आधुनिक विद्या निकेतन ट्यूशन सेंटर	तन ट्यूशन सेंटर	आधुनिक विद्या नि
Algebraic Expression	(c) $-2xy^2$ , $x^2y$ , $5y^2x$ , $x^2z$	Algebraic Expression
the following using literals, numbers and	(d) abc, ab²c, acb², c²ab, b²ac, a²bc, cab²	1. Write the following using literals, numbers and

**13.** (a) 3x, 7x

(b) 7y, -9y (d) 3x, 2y

(f) 6a<sup>3</sup>, -4a<sup>3</sup>, 10a<sup>3</sup>, -8a<sup>3</sup>

(b) y decreased by 7

signs of basic operations.

**13.** (a) 3x, 7x

(d) abc,  $ab^2c$ ,  $acb^2$ ,  $c^2ab$ ,  $b^2ac$ ,  $a^2bc$ ,  $cab^2$ 

(c)  $-2xy^2$ ,  $x^2y$ ,  $5y^2x$ ,  $x^2z$ 

(c) 2xy 5xy, -xy

(b) 7y, -9y (d) 3x, 2y

(f) 6a<sup>3</sup>, -4a<sup>3</sup>, 10a<sup>3</sup>, -8a<sup>3</sup>

(e)  $2x^2$ ,  $3x^2$ ,  $7x^2$ 

आधुनिक विद्या निकेतन ट्यूशन सेंटर

signs of basic operations. (e) Sum of x and the quotient of y by 5 (a) x increased by 12 (g) 2 less than the quotient of x by y (d) 5 times x added to 7 times y (c) The difference of a and b. when a > b t) x taken away from 4

**14.** (a) x - 3y - 2z, 5x + 7y - z and -7x - 2y + 4z (b)  $m^2 - 4m + 5$ ,  $-2m^2 + 6m - 6$  and  $-m^2 - 2m - 7$ (h)  $x^2$  - $a^2$ , -  $5x^2$  +  $2a^2$ , -  $4x^2$  +  $4a^2$ 

(g) 7xyz, -5xyz, 9xyz, -8xyz

(e)  $2x^2$ ,  $3x^2$ ,  $7x^2$ (c) 2xy 5xy, -xy

(c)  $2x^2 - 3xy + y^2$ ,  $-7x^2 - 5xy - 2y^2$  and  $4x^2 + xy -$ (d) 4xy - 5yz - 7zx, -5xy + 2yz + zx and -2xy - 3yz +

**15.** (a) 3a - 2b + 5c, 2a + 5b - 7c, - a - b + c (b) 8a - 6ab + 5b, 6a - ab - 8b, - 4a + 2ab + 3b

2. Write the following in the exponential form:

**15.** (a) 3a - 2b + 5c, 2a + 5b - 7c, - a - b + c

(c)  $2x^3 - 3x^2 + 7x - 8$ ,  $-5x^3 + 2x^2 - 4x + 1$ , 3 - 6x + 6x + 1(b) 8a - 6ab + 5b, 6a - ab - 8b, - 4a + 2ab + 3b (k) x cubed less than y cubed

Thrice x added to y squared

(i) Twice x increased by y

(h) x multiplied by itself

(g) 2 less than the quotient of x by y

**14.** (a) x - 3y - 2z, 5x + 7y - z and -7x - 2y + 4z

(h)  $x^2$  - $a^2$ , -  $5x^2$  +  $2a^2$ , -  $4x^2$  +  $4a^2$ 

(g) 7xyz, -5xyz, 9xyz, - 8xyz

(c)  $2x^2 - 3xy + y^2$ ,  $-7x^2 - 5xy - 2y^2$  and  $4x^2 + xy -$ 

(d) 4xy - 5yz - 7zx, -5xy + 2yz + zx and -2xy - 3yz +

(b)  $m^2 - 4m + 5$ ,  $-2m^2 + 6m - 6$  and  $-m^2 - 2m - 7$ 

(f) x taken away from 4

(e) Sum of x and the quotient of y by 5 (d) 5 times x added to 7 times y (c) The difference of a and b. when a > b

