

Multiplying out and simplifying - Revision

Multiply out and simplify the following:

- (a) $3(2x - 1) + 4x$
- (b) $6h(2h - 3) - 4(5h + 8)$
- (c) $2t(t - 5) + 3t(t - 4) + 4t^2$
- (d) $7h - 8(2h - 4)$
- (e) $20h + h - (2h - 4)$
- (f) $m^2(m - 2)$
- (g) $3m^2(4m - m^{1/2})$
- (h) $\sqrt{2}(2 - \sqrt{8})$

Today we will be learning how to multiply out double brackets.

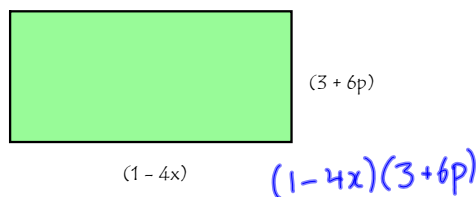
Multiplying out and simplifying - Revision

Multiply out and simplify the following:

- (a) $3(2x - 1) + 4x$
 $= 6x - 3 + 4x$
 $= 10x - 3$
- (b) $6h(2h - 3) - 4(5h + 8)$
 $12h^2 - 18h - 20h - 32$
 $12h^2 - 38h - 32$
- (c) $2t(t - 5) + 3t(t - 4) + 4t^2$
 $2t^2 - 10t + 3t^2 - 12t + 4t^2$
 $9t^2 - 22t$
- (d) $7h - 8(2h - 4)$
 $7h - 16h + 32$
 $-9h + 32$
- (e) $20h + h - (2h - 4)$
 $21h - 2h + 4$
 $19h + 4$
- (f) $m^2(m - 2)$
 $m^3 - 2m^2$
- (g) $3m^2(4m - m^{1/2})$
 $12m^3 - 3m^{5/2}$
- (h) $\sqrt{2}(2 - \sqrt{8})$
 $2\sqrt{2} - \sqrt{16}$
 $2\sqrt{2} - 4$

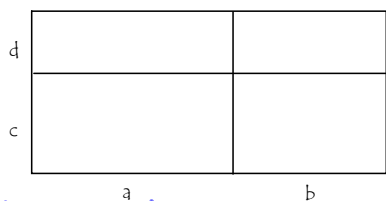
Multiplying out double brackets

Write an expression for the area of this rectangle



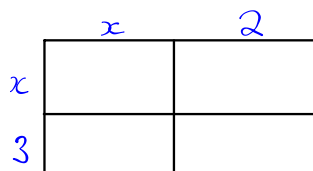
Multiplying out double brackets

Write an expression for the area of the large rectangle



$(a + b)(c + d)$
or
 $ac + ad + bc + bd$

②



$A = (3 + x)(2 + x)$

or
 $A = x^2 + 2x + 3x + 6$
 $x^2 + 5x + 6$

③

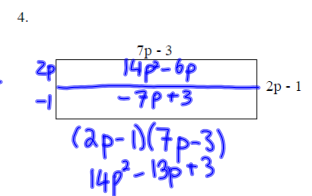
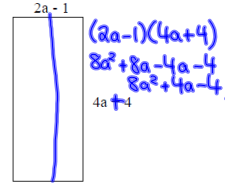
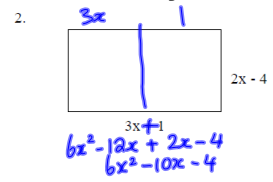
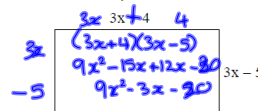
	$2x$	-1
x	$2x^2$	$-x$
4	$8x$	-4

$$A = 2x^2 - 4 - x + 8x$$

$$2x^2 + 7x - 4$$

$$A = (x+4)(2x-1)$$

Write an expression for the area of each of these rectangles



Multiplying out double brackets

4. Multiply out and simplify

$$(2x-8)(x+5)$$

$$2x^2 + 10x - 8x - 40$$

$$2x^2 + 2x - 40$$

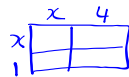
⑤ $(2x+7)(3x-8)$

⑥ $(5-x)(2+x)$

Multiplying out double brackets

- (a) $(x+4)(x+1)$ (b) $(2x+3)(x-1)$ (c) $(5x+1)(x+3)$
- (d) $(2x+2)(x+5)$ (e) $(3x-4)(4x+5)$ (f) $(x^2+8)(x^2-3)$
- (g) $(2h-5)(h+2)$ (h) $(5k-4)(3+k)$ (i) $(9a+5)(a-7)$

