

9th Maths Review 10 Exercise

Q.1 Choose the correct option.

i. $x = 5$ represents:

(a) x -axis (b) y -axis (c) line $\parallel$ to x -axis (d) line $\parallel$ to y -axis

ii. Slope of the line $y = 5x + 3$ is:

(a) 3 (b) -3 (c) 5 (d) -5

iii. The y - intercepts of $y = -2x - 1$ is:

(a) -2 (b) 2 (c) -1 (d) 1

iv. The graph of $y = x^3$, cuts the x -axis at:

(a) $x = 0$ (b) $x = 1$ (c) $x = -1$ (d) $x = 2$

v. The graph of 3^x represents:

(a) growth (b) decay (c) both (a) and (b) (d) a line

vi. The graph of $y = -x^2 + 5$ opens:

(a) upward (b) downward (c) left side (d) right side

vii. The graph of $y = x^2 - 9$ opens:

(a) upward (b) downward (c) left side (d) right side

viii. $y = 5^x$ is function.

(a) linear (b) quadratic (c) cubic (d) exponential

ix. Reciprocal function is:

(a) $y = 7^x$ (b) $y = \frac{2}{x}$ (c) $y = 2x^2$ (d) $y = 5x^3$

x. $y = 3x^3 + 7$ is function.

(a) exponential (b) cubic (c) linear (d) reciprocal

i	d	ii	c	iii	c	iv	a	v	a
vi	b	vii	a	viii	d	ix	b	x	b

Functions and their Graphs

The graph of which equation is a straight line?

(a) $y = 2x$ (b) $y = x^2$ (c) $y = x^3$ (d) $xy = 1$

2. The graph of which equation is a parabola?

(a) $y = 2x$ (b) $y = x^2$ (c) $y = x^3$ (d) $xy = 1$

3. The graph of a quadratic function is always:

(a) straight line (b) curves line (c) parabola (d) hyperbola

4. In $y = ax^2 + bx + c$ if $a > 0$ then parabola opens:

(a) upward (b) downward (c) right ward (d) left ward

5. In $y = ax^2 + bx + c$ if $a < 0$ then parabola opens:

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- (a) upward (b) downward (c) right ward (d) left ward
6. The graphs of which equation pass through the origin?
 (a) $y = 4x + 2$ (b) $y = x^2 + 1$ (c) $y = 3x^3$ (d) $xy=8$
7. The graph of which function has at most_{st} two turning points?
 (a) linear (b) quadratic (c) cubic (d) biquadratic
8. The graph of which function has " S " shape?
 (a) linear (b) quadratic (c) cubic (d) reciprocal
9. The graph of which function has " U " shape?
 (a) linear (b) quadratic (c) cubic (d) reciprocal
10. A line that continually approaches a given curve but does not meet it at any finite distance is called:
 (a) horizontal line (b) vertical line (c) Tangent line (d) asymptotes

Answer Key

1	a	2	b	3	c	4	a	5	b	6	c	7	c	8	c	9	b	10	d
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Q. 2 Plot the graph of the following functions:

(i) $y = 3^{-x}$ for x from - 2 to 4

Solution:

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Step-I: Substitute the values of " x " in the given function and find the corresponding values of y , as given below.

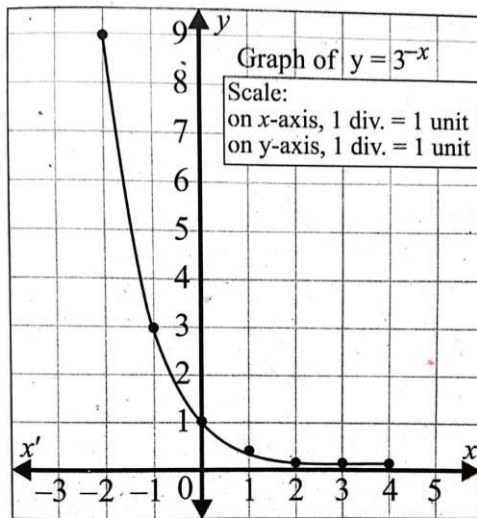
x	$y = 3^{-x}$	(x, y)
-2	9	$(-2, 9)$
-1	3	$(-1, 3)$
0	1	$(0, 1)$
1	$\frac{1}{3} = 0.33$	$(1, 0.33)$
2	$\frac{1}{9} = 0.11$	$(2, 0.11)$
3	$\frac{1}{27} = 0.03$	$(3, 0.03)$

4	$\frac{1}{81} = 0.01$	(4,0.01)
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Step-II Select a suitable scale for graph like On x -Axis, 1 division = 1 unit

On y -Axis, 1 division = 1 unit

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.