(a)  $b \times b \times b \times ...15$  times

(d)  $6 \times x \times x \times y \times y$ 

(c)  $14 \times a \times a \times a \times a \times b \times b \times b$ (b)  $y \times y \times y \times ...20$  times 2. Write the following in the exponential form:

(k) x cubed less than y cubed (j) Thrice x added to y squared (i) Twice x increased by y h) x multiplied by itself

(a)  $b \times b \times b \times ...15$  times

Write down the following in the product form: (c)  $9xy^2z$ (d) 10a³b³c³ (c)  $2x^3 - 3x^2 + 7x - 8$ ,  $-5x^3 + 2x^2 - 4x + 1$ , 3 - 6x + 1(d)  $2x^2 - 8xy + 7y^2 - 8xy^2$ ,  $2xy^2 + 6xy - y^2 + 3x^2$ ,  $4y^2$ 

(c) ab - a<sup>2</sup> (f)  $2 + x - x^2 + 6x^3$ ,  $-6 - 2x + 4x^2 - 3x^3$ ,  $2 + x^2$ ,  $3 - x^3$ (e)  $x^3 + y^3 - Z^3 + 3xyz$ ,  $-x^3 + y^3 + z^3 - 6xyz$ ,  $x^3 - y^3 - y$  $- xy - x^2 + xy^2$ 

**14.** (a) 5x from 2x

(c) 3a from 5b (d) -7x from 9y (b) -xy from 6xy

. (a) 5a + 7b - 2c from 3a - 7b + 4c (c)  $5x^2 - 3xy + y^2$  from  $7x^2 - 2xy - 4y^2$ (b) a - 2b - 3c from -2a + 5b - 4c (e)  $10x^2$  from  $-7x^2$ (f)  $a^2 - b^2$  from  $b^2 - a^2$ 

**6.** If p = -2, q = -1 and r = 3, find the value of

(a)  $p^2 + q^2 - r^2$ 

(b)  $2p^2 - q^2 + 3r$ 

**5.** If x = 1, y = 2 and z = 5, find the value of

(e) 5a<sup>2</sup> - 2ab (b)  $a^2 + ab$ 

(f)  $a^3 - b^3$ 

(c)  $2x^2 - 3y^2 + z^2$ (a) 3x - 2y + 4z

(d) xy + yz - zx

(b)  $x^2 + y^2 + z^2$ 

(f)  $x^3 - y^3 - z^3$ 

(e)  $2x^2y - 5yz + xy^2$ 

**4.** If a = 2 and b = 3, find the value of

(a)  $x^2y^4$ 

(b) 6y<sup>5</sup>

(e)  $3 \times z \times z \times z \times y \times y \times x$ 

(d) 6 × × × × × y × y

(c) 14 × a × a × a × a × b × b × b (b) y × y × y × ...20 times

(f)  $-11x^2y^2 + 7xy - 6$  from  $9x^2y^2 - 6xy + 9$ (e)  $x^3 + 2x^2y + 6xy^2 - y^3$  from  $y^3 - 3xy^2$ (g) -2a + b + 6d from 5a - 2b - 3c (d)  $6x^3 - 7x^2 + 5x - 3$  from  $4 - 5x + 6x^2 - 8x^3$ 

(c) y<sup>2</sup> in 8xy<sup>2</sup>z (f) a in 6ab (d)  $-2x^3y^2z$ **15.** (a)  $2p^3 - 3p^2 + 4p^5 - 6p^3 + 2p^2 - 8p - 2 + 6p + 8$ (b)  $2x^2 - xy + 6x - 4y + 5xy - 4x + 6x + 3y$ 

8. Write die numerical coefficient of

(b) -6bc (c) 7xyz

(g)  $x^3$  in  $x^3$ 

(h)  $x^2$  in  $-x^2$ (e) p in -2pqr (b) y in -5y

(d) z in -7xz (a) x in 13x Write the coefficient of

(e) p<sup>4</sup> +q<sup>4</sup> - r<sup>4</sup> (c) p - q - r

(f)  $3p^2q + 5pq^2 + 2pqr$ 

(d)  $p^3 + q^3 + r^3 + 3pqr$ 

9. Write the constant term of

**17.** (a)  $(a^2 + b^2 + 2ab) - (a^2 + b^2 - 2ab)$ **16.** (a) a - (b - 2a) (d)  $-2(x^2 - y^2 + xy) - 3(x^2 + y^2 - xy)$ (c)  $-4x^2 + \{(2x^2 - 3) - (4 - 3x^2)\}$ (b) -3(a + b) + 4(2a - 3b) - (2a - b)(c)  $x^4$  -  $6x^3$  + 2x - 7 +  $7x^3$  - x +  $5x^2$  + 2 -  $x^4$ (b) 4x - (3y - x + 2z)