Questions



① $(x+4)(x+1)$
 $x^2 + 5x + 4$

② $(2x+3)(x-1)$
 $2x^2 + x - 3$

③ $(5x+1)(x+3)$
 $5x^2 + 16x + 3$

④ $(2x+2)(x+5)$
 $2x^2 + 12x + 10$

⑤ $(3x-4)(4x+5) = 12x^2 - x - 20$

⑥ $(x^2+8)(x^3-3) = x^5 - 3x^2 + 8x^3 - 24$

Daily Practice 12.1.2018

Q1. State the equation of the line that passes through

(0, 8) and (3, 1) $m = \frac{1-8}{3-0} = \frac{-7}{3}$
 $y = \frac{-7}{3}x + 8$

Q2. Simplify $\frac{10015}{10015}$
 $= 1015$

Q3. Solve the equation $4(x-7) = 3x+19$
 $4x-28 = 3x+19$
 $x-28 = 19$ $x = 47$

Q4. Calculate the mean and median of -2, 3, 5, 6, 8, 9

Mean = $\frac{29}{6} = 4.83$ (Rd.p.)
Median = $\frac{6+8}{2} = 7$

Today we will be learning how to quickly square brackets.

Multiplying out double brackets (Squaring)

Multiply out the following and see if you notice a pattern

$$(x-1)^2 = x^2 - 2x + 1 \quad (x+3)^2 = x^2 + 6x + 9 \quad (2x+4)^2 = 4x^2 + 16x + 16 \quad (5-x)^2 = 25 - 10x + x^2$$

Square first term
First term x Second term then x 2
Square last term

Squaring out brackets

Multiply out and simplify the following:

(i) $(2x-1)^2$ (ii) $(3x-3)^2$ (iii) $(7x-6)^2$ (iv) $(-2+3x)^2$

(v) $(2x-1)^2 + 7x$ (vi) $(x-8)^2 + (x+4)^2$

(vii) $3(x+6)^2 + 2(x-4)^2 + 5x^2 + 9$ (viii) $\frac{10(x+3)^8}{(x+3)^6}$

Squaring out brackets

Multiply out and simplify the following:

(i) $(2x-1)^2 = 4x^2 - 4x + 1$ (ii) $(3x-3)^2 = 9x^2 - 18x + 9$ (iii) $(7x-6)^2 = 49x^2 - 84x + 36$ (iv) $(-2+3x)^2 = 4 - 12x + 9x^2$

(v) $(2x-1)^2 + 7x = 4x^2 - 4x + 1 + 7x = 4x^2 + 3x + 1$ (vi) $(x-8)^2 + (x+4)^2 = x^2 - 16x + 64 + x^2 + 8x + 16 = 2x^2 - 8x + 80$

(vii) $3(x+6)^2 + 2(x-4)^2 + 5x^2 + 9 = 3(x^2 + 12x + 36) + 2(x^2 - 8x + 16) + 5x^2 + 9 = 3x^2 + 36x + 108 + 2x^2 - 16x + 32 + 5x^2 + 9 = 10x^2 + 20x + 149$ (viii) $\frac{10(x+3)^8}{(x+3)^6} = 10(x+3)^2 = 10(x^2 + 6x + 9) = 10x^2 + 60x + 90$

DAILY PRACTICE 15.1.2018

Q1. Simplify $15h^7 \div 5h^2 = 3h^5$

Q2. Calculate the area of a circle with radius 9cm

$A = \pi r^2 = \pi \times 9^2 = 254.5 \text{ cm}^2$ (1.d.p)

Q3. Calculate the volume of a cube with side 4cm

$V = 4^3 = 64 \text{ cm}^3$

Q4. Multiply out and simplify $4m(3m^{-1} + m^3)$

$12m^0 + 4m^4 = 12 + 4m^4$

Q5. Solve the equation $\frac{5m-1}{2} = 17$

$5m-1=34$
 $5m=35$
 $m=7$

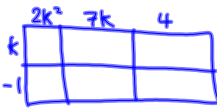
Today we will be continuing to practise multiplying out brackets.

