

Solutions  $\Rightarrow$  1 mark each

40

MPM 2D1

Revisit Factoring Skills

Common Factor

1a)  $2a^2 - 6a$   $2a(a-3)$

b)  $15xy - 10xy^2$   $5xy(3-2y)$

c)  $64x^6y^2 - 32x^4y^4$   $32x^4y^2(2x^2 - y^2)$

d)  $x^4 - 5x^3 + 3x^2$   $x^2(x^2 - 5x + 3)$

e)  $45a^2b - 15ab^2 - 60ab$   $15ab(3a - b - 4)$

f)  $x(a+b) + y(a+b)$   $(a+b)(x+y)$

g)  $2ax - 3bx - 2ay + 3by$   $(2a-3b)(x-y)$

h)  $x^2 + y - xy - x$   $(x-y)(x-1)$

Factoring Trinomials

2a)  $x^2 - 9x + 20$   $(x-4)(x-5)$

b)  $m^2 - 13m + 42$   $(m-6)(m-7)$

c)  $a^2 + 6a + 9$   $(a+3)^2$

d)  $25 - 10x + x^2$   $(5-x)^2$

e)  $a^2 - 3ab - 10b^2$   $(a-5b)(a+2b)$

f)  $3x^2 + 3x - 6$   ~~$3(x+2)(x-1)$~~   
 $3(x+2)(x-1)$

g)  $x^2 + 8xy + 15y^2$   $(x+5y)(x+3y)$

h)  $3y^2 + 12y - 15$   $3(y+5)(y-1)$

3a)  $4x^2 + 8x + 3$   $(2x+3)(2x+1)$

b)  $9x^2 + 15x + 4$   $(3x+4)(3x+1)$

c)  $2y^2 + 3y + 1$   $(2y+1)(y+1)$

d)  $3x^2 - 5x - 2$   $(3x+1)(x-2)$

e)  $5x^2 - 11x + 2$   $(5x-1)(x-2)$

f)  $6m^2 - 11m - 10$   $(3m+2)(2m-5)$

g)  $10b^2 + b - 3$   $(5b+3)(2b-1)$

h)  $3x^2 + 13x + 4$   $(3x+1)(x+4)$

Factoring Special Products

4a)  $y^2 + 8y + 16$   $(y+4)^2$

b)  $m^2 - 6m + 9$   $(m-3)^2$

c)  $x^2 - 25$   $(x+5)(x-5)$

d)  $9x^2 - 49$   $(3x+7)(3x-7)$

e)  $4a^2 + 4a + 1$   $(2a+1)^2$

f)  $x^2 - 4y^2$   $(x-2y)(x+2y)$

g)  $25a^2 - 40ab + 16b^2$   $(5a-4b)^2$

h)  $(a+b)^2 - c^2$   $(a+b+c)(a+b-c)$

i)  $c^2 - (2a-b)^2$   $(c+2a-b)(c-2a+b)$

You decide

5a)  $a^2 - ab - 56b^2$   $(a-8b)(a+7b)$

b)  $6a^2 + 5a + 1$   $(3a+1)(2a+1)$

c)  $m^4 - 5m^2 - 36$   $(m^2+4)(m+3)(m-3)$

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

e)  $4x^2 - 11x + 6$   $(4x-3)(x-2)$

f)  $x^3 - xy$   $x(x^2 - y)$

g)  $2x^2 - 16x + 32$   $2(x-4)^2$



45) ~~4x~~ - 4xy

46) 4(2a+b)(2a+2b)

47) -3(a+3b)(5a+7b)

48) (19x+4)(x+b)

49) -4(3x+y)(x+3y)

50) 8(2x+ty)(x+8y)

## 2.10 Exercise

**B** You must be able to recognize which skills must be used to factor a polynomial. When you factor the following polynomials, always check for a common factor first. There are at least two expressions that cannot be factored. Can you find others?