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(ii) $y = \frac{2}{x}, x \neq -0$

solution:

$$y = \frac{2}{x}, x \neq -7$$

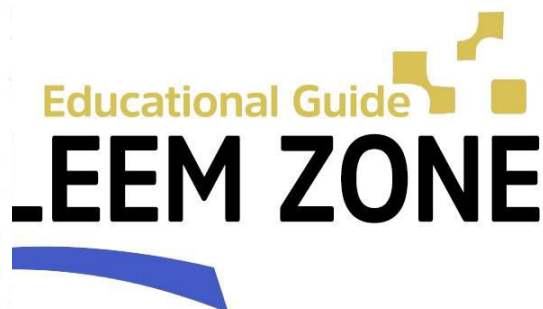
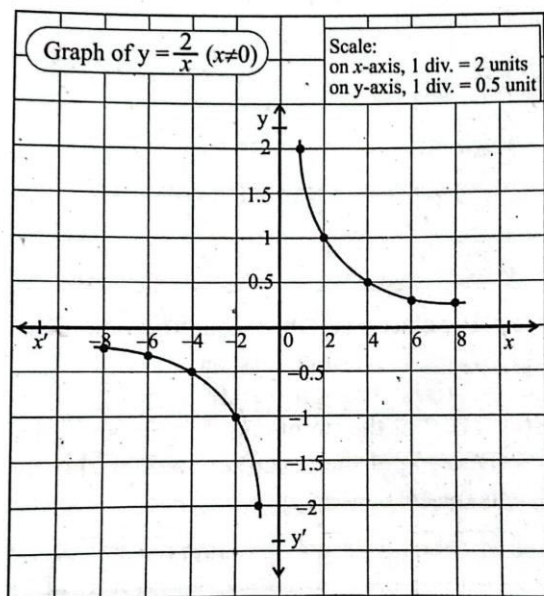
step-I: Substitute the values of " x " in the given function and find the corresponding values of y , as given below.

x	$y = \frac{2}{x}$
-8	-0.25
-6	-0.33
-4	-0.5
-2	-1
-1	-2
0	undefined

1	2
2	1
4	0.5
6	0.33
8	0.25

Step-II Select a suitable scale for graph like On x -Axis, 1 division = 2 units
On y -Axis, 1 division = 0.5 unit

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.



Q. 3 Sales for a new magazine are expected to grow according to the equation: $S = 200000(1 - e^{-0.05t})$, where t is given in weeks.

(a) Plot graph of sales for the first 50 weeks.

(b) Calculate the number of magazines sold, when $t = 5$ and $t = 35$.

Solution (a):

Graph for First 50 weeks:

Step-I: Substitute the values of " t " in the given function and find the corresponding values of S , as given below.

$$S = 200000(1 - e^{-0.05t}) \quad (t \text{ is time in weeks})$$

We know that $e \approx 2.718 \approx 2.72$

1	$S = 200000(1 - e^{-0.05t})$
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0	0
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5	44,239
10	78,694
15	105,527
20	126,424
25	142,699
30	155,374
$t = 35$	165,245
$t = 40$	172,932
$t = 45$	178,920
$t = 50$	183,583

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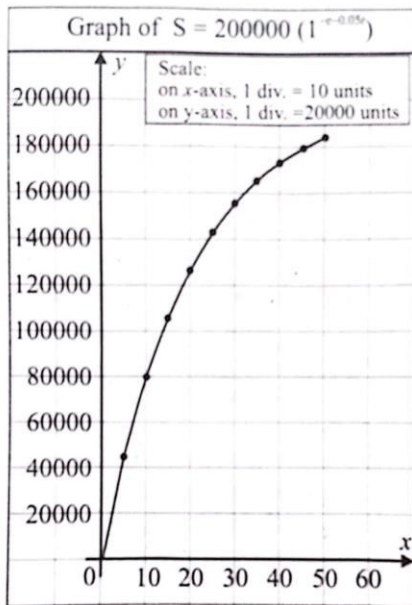
Step-II Select a suitable scale for graph like

On x -Axis, 1 division = 10 units

On y -Axis, 1 division = 20,000 units

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.

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(b) Calculate the number of magazines sold, when $t = 5$ and $t = 35$.