Multiplying out double brackets with trinomials

Examples: Multiply out and simplify

(i) $(k-1)(2k^2+7k+4)$
 $2k^2+7k^2+4k-2k^2-7k-4$

$2k^2+5k^2-3k-4$



(ii) $(3m+7)(m^2-8m+3)$
 $3m^3-24m^2+9m+7m^2-56m+21$
 $3m^3-17m^2-47m+21$

Multiplying out double brackets with trinomials

- (a) $(x+5)(2x^2+4x+9)$ (b) $(x-3)(5x^2+x+6)$
 (c) $(x-2)(6x^2-5x+7)$ (d) $(x+7)(3x^2+9x-2)$
 (e) $(x-4)(5x^2-x-8)$ (f) $(x+1)(7x^2-2x+11)$
 (g) $(2x+1)(3x^2+4x+1)$ (h) $(3x+4)(x^2-11x+2)$
 (i) $(5x-2)(2x^2+3x-7)$ (j) $(4x-3)(3x^2-5x-4)$

- (l) $(k-1)(3k+5)^2$ (m) $(6k-1)(2k^2+3k-1)-(x+5)$
 (n) $(h+1)^2-(h+5)^2$

Multiplying out double brackets with trinomials

- (a) $(x+5)(2x^2+4x+9)$
 $2x^3+4x^2+9x+10x^2+20x+45$
 $2x^3+14x^2+29x+45$
 (b) $(x-3)(5x^2+x+6)$
 $5x^3+x^2+6x-3x^2-3x-18$
 $5x^3-2x^2+3x-18$
 (c) $(x-2)(6x^2-5x+7)$
 $6x^3-5x^2+7x-12x^2+10x-14$
 $6x^3-17x^2+17x-14$
 (d) $(x+7)(3x^2+9x-2)$
 $3x^3+9x^2-2x+21x+63x-14$
 $3x^3+30x^2+63x-14$
 (e) $(x-4)(5x^2-x-8)$
 $5x^3-x^2-8x+20x^2-4x+32$
 $5x^3+19x^2-4x+32$
 (f) $(x+1)(7x^2-2x+11)$
 $7x^3-2x^2+11x+7x^2+9x+11$
 $7x^3+5x^2+9x+11$
 (g) $(2x+1)(3x^2+4x+1)$
 $6x^3+4x^2+3x^2+4x+2x+1$
 $6x^3+7x^2+6x+1$
 (h) $(3x+4)(x^2-11x+2)$
 $3x^3-33x^2+6x+4x^2-44x+8$
 $3x^3-29x^2-38x+8$
 (i) $(5x-2)(2x^2+3x-7)$
 $10x^3+15x^2-35x-4x^2-6x+14$
 $10x^3+11x^2-41x+14$
 (j) $(4x-3)(3x^2-5x-4)$
 $12x^3-20x^2-16x+15x^2-12x+12$
 $12x^3-5x^2-28x+12$

Daily Practice

17.1.2018

- Q1. Calculate the volume of a cylinder with radius 4cm and height 17cm
 $V = \pi r^2 h = \pi \times 4^2 \times 17 = 854.51 \text{ cm}^3$ (2dp)
 Q2. Multiply out and simplify $(2k+3)(k-8)$
 $2k^2-16k+3k-24$
 $2k^2-13k-24$
 Q3. Factorise $4gh-20h$
 $4h(g-5)$
 Q4. Simplify $\sqrt{4 \times 30} = 2\sqrt{30}$
 Q5. Evaluate $32^{\frac{2}{5}}$
 $(\sqrt[5]{32})^2 = 2^2 = 4$

(l) $(k-1)(3k+5)^2$
 $(k-1)(9k^2+30k+25)$
 $9k^3+30k^2+15k-9k^2-30k-25$
 $9k^3+21k^2-5k-25$
 (m) $(6k-1)(2k^2+3k-1)-(x+5)$
 $12k^3+18k^2-6k-2k^2-3k+1-x-5$
 $12k^3+16k^2-9k-4-x$

(n) $(h+1)^2-(h+5)^2$
 $h^2+2h+1-(h^2+10h+25)$
 $h^2+2h+1-h^2-10h-25$
 $-8h-24$

Today we will be working out how to rationalise the denominator for more difficult questions.

Homework online due Monday 22.1.2018

Surds: Rationalising the denominator _____

Revisiting surds...