**10.** Identify the

monomials, binomials

and

(d)  $z^3 - 2z^2 + z - \frac{8}{3}$ (b) 2x<sup>2</sup> - 9

(c)  $4y^2 - 5y + \frac{3}{5}$ (a)  $3x^2 + 5x + 8$ 

trinomials in the following:

(b)  $5 + 7x^3y^3z^3$ 

(c) -5x<sup>3</sup>

3. Write down the following in the product form: **4.** If a = 2 and b = 3. find the value of (a)  $x^2y^4$ (a) a + b (e)  $3 \times z \times z \times z \times y \times y \times x$ (b) 6y<sup>5</sup> (b)  $a^2 + ab$ (c)  $9xy^2z$ (c) ab - a<sup>2</sup> (d) 10a³b³c³

**5.** If x = 1, y = 2 and z = 5, find the value of (a) 3x - 2y + 4z(d) 2a - 3b (e)  $5a^2$  - 2ab (f)  $a^3$  -  $b^3$ (b)  $x^2 + y^2 + z^2$ 

Subtract

(f)  $2 + x - x^2 + 6x^3$ ,  $-6 - 2x + 4x^2 - 3x^3$ ,  $2 + x^2$ ,  $3 - x^3$ 

+ 4x - 2x

(e)  $x^3 + y^3 - Z^3 + 3xyz$ ,  $-x^3 + y^3 + z^3 - 6xyz$ ,  $x^3 - y^3 - y$ 

(d)  $2x^2 - 8xy + 7y^2 - 8xy^2$ ,  $2xy^2 + 6xy - y^2 + 3x^2$ ,  $4y^2$ 

 $-xy-x^2+xy^2$ 

**14.** (a) 5x from 2x

(c) 3a from 5b

**15.** (a) 5a + 7b - 2c from 3a - 7b + 4c

(c)  $5x^2 - 3xy + y^2$  from  $7x^2 - 2xy - 4y^2$ (b) a - 2b - 3c from -2a + 5b - 4c (e)  $10x^2$  from  $-7x^2$ 

(f)  $a^2 - b^2$  from  $b^2 - a^2$ 

(b) -xy from 6xy (d) -7x from 9y

+ 4x - 2x

**6.** If p = -2, q = -1 and r = 3, find the value of (a)  $p^2 + q^2 - r^2$ (e) p<sup>4</sup> +q<sup>4</sup> - r<sup>4</sup> (c) p - q - r (c)  $2x^2 - 3y^2 + z^2$ (e)  $2x^2y - 5yz + xy^2$ (f)  $3p^2q + 5pq^2 + 2pqr$ (d) xy + yz - zx(d)  $p^3 + q^3 + r^3 + 3pq$ (b)  $2p^2 - q^2 + 3r$ (f)  $x^3 - y^3 - z^3$ 

8. Write die numerical coefficient of (g)  $x^3$  in  $x^3$ (d) z in -7xz (a) ab (b) -6bc (h)  $x^2$  in  $-x^2$ (e) p in -2pqr (c) 7xyz

**9.** Write the constant term of

(a)  $3x^2 + 5x + 8$ 

(b) 2x<sup>2</sup> - 9

(c)  $4y^2 - 5y + \frac{3}{5}$ (d)  $z^3 - 2z^2 + z - \frac{8}{3}$ 

**10.** Identify the (d) a + b - 2ctrinomials in the following: (a) -2xyz (e) xy + yz - zx(b)  $5 + 7x^3y^3z^3$ monomials, binomials (c) -5x<sup>3</sup>