Solution:

Given that $S = 20000(1 - e^{-0.05t})$

Put $t = 5$ in function.

$$S = 200,000(1 - e^{-0.05 \times 5})$$

$$S = 200,000(1 - e^{-0.25}) = 44,239.8 \approx 44,240$$

Thus 44,240 magazines are sold when $t = 5$.

Put $t = 35$ in function.

$$S = 200,000(1 - e^{-0.05 \times 35})$$

$$S = 200,000(1 - e^{-1.75}) = 165,245.2 \approx 165,245$$

Thus 165,245 magazines are sold when $t = 35$.

Q. 4 Plot the graph of following for x from -5 to 5 :

(i) $y = x^2 - 3$

Solution:

$$y = x^2 - 3$$

Step-I: Substitute the values of " x " in the given function and find the corresponding values of y , as given below.

x	$y = x^2 - 3$	(x, y)
-5	22	$(-5, 22)$
-4	13	$(-4, 13)$
-3	6	$(-3, 6)$

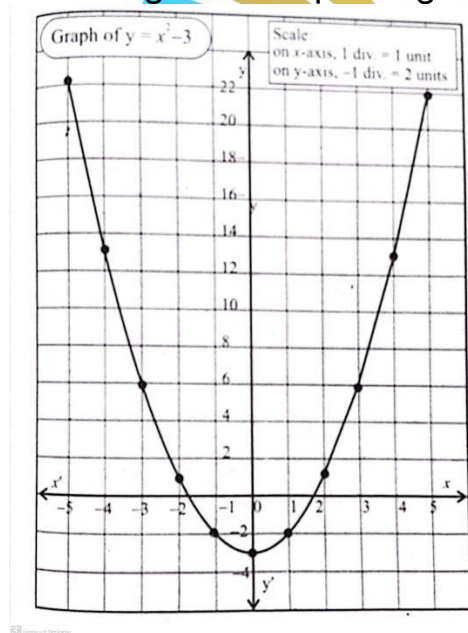
-2	1	$(-2, 1)$
-1	-2	$(-1, -2)$
0	-3	$(0, -3)$
1	-2	$(1, -2)$
2	1	$(2, 1)$
3	6	$(3, 6)$
4	13	$(4, 13)$
5	22	$(5, 22)$

Step-II Select a suitable scale for graph like

On x -axis, 1 division = 1 unit

On y -axis, 1 division = 2 units

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.



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(ii) $y = 15 - x^2$

Solution

$$y = 15 - x^2 \quad (-5 \text{ to } 5)$$

step-I: Substitute the values of " x " in the given function and find the corresponding values of y , as given below.

x	$y = 15 - x^2$	(x, y)
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-5	-10	(-5, -10)
-4	-1	(-4, -1)
-3	6	(-3, 6)
-2	11	(-2,11)
-1	14	(-1, 14)
0	15	(0,15)
1	14	(-1,14)
2	11	(2,11)

3	6	(4,6)
4	-1	(4, -1)
5	-10	(5, -10)

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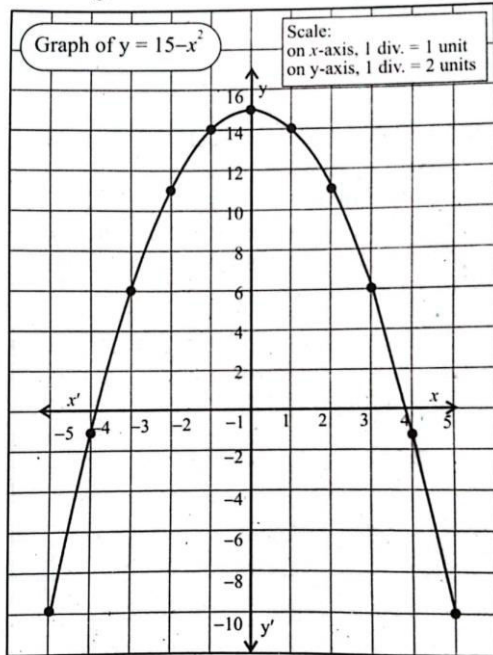
Step-II Select a suitable scale for graph line

On x -Axis, 1 division = 1 unit

On y -Axis, 1 division = 2 units

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.

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Q. 5 Plot the graph of $y = \frac{1}{2}(x + 4)(x - 1)(x - 3)$ from -5 to 4 .

