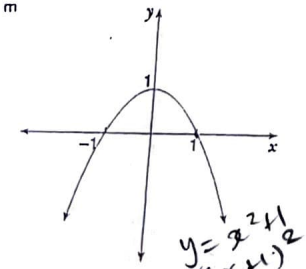
k 

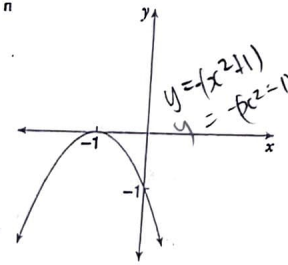
l 

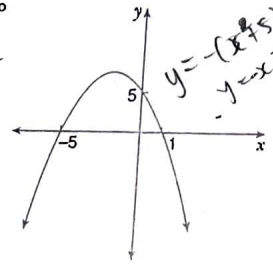
y 

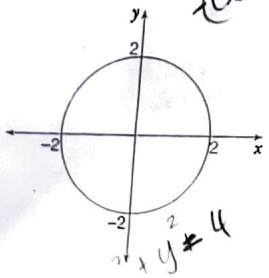
z 

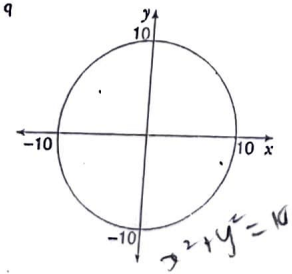
α 

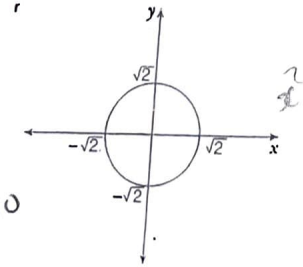
m 

n 

o 

p 

q 

r 

3 a D b E c I d A e H f B g C h G i F

4 a $y = x + 1$ b $y = -x^2$ c $y = 2^x$ d $x^2 + y^2 = 36$
e $y = -\frac{1}{3}x + 1$ f $xy = -1$ g $y = 2x^2$ h $y = x(x - 2)$
i $x^2 + y^2 = 4$ j $y = -\frac{1}{2}x^3$ k $y = 2^{-x}$ l $xy = 4$
m $y = (x - 2)^2$ n $y = 9 - x^2$ o $y = 2x^3 - 6$ p $y = (x + 1)(x - 3)$
q $y = 6^x$ r $y = (x - 2)(x + 6)$