11. Write all the terms of the algebraic expressions: (a)  $4x^5 - 6y^4 + 7x^2y - 9$ (i)  $ax^3 + bx^3 + cx + d$ (g) 2x + 1(h) -14 (b)  $9x^3 - 5z^4 + 7x^3y - xyz$ 

**12.** Identify the like terms in the following:

(a) a<sup>2</sup>, b<sup>2</sup>, -2a<sup>2</sup>, c<sup>2</sup>, 4a

(b) 3x, 4xy, -yz, -zy,  $\frac{1}{2}$ zy

(e)  $x^3 + 2x^2y + 6xy^2 - y^3$  from  $y^3 - 3xy^2$ (d)  $6x^3 - 7x^2 + 5x - 3$  from  $4 - 5x + 6x^2 - 8x^3$ (f)  $-11x^2y^2 + 7xy - 6$  from  $9x^2y^2 - 6xy + 9$ 

(b) y in -5y (c) y<sup>2</sup> in 8xy<sup>2</sup>z (f) a in 6ab

(d)  $-2x^3y^2z$ 

and

**16.** (a) a - (b - 2a)

Simplify:

7. Write the coefficient of

(a) x in 13x

(g) -2a + b + 6d from 5a - 2b - 3c

**15.** (a)  $2p^3 - 3p^2 + 4p^5 - 6p^3 + 2p^2 - 8p - 2 + 6p + 8$ (b)  $2x^2 - xy + 6x - 4y + 5xy - 4x + 6x + 3y$ 

**17.** (a) (a<sup>2</sup> + b<sup>2</sup> + 2ab) - (a<sup>2</sup> + b<sup>2</sup> - 2ab) (c)  $x^4$  -  $6x^3$  + 2x - 7 +  $7x^3$  - x +  $5x^2$  + 2 -  $x^4$ (c)  $-4x^2 + \{(2x^2 - 3) - (4 - 3x^2)\}$ (b) -3(a + b) + 4(2a - 3b) - (2a - b)(e) a - [2b - {3a - (2b - 3c)}] (d)  $-2(x^2 - y^2 + xy) - 3(x^2 + y^2 - xy)$ (f) - x + [5y - {x - (5y - 2x)}] (b) 4x - (3y - x + 2z)

MVN

(m) -a - [a + {a + b - 2a - (a - 2b)} - b] (l) 2a - 3b - [3a - 2b - {a - c - (a - 2b)}]

 $(k) \times y - [yz - zx - \{yx - (3y - xz) - (xy - zy)\}]$ 

(j)  $3 - [x - {2y - (5x + y - 3) + 2x^2} - (x^2 - 3y)]$ 

(i)  $5a - [a^2 - \{2a(1 - a + 4a^2) - 3a(a^2 - 5a^3)\}] - 8a$ 

(h)  $12x - [3x^2 + 5x^2 - \{7x^2 - (4 - 3x - x^3) + 6x^3\} - 3x]$ 

(g) 86 - [15x - 7(6x - 9) - 2{10x - 5(2 - 3x)}]

MVN ALGEBRA (Junior)

ALGEBRA (Junior)

11. Write all the terms of the algebraic expressions:

(i)  $ax^3 + bx^3 + cx + d$ 

(g) 2x + 1

(h) -14 (e) xy + yz - zx

 $(f) - x + [5y - {x - (5y - 2x)}]$ (e) a - [2b - {3a - (2b - 3c)}]

(d) a + b - 2c

(a)  $4x^5 - 6y^4 + 7x^2y - 9$  (b)  $9x^3 - 5z^4 + 7x^3y - xyz$ 

(i)  $5a - [a^2 - {2a(1 - a + 4a^2) - 3a(a^2 - 5a^3)}] - 8a$ 

(j)  $3 - [x - {2y - (5x + y - 3) + 2x^2} - (x^2 - 3y)]$ 

(h)  $12x - [3x^2 + 5x^2 - \{7x^2 - (4 - 3x - x^3) + 6x^3\} - 3x]$ (g) 86 - [15x - 7(6x - 9) - 2{10x - 5(2 - 3x)}]

(l) 2a - 3b - [3a - 2b - {a - c - (a - 2b)}] (m) -a - [a + {a + b - 2a - (a - 2b)} - b]  $(k) \times y - [yz - zx - \{yx - (3y - xz) - (xy - zy)\}]$  Identify the like terms in the following:

(a)  $a^2$ ,  $b^2$ ,  $-2a^2$ ,  $c^2$ , 4a

(b) 3x, 4xy, -yz, -zy,  $\frac{1}{2}$ zy

## Simple Equations

- each of the following statements (a) 5 times a number equals 40. equation:
- (c) 25 exceeds a number by 7.