Solution:

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

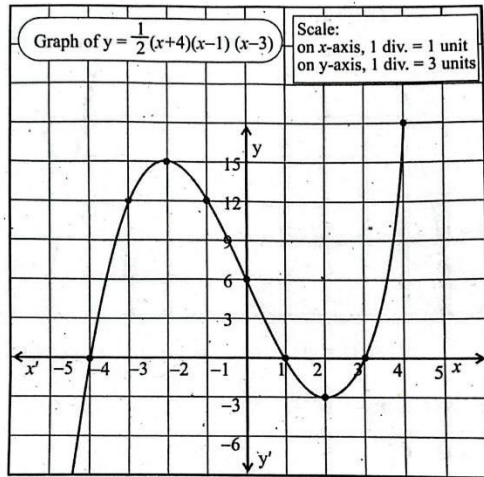
Step-I: Substitute the values of "x" in the given function and find the corresponding values of y, as given below.

x	y	(x, y)
-4	0	(-4, 0)
-3	12	(-3, 12)
-2	15	(-2, 15)
-1	12	(-1, 12)
0	6	(0, 6)
1	0	(1, 0)
2	-3	(2, -3)
3	0	(3, 0)
4	12	(4, 12)

Step-II Select a suitable scale for graph like On x -Axis, 1 division = 1 units

On y -axis, 1 division = 3 units

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.



Q. 6 The supply and demand functions for a particular market are given by the equations:

- (i) $P_s = Q^2 + 5$ and $P_d = Q^2 - 10Q$, where P represents price and Q represents quantity,
(ii) Sketch the graph of each function over the interval $Q = -20$ to $Q = 20$.

Solution:

$$P_s = Q^2 + 5, P_d = Q^2 - 10Q$$

Step-I: Substitute the values of " Q " in the given function and find the corresponding values of P_s and P_d as given below.

Q	P_s	P_d
-20	405	600
-15	230	375
-10	105	200
-5	30	75
0	5	0
5	30	-25
10	105	0

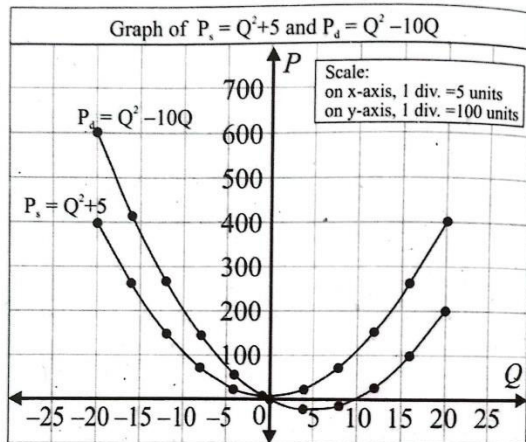
15	230	75
20	405	200

Step-II Select a suitable scale for graph like

On x -axis, 1 division = 5 units

On y -axis, 1 division = 100 units

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.



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Q.7 A television manufacturing company makes 40 inches LEDs. The cost of manufacturing x LEDs is $C(x) = 60,000 + 250x$ and the revenue from selling x LEDs is $R(x) = 1200x$. Find the breakeven point and find the profit or loss when 100 LEDs are sold. Identify the break-even point graphically. Solution:

Finding Break-even point:

The break-even point means no profit or loss. It happens when total cost and revenue are equal.

$$R(x) = C(x)$$

$$1200x = 60,000 + 250x$$

$$1200x - 250x = 60,000$$

$$950x = 60,000$$

$$x = \frac{60000}{950} = 63.16 \approx 63$$

Since break-even is at approximately 64

LEDs. Surely it will be profit on selling 100 LEDs.

$$\text{Profit} = R(x) - C(x)$$

$$\text{Profit} = (1200x) - (60,000 + 250x)$$

$$\text{Profit} = 1200x - 60,000 - 250x$$

$$\text{Profit} = 950x - 60,000$$

Put the $x = 100$ in the profit function.

$$\text{Profit} = 950(100) - 60,000$$

$$\text{Profit} = 95000 - 60,000$$

$$\text{Profit} = 35,000.$$

Plotting the graph:

$$C(x) = 60,000 + 250x, R(x) = 1200x$$

x	$C(x)$	$R(x)$
0	60,000	(0,0)
20	65,000	24,000
40	70,000	48,000
60	75,000	72,000
80	80,000	96,000
100	85,000	
120	90,000	

Step-II Select a suitable scale for graph line. On x-axis, 1 division = 20 units On y-axis, 1 division = 20,000 units

Step-III Plot the points on the grid and join them to get the required graph as shown in figure.

