

MTH-4106 Factoring and Algebraic Fractions: **Worksheet #11**

For each group of algebraic fractions, determine the common denominator, and the equivalent fractions:

1. $\frac{1}{x^2} + \frac{1}{x-1} + \frac{1}{x(x-1)}$

2. $\frac{1}{a+2} + \frac{1}{a-3}$

3. $\frac{1}{b} + \frac{1}{c-3}$

4. $\frac{1}{m(m+4)} + \frac{1}{5m(m+4)(m-6)}$

5. $\frac{1}{s+2} + \frac{1}{(s+2)^2}$

$$6. \quad \frac{1}{3t^3} + \frac{1}{t-2} + \frac{1}{4t^2(t-2)}$$

$$7. \quad \frac{1}{(n-3)(n+6)} + \frac{1}{(n+6)^2} + \frac{1}{n^2(n-3)}$$

$$8. \quad \frac{1}{7x^2(x+2)} + \frac{1}{3x(m-2)^2} + \frac{1}{3(m-2)x^3}$$

$$9. \quad \frac{1}{5d^2(m+4)} + \frac{1}{3m(m+2)} + \frac{1}{15(m+4)^2 d^3}$$

$$10. \quad \frac{1}{3ax^3(d+4)} + \frac{1}{6a^2(d+4)u^2} + \frac{1}{9xua(d+4)} + \frac{1}{2x^2}$$

$$11. \frac{1}{b} + \frac{1}{b+1}$$

$$12. \frac{1}{z+1} + \frac{1}{z+4}$$

$$13. \frac{1}{k(k+1)} + \frac{1}{4k(k+1)(k+2)}$$

$$14. \frac{1}{d+1} + \frac{1}{(d+1)^2}$$

$$15. \frac{1}{h^2} + \frac{1}{h-1} + \frac{1}{h(h-1)}$$

$$16. \frac{1}{(r-7)^2} + \frac{1}{(r-7)(r+2)} + \frac{1}{r^2(r+2)}$$

$$17. \frac{1}{ab} + \frac{1}{ac}$$

$$18. \frac{1}{x^2} + \frac{1}{x^3} + \frac{1}{x}$$

$$19. \frac{1}{2a} + \frac{1}{3a^2} + \frac{1}{a}$$

$$20. \frac{1}{5m} + \frac{1}{4n} + \frac{1}{3o^2}$$

$$21. \frac{1}{a^2b^3} + \frac{1}{ac^2} + \frac{1}{b^3c^4}$$

$$22. \frac{1}{4x^2y} + \frac{1}{x^3y^2} + \frac{1}{6y^3}$$

$$23. \frac{1}{6p^5q^3} + \frac{1}{8p^2q^4} + \frac{1}{4q^4}$$

$$24. \frac{1}{c^4d} + \frac{1}{6} + \frac{1}{d^2}$$

$$25. \frac{1}{a^4b^2c} + \frac{1}{c^3d^4} + \frac{1}{ab^5}$$

$$26. \frac{1}{x^3 y^2} + \frac{1}{8z^2} + \frac{1}{2y^4}$$

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

$$28. \frac{1}{4ab(c-3)^4} + \frac{1}{2b^2(c-3)^2} + \frac{1}{8a(d+4)}$$

$$29. \frac{1}{ab} + \frac{1}{b(a+b)} + \frac{1}{a(a+b)}$$

$$30. \frac{1}{(x+3)} + \frac{1}{(x-3)} + 1$$

Answers - Worksheet # 11

Note

As long as you have identified the C.D., you can write "C.D." instead of the denominators.

e.g.

$$1. \text{ C.D.} = x^2(x-1)$$

$$\frac{x-1}{x^2(x-1)} + \frac{x^2}{x^2(x-1)} + \frac{x}{x^2(x-1)}$$

$$2. \text{ C.D.} = (a+2)(a-3)$$

$$\frac{a-3}{(a+2)(a-3)} + \frac{a+2}{(a+2)(a-3)}$$

$$3. \text{ C.D.} = b(c-3)$$

$$\left. \frac{c-3}{b(c-3)} + \frac{b}{b(c-3)} \right\} \text{ OR } \frac{c-3}{\text{C.D.}} + \frac{b}{\text{C.D.}}$$

$$4. \text{ C.D.} = 5m(m+4)(m-6)$$

$$\frac{5(m-6)}{5m(m+4)(m-6)} + \frac{1}{5m(m+4)(m-6)}$$

$$5. \text{ C.D.} = (s+2)^2$$

$$\frac{s+2}{(s+2)^2} + \frac{1}{(s+2)^2}$$

$$6. \text{ C.D.} = 12t^3(t-2)$$

$$\frac{4(t-2)}{12t^3(t-2)} + \frac{12t^3}{12t^3(t-2)} + \frac{3t}{12t^3(t-2)}$$

$$7. \text{ C.D.} = n^2(n-3)(n+6)^2$$

$$\frac{n^2(n+6)}{n^2(n-3)(n+6)^2} + \frac{n^2(n-3)}{n^2(n-3)(n+6)^2} + \frac{(n+6)^2}{n^2(n-3)(n+6)^2}$$