(d) 5 subtracted from thrice a number is 16.

- (b) A number Increased by 8 equals 15.
- Write a statement for each of the equations, given below:
- (c) 11 + 3x = 17(f)  $\frac{2z}{3} = 8$ (e) 12y - 30 = 6(b) 2y = 18(d) 2x - 3 = 13 $(a) \times -7 = 14$ 
  - 3. Verify by substitution that
  - (a) the root of 3x 5 = 7 is x = 4

(b) the root of 3 + 2x = 9 is x = 3

- Solve each of the following equations by (c) 4x = 28(f)  $\frac{x}{3} = 4$  $(b) \times -7 = 10$ trial-and-error method: (a) y + 9 = 13
- (h)  $\frac{1}{2}$  x + 7 = 11 (i) 2y + 4 = 3y (e) 11 + x = 19(g) 2x - 3 = 9(d) 3y = 36
- Solve each, of the following equations and. verify

## the answer in each case:

- **5.** (a) x 1 = 0
  - (g) y + 4 = 4(d) x + 6 = 2
    - **6.** (a) 3I = 42

      - (d) 4x = 25
- (h) 20t = -10
- (b) 5m + 7 = 17

  - (d)  $\frac{3p}{10} = 6$
- (b)  $\frac{p}{4}=5$ (e) 3s = -9
  - h) 2q = 6
- (k) 2q + 6 = 12

(b) 5t + 28 = 10

(d)  $\frac{q}{4} + 7 = 5$ 

- (c)  $\frac{a}{5} + 3 = 2$ 
  - (e)  $\frac{5}{2}$  x = 10
- = 13 (g)  $7m + \frac{19}{2} =$
- - (i)  $\frac{3l}{2} = \frac{2}{3}$

- (c) 3(n 5) = 21 **10.** (a) 2(x + 4) = 12
- (e) 4(2 x) = 8

(d) - 4(2 + x) = 8

(b) 3(n-5) = 21

(j)  $\frac{2b}{3}$  – 5 = 3

- (e) 0 = 16 + 4(m 6)(c) 16 = 4 + 3(t + 2)
- Express the following in exponential form:
  - $(a) 6 \times 6 \times 6 \times 6$

- (e) y 4 = -7(b) x + 1 = 0
  - (h) y + 4 = -4
    - $9 = \frac{2}{q}$  (q)

    - (e) 8y = 36

(f)  $\frac{z}{3} = \frac{5}{4}$ 

- - (g)  $\frac{a}{5} = \frac{7}{15}$ 7. (a) 3n 2 = 46
- (e) 10p + 10 = 100(a) 10p = 100

(f) 3s + 12 = 0

(c)  $\frac{-P}{3}=5$ 

- (d)  $\frac{3p}{4} = 6$  (g) 3s = 0
  - (j) 2q + 6 = 0
- **9.** (a)  $2y + \frac{5}{2} = \frac{37}{2}$

(h) 6z + 10 = -2

(f)  $\frac{5}{2}$  x =  $\frac{52}{4}$ 

- - **11.** (a) 4 = 5(p 2)
- **Exponents and Powers**
- 1. Find the value of:

(c) 11<sup>2</sup>

- $(b) t \times t$

- $(c) b \times b \times b \times b$
- $(d) 5 \times 5 \times 7 \times 7 \times 7$