What happens when you want to rationalise the denominator when you have a fraction of the form below?

$$\frac{3}{1+\sqrt{2}}$$

① $(\sqrt{3}+2)(1-\sqrt{3})$
 $\sqrt{3} - 3 + 2 - 2\sqrt{3} = -\sqrt{3} - 1$

② $(\sqrt{2}+1)(1-\sqrt{2})$
 $\sqrt{2} - 2 + 1 - \sqrt{2} = -1$

③ $(3-\sqrt{5})(3+\sqrt{5})$
 $9 + 3\sqrt{5} - 3\sqrt{5} - 5 = 4$

Surds: Rationalising the denominator _____

Recall $\frac{3}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{3\sqrt{2}}{2}$

What about $\frac{3}{\sqrt{2}+1}$?

Surds: Rationalising the denominator _____

To rationalise the denominator of a fraction with surds where the fraction is of the form

$$\frac{a}{b \pm \sqrt{t}}$$

Multiply both numerator and denominator by the conjugate of the denominator (the denominator with the middle sign changed).

Surds: Rationalising the denominator using the conjugate _____

Examples: Write the following with a rational denominator

1. $\frac{2}{(3+\sqrt{5})(3-\sqrt{5})} \times \frac{(3-\sqrt{5})}{(3-\sqrt{5})}$
 $= \frac{6-2\sqrt{5}}{9-3\sqrt{5}+3\sqrt{5}-5}$
 $= \frac{6-2\sqrt{5}}{4}$
 $= \frac{3-\sqrt{5}}{2}$

2. $\frac{1+\sqrt{3}}{4-\sqrt{2}} \times \frac{4+\sqrt{2}}{4+\sqrt{2}}$
 $\frac{4+\sqrt{2}+4\sqrt{3}+\sqrt{6}}{16+4\sqrt{2}-4\sqrt{2}-2}$
 $\frac{4+\sqrt{2}+4\sqrt{3}+\sqrt{6}}{14}$

Daily Practice 18.1.2018

Q1. Find the value of a house that was worth £84 000 and appreciated by 6% in its first year and 8% in its second.

$$84000 \times 1.06 = \pounds 89040$$

$$89040 \times 1.08 = \pounds 96163.20$$

Q2. Multiply out and simplify $(3x-1)(x+4)$

$$3x^2 + 12x - 1x - 4$$

$$3x^2 + 11x - 4$$

Q3. Simplify $2\sqrt{3} - \sqrt{48}$

$$2\sqrt{3} - \sqrt{16\sqrt{3}}$$

$$2\sqrt{3} - 4\sqrt{3} = -2\sqrt{3}$$

Q4. Simplify $\frac{2m^2 \times 7m^3}{7m^{-5}}$

$$= \frac{14m^5}{7m^{-5}} = 2m^{10}$$

Q5. Multiply out and simplify $(3x-2)^2$

$$(3x-2)(3x-2)$$

$$= 9x^2 - 12x + 4$$

Today we will be continuing to learn how to rationalise the denominator.

Surds: Rationalising the denominator using the conjugate

Rationalise the denominator, in each fraction, using the appropriate conjugate surd.

- (a) $\frac{1}{\sqrt{2}-1}$ (b) $\frac{1}{\sqrt{5}+1}$ (c) $\frac{12}{2-\sqrt{3}}$ (d) $\frac{1}{1-\sqrt{2}}$
 (e) $\frac{1}{1+\sqrt{3}}$ (f) $\frac{3}{\sqrt{5}-1}$ (g) $\frac{2}{\sqrt{2}+2}$ (h) $\frac{3}{2-\sqrt{6}}$
 (i) $\frac{5}{3+\sqrt{2}}$ (j) $\frac{4}{1+\sqrt{3}}$ (k) $\frac{1}{\sqrt{7}-2}$ (l) $\frac{1}{\sqrt{3}-\sqrt{2}}$
 (m) $\frac{6}{\sqrt{3}+\sqrt{2}}$ (n) $\frac{12}{\sqrt{10}-\sqrt{2}}$ (o) $\frac{3}{\sqrt{5}+\sqrt{6}}$ (p) $\frac{14}{9-\sqrt{2}}$

Solutions:

