REVIEW EXERCISE 10

1. Four options are given against each statement. Encircle the correct option.

(i) $x = 5$ represents:

(a) x-axis (b) y-axis

(c) line || to x-axis (d) line || 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.

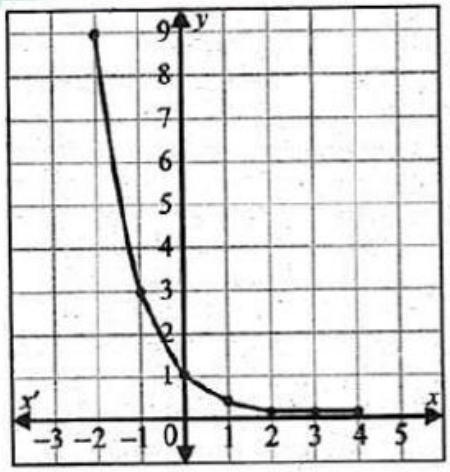
(a) exponential (b) cubic (c) linear (d) reciprocal

Q.1 **Plot the graph of the following functions:**

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

Ans:

x	$y = 3^{-x}$	(x, y)
-2	$3^{-(-2)} = 9$	$(-2,9)$
-1	$3^{-1(-1)} = 3$	$(-1,3)$
0	$3^{0} = 1$	$(0,1)$
1	$3^{-1} = 0.33$	$(1,0.33)$
2	$3^{-2} = 0.11$	$(2,0.11)$
3	$3^{-3} = 0.04$	$(3,0.04)$
4	$3^{-4} = 0.01$	$(4,0.01)$

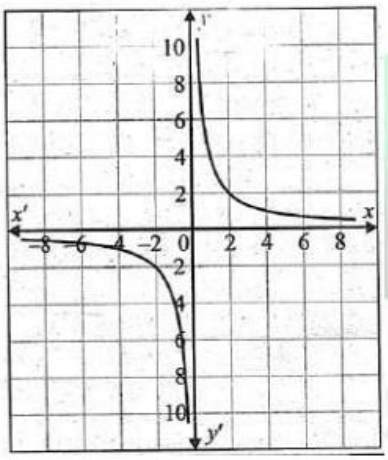


(ii) $y = \frac{2}{x}, x \neq 0$

Ans:

x	$y = \frac{2}{x}$	(x, y)

-2	$\frac{2}{-2}=-1$	$(-2,-1)$
-1	$\frac{2}{-1}=-2$	$(-1,-2)$
0		
1	$\frac{2}{1}=2$	$(1,2)$
2	$\frac{2}{2}=1$	$(2,1)$
3	$\frac{2}{3}=0.67$	$(3,0.67)$
4	$\frac{2}{27}=\frac{1}{2}=0.5$	$(4,0.5)$



Q.2 **Sales for a new magazine are expected to grow according to the equation:**

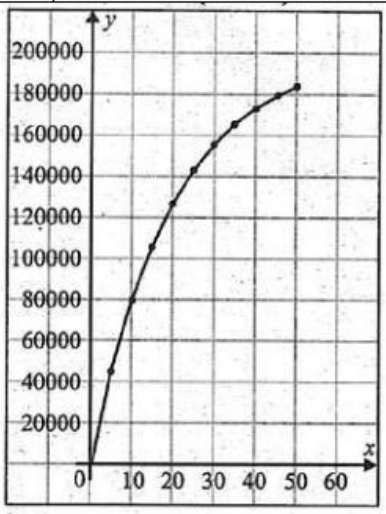
$S=200000\left(1-e^{-0.05t}\right)$, **where t is given in weeks.**

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

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

Ans:

t	$S=200000\left(1-e^{-0.05t}\right)$
5	$200000\left(1-e^{(-0.05)5}\right)=47619$
10	$200000\left(1-e^{(-0.05)10}\right)=86394$
15	$200000\left(1-e^{(-0.05)15}\right)=118341$
20	$200000\left(1-e^{(-0.05)20}\right)=143911$
25	$200000\left(1-e^{(-0.05)25}\right)=162241$
30	$200000\left(1-e^{(-0.05)30}\right)=176351$
35	$200000\left(1-e^{(-0.05)35}\right)=186241$

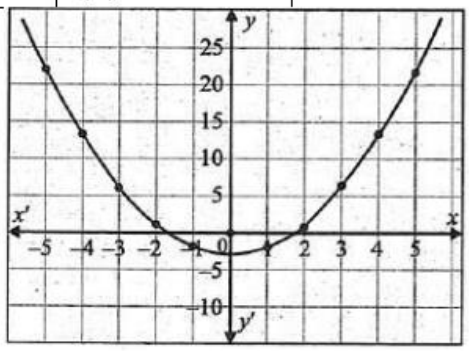


Q.3 **Plot the graph of following for x from -5 to 5:**

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

Ans:

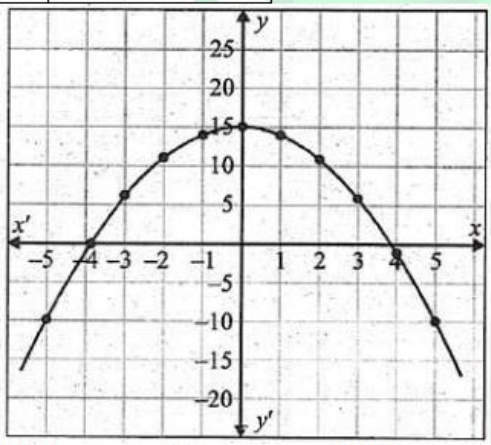
x	$y=x^2-3$
-5	$(-5)^2-3=22$
-4	$(-4)^2-3=13$
-3	$(-3)^2-3=6$
-2	$(-2)^2-3=1$
-1	$(-1)^2-3=-2$
0	$(0)^2-3=-3$
1	$(1)^2-3=-2$
2	$(2)^2-3=1$
3	$(3)^2-3=6$
4	$(4)^2-3=13$
5	$(5)^2-3=22$



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

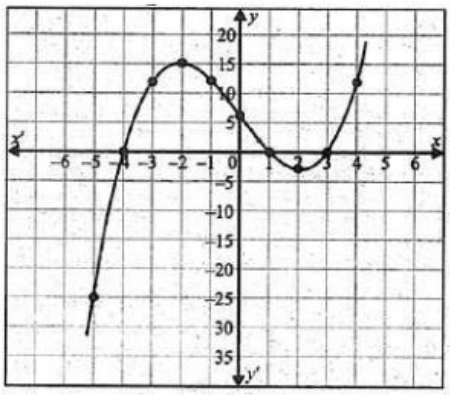
Ans:

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



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

Ans:



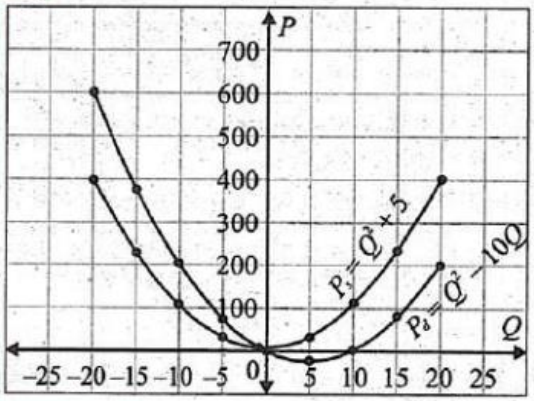
Q.5 **The supply and demand functions for a particular market are given by the equations:**

$P_s = Q^2 + 5$ **and** $P_d = Q^2 - 10Q$, **where** P **represents price and Q represents quantity,**

Sketch the graph of each function over the interval $Q = -20$ **to** $Q = 20$

Ans:

Q	$P_s = Q^2 + 5$	$P_d = Q^2 - 100Q$
-20	$(-20)^2 + 5 = 405$	$(-20) - 100(-20) = 600$
-15	$(-15)^2 + 5 = 230$	$(-20) - 100(-15) = 550$
-10	$(-10)^2 + 5 = 105$	$(-20) - 100(-10) = 1400$
-5	$(-5)^2 + 5 = 30$	$(-20) - 100(-5) = 900$
0	$(0)^2 + 5 = 5$	$(-20) - 100(0) = 400$
5	$(5)^2 + 5 = 30$	$(-20) - 100(5) = -100$
10	$(10)^2 + 5 = 105$	$(-20) - 100(10) = -600$
15	$(15)^2 + 5 = 230$	$(-20) - 100(15) = -1100$
20	$(20)^2 + 5 = 405$	$(-20) - 100(20) = -1600$



Q.6 **A television manufacturer company make 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 break-even point and find the profit or loss when 100 LEDs are sold. Identify the break-even point graphically.

Ans:

x	$C(x) = 600000 + 250x$	x	$R(x) = 1200x$
0	$600000 + 250(0) = 600000$	0	$1200(0) = 0$
20	$600000 + 250(20) = 65000$	20	$1200(20) = 24000$
40	$600000 + 250(40) = 70000$	40	$1200(40) = 48000$
60	$600000 + 250(60) = 75000$	60	$1200(60) = 72000$
80	$600000 + 250(80) = 80000$	80	$1200(80) = 96000$

Break even point is $(63, 75790)$

If profit is realized then $SP > CP$

Profit $= 1200x - [6000 + 250x]$

$= 1200x - 6000 - 250x$

$= 950x - 6000$

For 100 LEDs, $x = 100$

Profit $= 950 \times 100 - 6000$

$= Rs35000$