3. Express each of the following numbers using exponential notation: (b) 343 (a) 512

an

as

f)axaxaxcxcxcxd

- 4. Identify the greater number, wherever possible, (d) 2<sup>3</sup> या 2<sup>2</sup> (с) 2<sup>8</sup> या 8<sup>2</sup> in each of the following? (a) 4<sup>3</sup> या 3<sup>4</sup> (b) 5<sup>3</sup> या 3<sup>5</sup>
- product of Express each of the following as
  - powers of their prime factors: (a) 648
- (d)  $3 \times 4^4$ (c)  $2^3 \times 5$ (c) 540 (b)  $72 \times 2^2$ (b) 405 **6.** (a)  $2 \times 10^3$
- (b)  $(-3) \times (-2)^3$  (c)  $(-3)^2 \times (-5)^2$ Using laws of exponents, simplify and write the (g)  $2^4 \times 3^2$ (f)  $5^2 \times 3^3$ (e)  $0 \times 10^2$ **7.** (a) (-4)<sup>3</sup>

the

(h)  $3^2 \times 10^4$ 

- (e)  $5^3 \times 5^7 \times 5^{12}$  (f)  $(-4)^{10} \times (-4)^{20}$ (c)  $4^3 \times 4^2$ (b)  $p^3 \times p^2$ answer in exponential form: (d)  $a^3 \times a^2 \times a^7$ **9.** (a)  $2^5 \times 2^3$ 
  - (c)  $20^{15} \div 20^{13}$ (f)  $11^6 \div 11^2$ (b)  $10^8 \div 10^4$ (e)  $7^{13} \div 7^{10}$ (d)  $9^{11} \div 9^7$

**10.** (a)  $2^9 \div 2^3$ 

 $(c)(7^{50})^2$ (b)  $(2^2)^{100}$ 

(d)  $(5^3)^7$ 

(e)  $(-2)^4 \times (-3)^4$  (f)  $a^m \times b^m$ (c)  $a^2 \times t^2$ (b)  $2^5 \times b^5$ 

**12.** (a)  $4^3 \times 2^3$ 

(c) x - 1 = 5(f) y - 4 = 4

 $(i) \times + 5 = 12$ 

(c)  $\frac{p}{7} = 4$ 

**11**. (a) (6<sup>2</sup>)<sup>4</sup>

- **13.** (a)  $4^5 \div 3^5$  (b)  $2^5 \div b^5$  (c)  $(-2)^5 \div b^3$  (d)  $5^6 \div (-2)^6$ (d)  $5^6 \times (-2)^6$
- (d)  $6^{\circ}0 \times 7^{\circ}$
- (d)  $\left(\frac{-2}{3}\right)^{-1}$ (c)  $4^0 + 5^0$ (p)  $(-3)_0$ 
  - (b) (-6)-1

15. (a) (4)<sup>-1</sup>

**14.** (a) 8<sup>0</sup>

- (c)  $a^3 \times a^2$ (c)  $\left(\frac{1}{3}\right)^{-1}$ (b)  $6^{15} \div 6^{10}$ **16.** (a)  $3^2 \times 3^4 \times 3^8$ 
  - (f)  $2^5 \times 5^5$ (i)  $8^t \div 8^2$ (e)  $(5^2)^3 \div 5^3$ (h)  $(3^4)^3$

(d)  $7^{x} \times 7^{2}$ 

= 40

 $\frac{20p}{3}$ 

- (p) 298 17. Express each of the following as a product of (c)  $729 \times 64$ prime factors only in exponential form: (b) 270 (a)  $108 \times 192$ (g)  $a^4 \times b^4$ 
  - Write the following numbers in the expanded

78.

(i) 2q - 6 = 0

- 279404, 3006194, 2806196, 120719, 20068
- Find the number from each of the following
  - (a)  $8 \times 10^4 + 6 \times 10^3 + 0 \times 10^2 + 4 \times 10^1 + 5 \times 10^0$ expanded forms:
    - (b)  $4 \times 10^5 + 5 \times 10^3 + 3 \times 10^2 + 2 \times 10^0$ (c)  $3 \times 10^4 + 7 \times 10^2 + 5 \times 10^0$ 
      - (d)  $9 \times 10^5 + 2 \times 10^2 + 3 \times 10^1$

20.