- (a) $\sqrt{2}+1$ (b) $\frac{\sqrt{5}-1}{4}$ (c) $12(2+\sqrt{3})$ (d) $-(1+\sqrt{2})$
 (e) $-\frac{1}{2}(1-\sqrt{3})$ (f) $\frac{3(\sqrt{5}+1)}{4}$ (g) $-(\sqrt{2}-2)$ (h) $-\frac{3}{2}(2+\sqrt{6})$
 (i) $\frac{5(3-\sqrt{2})}{7}$ (j) $-2(1+\sqrt{3})$ (k) $\frac{\sqrt{7}+2}{3}$ (l) $\sqrt{3}+\sqrt{2}$
 (m) $6(\sqrt{3}-\sqrt{2})$ (n) $\frac{3}{2}(\sqrt{10}+\sqrt{2})$ (o) $-3(\sqrt{5}-\sqrt{6})$ (p) $\frac{14(9+\sqrt{2})}{79}$

Daily Practice

19.1.2018

20 Questions Mental Maths

Today we will be completing a maths trail on rationalising the denominator.

Homework due Monday!

DAILY PRACTICE

22.1.2018

Q1. Multiply out and simplify $(x-4)^2$
 $x^2 - 8x + 16$

Q2. Find the value of a house that was worth £140 000 and appreciated by 15%
 $140\,000 \times 1.15 = 161\,000$

Q3. State the median and interquartile range of 2, 4, 7, 11, 9, -2, 1, 15
 $-2, 1, 2, 4, 7, 9, 11, 15$

Q4. Simplify $\sqrt{200} = \sqrt{100 \times 2} = 10\sqrt{2}$
 $Q_2 = \text{median} = 5.5$
 $Q_1 = 1.5 \quad Q_3 = 10$

Q5. Evaluate $16^{\frac{3}{4}} = \frac{1}{16^{\frac{3}{4}}} = \frac{1}{(\sqrt[4]{16})^3} = \frac{1}{2^3} = \frac{1}{8}$
 I.Q.R. = $10 - 1.5 = 8.5$

Multiplying out brackets - Working Backwards

Today we will be practising factorising.

What multiplies out to give these solutions?

$$x^2 + 3x \quad 12ab + 4b \quad x^2 + 6x + 9$$

$$x(x+3) \quad 4b(3a+1) \quad (x+3)^2$$

$$b^2 + bc \quad b^2 + 5b + 6 \quad 100b^2 - 25$$

$$b(b+c) \quad (b+3)(b+2) \quad 25(b^2-1)$$

$$2b^2 + 7b + 1 \quad x^2 - 1 \quad (10b+5)(10b-5)$$

$$(x+1)(x-1) \quad 25(b+1)(b-1)$$

Write out possible questions to go with these answers.

Factorising

The opposite of multiplying out is known as factorising.

There are three types of factorising:

1. Common Factor
2. Difference of 2 squares
3. Factorising trinomials.

Always look for a common factor first!

Factorising - Common Factor

Take out the HCF (both numerical and algebraic)

Examples: Factorise

1. $12ah - 18h^2$
 $6h(2a-3h)$

2. $30ab - 20b^2 + 10bc$
 $10b(3a-2b+c)$

Factorising - Common Factor

- Come up with 5 factorising questions in which the person has to take out a common factor.
- Keep a note of your answers somewhere in your jotter.
- Give the questions to the person beside you to complete when ready.

Daily Practice

24.1.2018

Write a small report on your progress this year. Think about the following questions when writing it:

How are you progressing in maths in S3?

How prepared do you feel for S4?

What are you doing well?

What do you need to work on?

What do you enjoy about maths?

What do you not enjoy about maths?

Q1. Expand the brackets and simplify the following expressions

(a) $(r-3)(r+10)$ $(3w-2)(3w-2)$ (c) $(7a-2)(a+5)$
 $r^2+10r-3r-30$ $9w^2-6w-6w+4$ $7a^2+35a-2a-10$
 $r^2+7r-30$ $9w^2-12w+4$ $7a^2+33a-10$

(f) $(x+1)(4x^2+6x-1)$ (g) $(2a-3)(3a^2-7a+4)$
 $4x^3+6x^2-x+4x^2+6x-1$ $6a^3-14a^2+8a-9a^2+21a-12$
 $4x^3+10x^2+5x-1$ $6a^3-23a^2+29a-12$

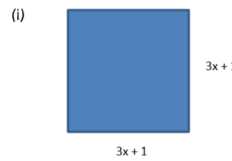
Today we will be continuing to learn to factorise.

