3. Factorising NOTES.notebook

August 14, 2017

Today's Learning:

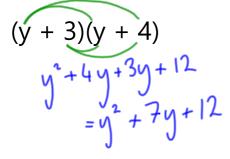
To multiply out brackets.

Multiplying Out Single Brackets

Take the term sitting outside the bracket and multiply it by each term inside the brackets. Remember, the sign in front of the term matters.

e.g. 1)
$$3(y + 9)$$
 2) $4p(p - 4)$ 3) $-2e(3 - e)$
= $3y + 27 = 4p^{2} - 16p = -6e + 2e^{2}$
4) $-(2 - q)$
 $= -2 + q$

How do we multiply out the brackets:



Multiplying Out Brackets

Multiply each term in the first bracket by each term in the second bracket. *remember the sign in

From to f the term matters e.g. Multiply out and simplify: 1) (y + 1)(y + 5) 2) (m + 4)(m - 2) 3) (p - 3)(p - 6)= $y^{2} + 5y + y + 5 = m^{2} - 2m + 4m - 8$ = $y^{2} + 6y + 5 = m^{2} + 2m - 8$ = $y^{2} + 6y + 5 = m^{2} + 2m - 8$ = $y^{2} - 6p - 3p + 18$ = $y^{2} - 6p + 18$

1) Solve the equation:

$$3c - 2 = 2c + 9$$

$$3c - 2 = 2c + 9$$

$$3c - 2 = 9$$

$$3c - 2 =$$

$$(d + 2)^{2} = (d+2)(d+2)$$

= $d^{2} + 2d + 2d + 4$
= $d^{2} + 4d + 4$
5) $(w + 1)(w^{2} + 2w - 4)$
= $w^{3} + 2w^{2} - 4w + w^{2} + 2w - 4$
= $w^{3} + 3w^{2} - 2w - 4$

4

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Multiply out the following:

2) (m + 5)(m - 5)

 $d^{2}-3d+3d-9 = m^{2}-25$ = $d^{2}-9 = m^{2}-25$ = 49-4

To practice factorising using difference of two squares

3) (7 + y)(7 - y)

1) (d + 3)(d - 3)

What do you notice?

Today's Learning:

and to factorise trinomials.

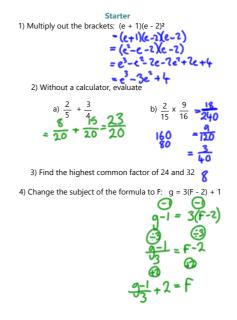
To factorise using single brackets.

16/6/17 **Factorising**

Factorising an expression means writing it as a product of its factors.

e.g. Factorise the following by taking out a common factor:

 $=3(g+3) = 8g(3+2f) = 2x(7x^{2} - 10x)$ $=2e(7e^{2} - 10e + 15)$ a) 3g + 9 **b)** 24g + 16gf c) 14x³ - 20x² =3(g+3)



Difference of Two Squares

If you see 2 squared terms and one is negative, we can factorise using difference of two squares.

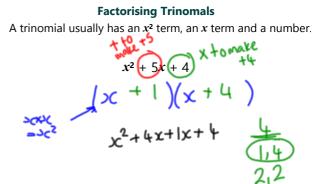
e.g. Factorise

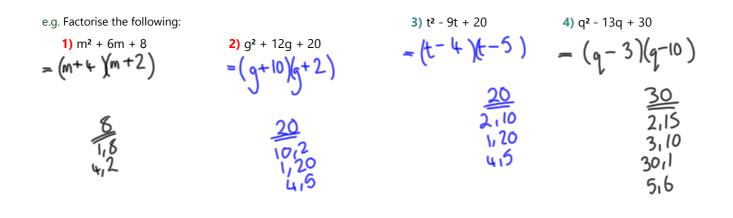
a)
$$g^2 - 4$$

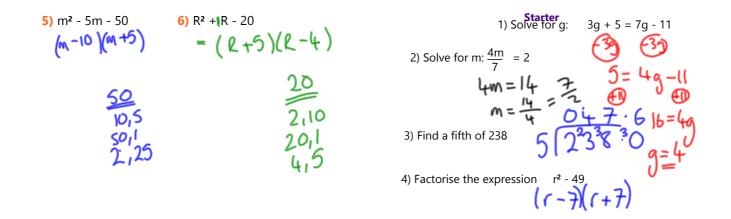
= $(g + 2)(g - 2)$ = $(m + r)(m - r)$ = $(2t + 4y)(2t - 4y)$

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Sometimes we can take out a common factor before using difference of two squares.





