Exercise 9.3

1. Write each of the following in expanded form:

(*i*) $(2x - 3y)^3$ (*ii*) $\left(\frac{1}{3}x + \frac{5}{3}y\right)^3$ (*iii*) $\left(2x - \frac{1}{3y}\right)^3$

(iv) $\left(3x-\frac{1}{x}\right)^3$ (v) $\left(2m+\frac{1}{2m}\right)^3$

2. Simplify each of the following:

(i) $(a-3b)^3+(a+3b)^3$

(ii) $\left(\frac{1}{3}a+\frac{2}{3}b\right)^3+\left(\frac{1}{3}a-\frac{2}{3}b\right)^3$

3. Evaluate each of the following by using suitable identities:

(i) $(104)^3$ (ii) $(999)^3$ (iii) $(599)^3$

4. If $x^3+\frac{1}{x^3}=m$ and $x^2+\frac{1}{x^2}=47$, find the value of m.

5. If $x+\frac{1}{x}=6$, find the value of $x^3-\frac{1}{x^3}$.

6. Find the value of $27x^3-\frac{1}{27x^3}$, if $3x-\frac{1}{3x}=5$.

7. Find the value of $8x^3+y^3$, if $2x+y=3$ and $xy=1$.

8. Find the value of $x^3+\frac{1}{x^3}$, if $x^2+\frac{1}{x^2}=14$.

Answers

1. (*i*) $8x^3 - 36x^2y + 54xy^2 - 27y^3$

(*ii*) $\frac{1}{27}x^3 + \frac{5}{9}x^2y + \frac{25}{9}xy^2 + \frac{125}{27}y^3$

(*iii*) $8x^3 - \frac{4x^2}{y} + \frac{2x}{3y^2} - \frac{1}{27y^3}$

(*iv*) $27x^3 - 27x + \frac{9}{x} - \frac{1}{x^3}$

(*v*) $8m^3 + 6m + \frac{3}{2m} + \frac{1}{8m^3}$

2. (*i*) $2a^3 + 54ab^2$

(*ii*) $\frac{2}{27}a^3 + \frac{8}{9}ab^2$

3. (*i*) 1124864 (*ii*) 997002999 (*iii*) 214921799

4. 322 **5.** $140\sqrt{2}$ **6.** 140 **7.** 9

8. 52