

Accel. PreCalculus  
Higher Order Factoring Practice

Name Key  
Date \_\_\_\_\_ Per \_\_\_\_\_

Factor the GCF from each expression.

1.  $4x^2y + 8xy^3 - 18x^5y$   
 $2x4(2x + 4y^2 - 9x^4)$

2.  $7x(x+3)^5 + 2x^2(x+3)^4$   
 $x(x+3)^4 [7(x+3) + 2x]$   
 $x(x+3)^4 (9x+21) = 3x(x+3)^4 (3x+7)$

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

4.  $\frac{1}{2}x(x-5)^3 + \frac{2}{3}x^2(x-5)^2$

$\frac{1}{2}x^2(x+4)^3 [6 - x(x+4)]$

$\frac{1}{6}x(x-5)^2 [3(x-5) + 4x]$

$\frac{1}{2}x^2(x+4)^3 [-x^2 - 4x + 6]$

$\frac{1}{6}x(x-5)^2 (7x-15)$

Factor each expression.

5.  $14a^2b - 35ab - 63ab^2$   
 $7ab(2a - 5 - 9b)$

6.  $a^2(s+2t)^2 + a(-s-2t)$   
 $a^2(s+2t)^2 - a(s+2t)$

$a(s+2t)[a(s+2t) - 1]$

$a(s+2t)(as + 2at - 1)$

7.  $100a^4 - (3a+2b)^2$

*Diff of Squares*  
 $(10a^2 - (3a+2b))(10a^2 + (3a+2b))$

8.  $(x+y)^2 - 49z^2$

*Diff of Squares*  
 $((x+y) - 7z)((x+y) + 7z)$

9.  $9x^2 + 95x + 50$

$(9x + 5)(x + 10)$

10.  $24k^3 + 124k^2 + 72k$

$4k(6k^2 + 31k + 18)$

$4k(3k + 2)(2k + 9)$

$$11. 6x^4 + 7x^2 - 24$$

$$(3x^2 + 8)(2x^2 - 3)$$

Sum  
of  
Cubes

$$12. 8a^3 + 125$$

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

$$(2a + 5)(4a^2 - 10a + 25)$$

Sum  
of  
Cubes

$$13. 64a^3 + (b+c)^3$$

$$(4a)^3 + (b+c)^3$$

$$(4a + (b+c))(16a^2 - 4a(b+c) + (b+c)^2)$$

$$14. 6(u+v)^2 - 5(u+v) - 6 \quad \text{let } a = u+v$$

$$6a^2 - 5a - 6$$

$$(3a + 2)(2a - 3)$$

$$(3(u+v) + 2)(2(u+v) - 3)$$

$$15. \underbrace{(4x^2 + 12xy + 9y^2)}_{\text{perfect square}} - 9$$

$$(2x + 3y)^2 - 9 \Rightarrow \text{Diff of Sq.}$$

$$((2x + 3y) - 3)((2x + 3y) + 3)$$

Factor  
By  
Grouping

$$16. \frac{175a^3b - 210a^3 - 280a^2b + 336a^2}{35a^3(5b - 6) - 56a^2(5b - 6)}$$

$$(35a^3 - 56a^2)(5b - 6)$$

$$7a^2(5a - 8)(5b - 6)$$

Factor  
By  
Grouping

$$17. \underline{a^2x + a^2d} - \underline{x - d}$$

$$a^2(x+d) - 1(x+d)$$

$$(a^2 - 1)(x+d)$$

$$(a-1)(a+1)(x+d)$$

$$18. 10x^2y^3z - 13xy^4z + 3y^5z$$

$$y^3z(10x^2 - 13xy + 3y^2)$$

$$y^3z(10x - 3y)(x - y)$$

$$19. 5x^4 + 58x^2y^2 + 80y^4$$

$$(5x^2 + 8y^2)(x^2 + 10y^2)$$

$$20. 48x^8 + 4x^4 - 252$$

$$4(12x^8 + x^4 - 63)$$

$$4(4x^4 - 9)(3x^4 + 7)$$

$$4(2x^2 - 3)(2x^2 + 3)(3x^4 + 7)$$