- (c) 3,18,65,00,000 Express the following numbers in standard form: (a) 5,00,00,000 (b) 70,00,000 (e) 39087.8 (d) 3,90,878
- (a) Diameter of Earth = 12756000 m. standard form:
  - between Earth and (b) Distance 384000000 m.
- (d) Number of stars in a galaxy = 1000000000000. 2001 of India in March (c) Population 1027000000

(e) The present age of universe = 12000000000

1. Write each of the following statements as

Simple Equations

- (b) A number Increased by 8 equals 15. (a) 5 times a number equals 40
- (d) 5 subtracted from thrice a number is 16. (c) 25 exceeds a number by 7.
- 2. Write a statement for each of the equations,
  - (c) 11 + 3x = 17given below:  $(a) \times -7 = 14$ 
    - (b) 2y = 18(e) 12y 30 = 6(d) 2x - 3 = 13
- (a) the root of 3x 5 = 7 is x = 43. Verify by substitution that
- 4. Solve each of the following equations by (b) the root of 3 + 2x = 9 is x = 3
  - (f)  $\frac{x}{3} = 4$ (e) 11 + x = 19 $(b) \times -7 = 10$ trial-and-error method: (a) y + 9 = 13(d) 3y = 36
  - (c) 4x = 28(g) 2x - 3 = 9

- (h)  $\frac{1}{2}$  x + 7 = 11 (i) 2y + 4 = 3y
- Solve each, of the following equations and. verify
  - - the answer in each case: **5.** (a) x - 1 = 0
- (c) x 1 = 5(f) y 4 = 4(e) y - 4 = -7(b) x + 1 = 0(d) x + 6 = 2
  - (h) y + 4 = -4 $9 = \frac{5}{q}$  (q) (g) y + 4 = 4

(i) x + 5 = 12

(c)  $\frac{p}{7} = 4$ II 70<u>|4</u>

 $\frac{z}{3}$ 

- **6.** (a) 3l = 42
- (d) 4x = 25
- (h) 20t = -10(e) 8y = 36(g)  $\frac{a}{5} = \frac{7}{15}$ 
  - **7.** (a) 3n 2 = 46
- (b) 5m + 7 = 17 (c)

= 40

 $\frac{20p}{3}$ 

- (d)  $\frac{3p}{10} = 6$
- (e) 10p + 10 = 1003.(a) 10p = 100
  - (b)  $\frac{P}{4} = \frac{1}{4}$ (d)  $\frac{3p}{4} = 6$  (g) 3s = 0
  - က

(f) 3s + 12 = 0

12

(c)  $\frac{-P}{3}$ 

- (e) 3s = -9
- (k) 2q + 6 = 12(h) 2q = 6

(i) 2q - 6 = 0

- (j) 2q + 6 = 0

(b) 5t + 28 = 10

(d)  $\frac{q}{4} + 7 = 5$ 

- **9.** (a)  $2y + \frac{5}{2} = \frac{37}{2}$

- (c)  $\frac{a}{5} + 3 = 2$ 
  - (e)  $\frac{5}{2}$  x = 10

(f)  $\frac{5}{2}$  x =  $\frac{52}{4}$ 

(h) 6z + 10 = -2

- (g)  $\bar{7}$ m +  $\frac{19}{2}$ 

  - (i)  $\frac{3l}{2} = \frac{2}{3}$
- - **10.** (a) 2(x + 4) = 12 (c) 3(n 5) = -21
- (e) 4(2 x) = 8**11.** (a) 4 = 5(p - 2)

(d) - 4(2 + x) = 8

(b) 3(n - 5) = 21

(j)  $\frac{2b}{3}$  – 5 = 3

(c) 16 = 4 + 3(t + 2)(e) 0 = 16 + 4(m - 6)

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of the following numbers

Expregs each

21.

(d) 4 + 5(p - 1) = 34

(b) - 4 = 5(p - 2)

- (b) -4 = 5(p 2)(d) 4 + 5(p 1) = 34

  - **Exponents and Powers**
- (a) 2<sup>6</sup>

- 1. Find the value of:

- 2. Express the following in exponential form:  $(b) t \times t$  $(a) 6 \times 6 \times 6 \times 6$