1.  $3a^2 + 6a$

4.  $25a^4 - 9y^4$

7.  $y^2 - 11y + 28$

10.  ~~$4x^2 - 11x + 6$~~

13.  $2y^2 - 8y^3$

16.  $-16 - 9x^2$

19.  $8 - 14y + 5y^2$

22.  ~~$6a^2 + 5a + 1$~~

25.  $m^4 + 3m^2 - 4$

28.  $a^2 - 144$

31.  $-a^2 - 2ab - b^2$

34.  $m^4 - 9m^2 - 112$

37.  ~~$2x^2 - 8$~~

40.  ~~$2x^2 - 16x + 32$~~

43.  $-48 - 3y^2$

45.  $(x - y)^2 - (x + y)^2$

47.  $(a - b)^2 - 16(a + 2b)^2$

49.  $4(x - y)^2 - 16(x + y)^2$

2.  $2x - 8xy$

5.  $x^2 + 7x + 12$

8.  $16x^2 - 8x + 1$

11.  $-1 + 9k^2$

14.  $x^2 + 6x + 8$

17.  $16 - 28x + 10x^2$

20.  $-(1 - a^4)$

23.  $x^4 - y^4$

26.  $x^2 - xy$

29.  $3a^2 - 36a + 36$

32.  $x^3 + 5x^2 - 6$

35.  $x^8 - 1$

38.  $4y^2 + 8y - 60$

41.  ~~$x^3 - xy^2$~~

44.  $x^2y^3z - 2xy^2$

46.  $9(a + b)^2 - (a - b)^2$

48.  $25(2x + 1)^2 - (9x - 1)^2$

50.  $25(x + 2y)^2 - 9(x - 2y)^2$

3.  $36a^3 - 4a^2$

6.  $3a^2 - 3b^2$

9.  ~~$a^2 - ab - 56b^2$~~

12.  $1 + 18y + 32y^2$

15.  $56x^2 + 9x - 2$

18.  $m^4 - 16$

21.  ~~$m^4 - 5m^2 - 36$~~

24.  $p^2 - 2pq - 63q^2$

27.  $x^2 + 3xy - x$

30.  ~~$(a + b)^2 - c^2$~~

33.  $x^4 + 18x^2 + 32$

36.  $2y^2 - 2y - 24$

39.  $m^4 - 16$

42.  $x^4 - 5x^2 + 4$

25.  $(m^2 + 4)(m + 1)(m - 1)$

26.  $x(x - y)$

27.  $x(x + 3y - 1)$

28.  $(a + 12)(a - 12)$

29. N.P.

30.  $-(a + b)^2$

32. NP

33.  $(m^2 + 16)(m^2 + 2)$

34.  $(m^2 + 7)(m + 4)(m - 1)$

35.  $(x^4 + 1)(x^2 + 1)(x + 1)(x - 1)$

36.  $2(y - 4)(y + 3)$

38.  $4(y + 5)(y - 3)$

39.  $(m^2 + 4)(m + 2)(m - 2)$

42.  $(x + 2)(x - 2)(x + 1)(x - 1)$

43.  $-3(y^2 + 16)$

44.  $xy^2(xy^2 - 2)$

1a)  $3a(a + 2)$

2)  $2x(1 - 4y)$

3.  $4a^2(9a^2 - 4)$

4.  $(5a^2 + 3y^2)(5a^2 - 3y^2)$

5.  $(x + 4)(x + 3)$

6.  $3(a + b)(a - b)$

7.  $(y - 4)(y - 7)$

8.  $(4x - 1)^2$

9.  $(a - 8b)(a + 7b)$

10.  $(4x - 3)(x - 2)$

11.  $(3k + 1)(3k - 1)$

12.  $(1 + 16y)(1 + 2y)$

13.  $2y^2(1 - 4y)$

14.  $(x + 4)(x + 2)$

15.  $(7x + 2)(8x - 1)$

16.  $-(16 + 9x^2)$

17.  $2(4x - 5)(2x - 1)$

18.  $(m^2 + 4)(m + 4)(m - 4)$

19.  $(4x - 5)(2x + 1)$

20.  $(a^2 + 1)(a + 1)(a - 1)$

21.  $(m^2 + 4)(m + 3)(m - 3)$

23.  $(x^2 + y^2)(x + y)(x - y)$

24.  $(p + 7q)(p - 9q)$