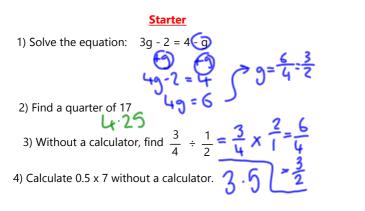


Factorise the following:

1)
$$t^{2} + 3t - 4$$
 $(t^{+})(t^{-1}) = 6$ $b^{2} + 10b + 16$
 $(b + 2)(b + 8)$
2) $y^{2} + 5y + 6(y+3)(y+2)^{7}$ $c^{2} - 8c + 16$
($c - 4$)($c - 4$)
3) $m^{2} - 7m + 10$ $m - 5$ $m^{-2} + m - 6$
($m - 5$)($m - 2$) $(m - 2)(m + 3)$
4) $a^{2} + a - 6$ $(a + 3)(a - 2)$
5) $m^{2} + m - 20$ $(m - 4)(m + 5)$

7)
$$3f^{2} - 14f - 24$$

 $(3f - 3)(f - 8) = 6m^{2} + 5m - 4$
 $(3f^{2} - 3)(f - 8) = (6m - 1)(m - 4)$
 $3f^{2} - 24f - 3f - 24 - 6m^{2} - 24m - m - 4$
 $24f - 6m^{2} - 24m - m - 4$
 $416 - 6m^{2} - 12m - 2m - 4$
 $2_{1}12 - 3_{1}8 - 3_{1}8 - 3_{1}8 - 3_{1}8$



Factorising Expressions

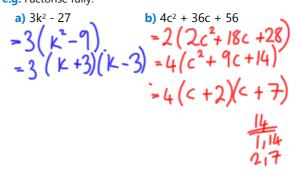
To factorise any expression, look for

A common factor

→ Difference of two squares

└→ Trinomial to factorise

e.g. Factorise fully:



<u>Starter</u>

Fully factorise the following expressions:

1) 3c² - 3c - 6	5) 6e² - 9e - 6
2) 2m² - 32	6) 4g³ - 400g
3) 3d³ - 3d	7) 6g² + 8g - 8

4) 4e² + 19e - 5

Today's Learning:

To learn to write expressions in completed square form.

2

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Completing the Square

Sometimes we want to write a trinomial as a squared bracket plus or minus a number, ie. $(x + a)^2 + b$. e.g. $x^2 + 4x + 3 = (x + 2)^2 - 1$

Later, this will make sketching these graphs easier.

e.g. Write these trinomials in completed square form:

a)
$$x^{2} \bigoplus x + 7$$

 $(x + 4)^{2} - 9$
 $(x + 4)^{2} = (x + 4)^{2}$
 $= (x + 4)(x + 4)$
 $= x^{2} + 4x^{2} + 4x^{2} + 16$
b) $x^{2} - 2x + 1$
 $(x - 1)^{2}$
 $= (x - 1)^{2} + 6x + 16$
c) $x^{2} + 6x + 11$
 $(x + 3)^{2} + 2$
 $= x^{2} + 3x + 3x + 1$

Write the following in completed square form...

1)
$$x^{2} - 14x + 40 (x-7)^{2} - 9$$

6) $x^{2} - 10x + 3 (x-5) - 12$
2) $x^{2} + 6x - 10 (x+3)^{2} - 19$
7) $x^{2} + 18x + 17 (x+7)^{2} - 41$
3) $x^{2} + 2x - 1 (x+1)^{2} - 2$
8) $x^{2} - 6x + 2 (x-3)^{2} - 7$
4) $x^{2} - 4x - 10 (x-2)^{2} - 14$
9) $x^{2} + 26x + 40 (x+1)^{2} - 16$
5) $x^{2} - 10x + 50 (x-5)^{2} + 25$
10) $x^{2} + 2x + 10 (x+1)^{2} + 9$