Factorising - Difference of 2 squares

Working backwards. What do we get when we factorise

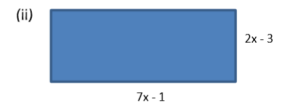
$$a^2 - b^2 = (a+b)(a-b)$$

Q2. Write an expression for each area in its simplest form



$$A = (3x+1)^2$$

$$A = 9x^2 + 6x + 1$$



$$A = (7x-1)(2x-3)$$

$$A = 14x^2 - 21x - 2x + 3$$

$$A = 14x^2 - 23x + 3$$

Factorising - Difference of 2 squares

Multiply out and simplify the following:

- $(x-3)(x+3)$
 x^2-9
- $(2x+1)(2x-1)$
 $4x^2-1$
- $(7h+4)(7h-4)$
 $49h^2-16$
- $25(1-2x)(1+2x)$
 $25(1-4x^2)$
 $25-100x^2$

Factorising - Difference of 2 squares

First, always look for a common factor. To identify a 'difference of 2 squares':

- You will have 2 terms that are squares.
- There will be a minus inbetween.

Examples: Factorise the following

(a) $x^2 - y^2$
 $(x+y)(x-y)$

(b) $81 - m^2$
 $(9+m)(9-m)$

(c) $9x^2 - 100y^2$
 $(3x+10y)(3x-10y)$

(d) $50 - 32m^2$
 $2(25 - 16m^2)$
 $2(5+4m)(5-4m)$

(e) Evaluate $1.75^2 - 1.25^2$

$$(1.75+1.25)(1.75-1.25)$$

$$= (3)(0.5)$$

$$= 1.5$$

Daily Practice 25.1.2018

Q1. Multiply out and simplify $(x - 4)(2x^2 + 7x - 8)$
 $2x^3 + 7x^2 - 8x - 8x^2 - 28x + 32$
 $2x^3 - x^2 - 36x + 32$

Q2. Write with a rational denominator $\frac{2}{\sqrt{3}}$
 $\frac{2 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{2\sqrt{3}}{3}$

Q3. Evaluate $144^{\frac{3}{2}} = (\sqrt{144})^3 = 12^3 = 1728$

Q4. Simplify $k^{\frac{3}{2}}(k^{\frac{1}{2}} + k^2)$
 $k^{\frac{3}{2}} + k^{\frac{3}{2} + 2}$
 $k^{\frac{3}{2}} + k^{\frac{7}{2}}$
 $k^2 + k^{\frac{7}{2}}$

Q5. $\frac{7x+3}{2} = 12$
 $7x+3=24$
 $7x=21$
 $x=3$

- (b) $5p^2 - 5$
 - (c) $45 - 5x^2$
 - (f) $4b^2 - 100$
 - (g) $3q^2 - 27$
 - (j) $xy^2 - 25x$
 - (k) $abc^2 - ab$
 - (n) $ak^2 - 121a$
 - (o) $10s^2 - 2 \cdot 5$
- $2(k^2+2)$
 $5(k^2+23)$
- $x^2 + 3x + 4$

Today we will be learning how to factorise trinomials.

Factorising Trinomials / Quadratics 25/1/18

A trinomial is an algebraic expression that is of the form

$$ax^2 + bx + c$$

The answer will be a pair of double brackets. Always look for a common factor first! You can use the rectangle to help.

Remember?

$$(x + 6)(x + 4)$$

	x	6
x	x^2	$6x$
4	$4x$	24

$x^2 + 10x + 24$

Factorising Trinomials with a unitary x^2 coefficient 1 in front of x^2

Examples:

1. Factorise $x^2 + 5x + 6$
 $(x + 3)(x + 2)$

	x	3
x	x^2	$3x$
2	$2x$	6

Factorising Trinomials with a unitary x^2 coefficient

Examples:

2. Factorise $x^2 - 11x + 24$

	x	-8
x	x^2	$-8x$
-3	$-3x$	24

$(x-8)(x-3)$

Today we will be continuing to practise factorising.