(d) 5 × 5 × 7 × 7 × 7

 $(c) b \times b \times b \times b$ 

(e)  $2 \times 2 \times a \times a$ 

exponential notation: (b) 343 (a)512

3. Express each of the following numbers using

an

(f) a × a × a × c × c × c × c × d

- 4. Identify the greater number, wherever possible, (d)  $2^3$  at  $2^2$ (c) 2<sup>8</sup> ਬਾ 8<sup>2</sup> in each of the following? (a) 4<sup>3</sup> 때 3<sup>4</sup> (b) 5<sup>3</sup> 때 3<sup>5</sup>
- 5. Express each of the following as product of
- powers of their prime factors: (a) 648
  - (b)  $72 \times 2^2$ **6.** (a)  $2 \times 10^3$ Simplify:
  - (h)  $3^2 \times 10^4$ (g)  $2^4 \times 3^2$ (f)  $5^2 \times 3^3$ (e)  $0 \times 10^2$

(c)  $(-3)^2 \times (-5)^2$ 

Using laws of exponents, simplify and write the

answer in exponential form:

(b)  $(-3) \times (-2)^3$ 

**7.** (a) (- 4)<sup>3</sup>

the

- (e)  $5^3 \times 5^7 \times 5^{12}$  (f)  $(-4)^{10} \times (-4)^{20}$ (c)  $4^3 \times 4^2$ (b)  $p^3 \times p^2$ (d)  $a^3 \times a^2 \times a^7$ **9.** (a)  $2^5 \times 2^3$ 
  - (c)  $20^{15} \div 20^{13}$  $(f) 116 \div 11^2$ (c)  $(7^{50})^2$ (e)  $7^{13} \div 7^{10}$ (b)  $10^8 \div 10^4$ (b)  $(2^2)^{100}$ (d)  $9^{11} \div 9^7$ **10.** (a)  $2^9 \div 2^3$ **11**. (a)  $(6^2)^4$
- **13.** (a)  $4^5 \div 3^5$  (b)  $2^5 \div b^5$  (c)  $(-2)^5 \div b^3$  (d)  $5^6 \div (-2)^6$ (e)  $(-2)^4 \times (-3)^4$  (f)  $a^m \times b^m$ (d)  $5^6 \times (-2)^6$

(c)  $a^2 \times t^2$ 

(b)  $2^5 \times b^5$ 

**12.** (a)  $4^3 \times 2^3$ 

- (d)  $\left(\frac{-2}{3}\right)^{-1}$ (d)  $6 \times 0 \times 7^0$ (c)  $\left(\frac{1}{3}\right)^{-1}$ (c)  $4^0 + 5^0$ (p) (-3)<sub>0</sub> (b) (-6)-1 15. (a) (4)<sup>-1</sup> **14.** (a) 8<sup>0</sup>
- 17. Express each of the following as a product of (f)  $2^5 \times 5^5$ (i)  $8^t \div 8^2$ (e)  $(5^2)^3 \div 5^3$ (h)  $(3^4)^3$ (d)  $7^{x} \times 7^{2}$ (g)  $a^4 \times b^4$

(c)  $a^3 \times a^2$ 

**16.** (a)  $3^2 \times 3^4 \times 3^8$  (b)  $6^{15} \div 6^{10}$ 

- (d) 768 18. Write the following numbers in the expanded prime factors only in exponential form: (c)  $729 \times 64$ (b) 270 (a)  $108 \times 192$
- **19.** Find the number from each of the following 279404, 3006194, 2806196, 120719, forms:
  - expanded forms:
- (a)  $8 \times 10^4 + 6 \times 10^3 + 0 \times 10^2 + 4 \times 10^1 + 5 \times 10^0$
- (b)  $4 \times 10^5 + 5 \times 10^3 + 3 \times 10^2 + 2 \times 10^0$ (c)  $3 \times 10^4 + 7 \times 10^2 + 5 \times 10^0$

(d)  $9 \times 10^5 + 2 \times 10^2 + 3 \times 10^1$ 

- (c) 3,18,65,00,000 **20.** Express the following numbers in standard form: (a) 5,00,00,000 (b) 70,00,000 (e) 39087.8 (d) 3,90,878
- of the following numbers 21. Expregs each standard form:
  - (a) Diameter of Earth = 12756000 m. between Earth (b) Distance
- in March 2001 India oę (c) Population 384000000 m.
- (e) The present age of universe = 12000000000 (d) Number of stars in a galaxy = 1000000000000. 1027000000