$$8. \text{ C.D.} = 21x^3(x+2)(m-2)^2$$

$$\frac{3x(m-2)^2}{21x^3(x+2)(m-2)^2} + \frac{7x^2(x+2)}{21x^3(x+2)(m-2)^2} + \frac{7(x+2)(m-2)}{21x^3(x+2)(m-2)^2}$$

$$9. \text{ C.D.} = 15d^3m(m+4)^2(m+2)$$

$$\frac{3d^3m(m+4)(m+2)}{15d^3m(m+4)^2(m+2)} + \frac{5d^3(m+4)^2}{15d^3m(m+4)^2(m+2)} + \frac{m(m+2)}{15d^3m(m+4)^2(m+2)}$$

$$10. \text{ C.D.} = 18a^2x^3u^2(d+4)$$

$$\frac{6au^2}{2x^3u^2(d+4)} + \frac{3x^3}{18a^2x^3u^2(d+4)} + \frac{2ax^2u}{18a^2x^3u^2(d+4)} + \frac{9a^2x^2u^2(d+4)}{18a^2x^3u^2(d+4)}$$

$$9. \text{ C.D.} = b(b+1)$$

$$\frac{b+1}{b(b+1)} + \frac{b}{b(b+1)}$$

$$12. \text{ C.D.} = (z+1)(z+4)$$

$$\frac{z+4}{(z+1)(z+4)} + \frac{z+1}{(z+1)(z+4)}$$

$$13. \text{ C.D.} = 4k(k+1)(k+2)$$

$$\frac{4(k+2)}{4k(k+1)(k+2)} + \frac{1}{4k(k+1)(k+2)}$$

$$14. \text{ C.D.} = (d+1)^2$$

$$\frac{(d+1)}{(d+1)^2} + \frac{1}{(d+1)^2}$$

$$15. \text{ C.D.} = h^2(h-1)$$

$$\frac{h-1}{h^2(h-1)} + \frac{h^2}{h^2(h-1)} + \frac{h}{h^2(h-1)}$$

$$16. \text{ C.D.} = r^2(r-7)^2(r+2)$$

$$\frac{r^2(r+2)}{(r-7)^2(r+2)} + \frac{r^2(r-7)}{r^2(r-7)^2(r+2)} + \frac{(r-7)^2}{r^2(r-7)^2(r+2)}$$

$$7) \text{ C.D.} = abc \text{ OR } (a)(b)(c)$$

$$\frac{c}{abc} + \frac{b}{abc}$$

$$8) \text{ C.D.} = x^3$$

$$\frac{x}{x^3} + \frac{1}{x^3} + \frac{x^2}{x^3}$$

$$9) \text{ C.D.} = 6a^2$$

$$\frac{3a}{6a^2} + \frac{2}{6a^2} + \frac{6a}{6a^2}$$

$$10) \text{ C.D.} = 60mno^2$$

$$\frac{12no^2}{60mno^2} + \frac{15mo^2}{60mno^2} + \frac{20mn}{60mno^2}$$

$$11) \text{ C.D.} = a^2b^3c^4$$

$$\frac{c^4}{a^2b^3c^4} + \frac{abc^2}{a^2b^3c^4} + \frac{a^2}{a^2b^3c^4}$$

$$12) \text{ C.D.} = 12x^3y^3$$

$$\frac{3xy^2}{12x^3y^3} + \frac{12y}{12x^3y^3} + \frac{2x^3}{12x^3y^3}$$

$$13) \text{ C.D.} = 24p^5q^4$$

$$\frac{4q}{24p^5q^4} + \frac{3p^3}{24p^5q^4} + \frac{6p^5}{24p^5q^4}$$

$$24) \text{ C.D.} = 6c^4d^2$$

$$\frac{6d}{6c^4d^2} + \frac{c^4d^2}{6c^4d^2} + \frac{6c^4}{6c^4d^2}$$

$$25) \text{ C.D.} = a^4b^5c^3d^4$$

$$\frac{b^3c^2d^4}{a^4b^5c^3d^4} + \frac{a^4b^5}{a^4b^5c^3d^4} + \frac{a^3c^3d^4}{a^4b^5c^3d^4}$$

$$26) \text{ C.D.} = 8x^3y^4z^2$$

$$\frac{8y^2z^2}{8x^3y^4z^2} + \frac{x^3y^4}{8x^3y^4z^2} + \frac{4x^3z^2}{8x^3y^4z^2}$$

$$27) \text{ C.D.} = 4x^2(y-3)^2(y-2)$$

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

$$28) \text{ C.D.} = 8ab^2(c-3)^4(d+4)$$

$$\frac{2b(d+4)}{\text{C.D.}} + \frac{4a(c-3)^2(d+4)}{\text{C.D.}} + \frac{b^2(c-3)^4}{\text{C.D.}}$$

$$29) \text{ C.D.} = ab(a+b)$$

$$\frac{a+b}{\text{C.D.}} + \frac{a}{\text{C.D.}} + \frac{b}{\text{C.D.}}$$

$$30) \text{ C.D.} = (x+3)(x-3)$$

$$\frac{x-3}{\text{C.D.}} + \frac{x+3}{\text{C.D.}} + \frac{(x+3)(x-3)}{\text{C.D.}}$$