Daily Practice 26.1.2018

Q1. Multiply out and simplify $(3x-1)(2x+4) + 2x$
 $6x^2 + 12x - 2x - 4 + 2x$
 $6x^2 + 12x - 4$

Q2. Factorise $3x^2 - 75$
 $3(x^2 - 25) = 3(x+5)(x-5)$

Q3. $1\frac{2}{3} - \frac{4}{5} = \frac{5}{3} - \frac{4}{5}$
 $= \frac{25}{15} - \frac{12}{15} = \frac{13}{15}$

Q4. Simplify $2m^2(3m^{\frac{1}{2}} + m^{-3})$
 $6m^{\frac{5}{2}} + 2m^{-1}$
 $6m^{\frac{5}{2}} + \frac{2}{m}$

Q5. Write with a rational denominator $\frac{3}{\sqrt{2}}$
 $\frac{3\sqrt{2}}{\sqrt{2}\sqrt{2}} = \frac{3\sqrt{2}}{2}$

Factorising Trinomials with a unitary x^2 coefficient

Examples:

3. Factorise $x^2 - 7x - 44$

	x	-11
x	x^2	$-11x$
4	$4x$	-44

$x^2 - 7x - 44$
 $(x-11)(x+4)$

Factorising Trinomials with a unitary x^2 coefficient

Questions: Factorise the following

- | | |
|--------------------|---|
| ① $x^2 + 12x + 35$ | ⑦ $x^2 + 15x + 56$ |
| ② $x^2 + 5x + 4$ | ⑧ $x^2 - 8x - 20$ |
| ③ $x^2 - 14x + 40$ | ⑨ $x^2 - 13x - 48$ |
| ④ $x^2 - 6x + 5$ | ⑩ $x^2 - 9x - 22$ |
| ⑤ $x^2 - 7x - 30$ | ⑪ $2x^2 + 20x + 42 = 2(x^2 + 10x + 21)$ |
| ⑥ $x^2 - 11x + 28$ | ⑫ $3x^2 - 24x + 36$ |
| | ⑬ $5x^2 - 20x - 25$ |

Daily Practice 29.1.2018

Q1. Multiply out and simplify $(x-2)^2 + 3x$
 $x^2 - 4x + 4 + 3x$
 $x^2 - x + 4$

Q2. Write with a rational denominator $\frac{3}{2+\sqrt{3}}$
 $\frac{3}{2+\sqrt{3}} \times \frac{2-\sqrt{3}}{2-\sqrt{3}} = \frac{6-3\sqrt{3}}{4-2\sqrt{3}+2\sqrt{3}-3} = \frac{6-3\sqrt{3}}{1}$

Q3. Calculate the height of the triangle

$\sin 26^\circ = \frac{h}{14}$
 $14 \sin 26^\circ = h$
 $h = 6.14 \text{ cm (ad.p.)}$

Q4. Solve $\frac{3x+2}{2} - \frac{x}{2} = 7$

$\times 2$
 $3x+2-x=14$
 $2x+2=14$
 $2x=12$
 $x=6$

Today we will be continuing to practise factorising trinomials.

Please complete a survey online at schoolmathematics.weebly.com

Factorising Trinomials with a non-unitary x^2 coefficient

Examples:

1.

Factorise $10x^2 - x - 3$

Factorising Trinomials with a non-unitary x^2 coefficient

Examples:

2.

Factorise $4p^2 + 3p - 7$

4p 1p
2p 2p

4p ²	7
7p	-14

Factorising Trinomials with a non-unitary x^2 coefficient

Examples:

3.

Factorise $4x^2 + 21x - 18$

4x	x
2x	2x

18	1
3	6
2	9

Daily Practice

2.2.2018

Q1. Calculate the median and quartiles of 2, 3, 7, 1, 8, 11, 4

1, 2, 3, 4, 7, 8, 11

Q₁ median Q₃

Q2. Factorise $x^2 - 5x - 14$

$(x+2)(x-7)$

Q3. Multiply out and simplify $(3x - 1)(2x^2 + 6x - 1)$

$6x^3 + 18x^2 - 3x - 2x^2 - 6x + 1$

$6x^3 + 16x^2 - 9x + 1$

Q4. Factorise $x^2 - 36$

$(x-6)(x+6)$

Q5. $\frac{1}{3} \div \frac{4}{5} = \frac{1}{3} \times \frac{5}{4} = \frac{5}{12}$

$= 2\frac{1}{12}$

Today we will be continuing to practise factorising.
Homework online due Thursday 8.2.18

- | | | | | | |
|-----------------------|-----------------------|-----------------------|------------------------|------------------------|------------------------|
| (a) $3x^2 + 7x + 2$ | (b) $2a^2 - 5a + 3$ | (c) $4p^2 - p - 3$ | (a) $(3x + 1)(x + 2)$ | (b) $(2a - 3)(a - 1)$ | (c) $(4p + 3)(p - 1)$ |
| (d) $2p^2 + 11p + 9$ | (e) $6x^2 - 7x + 2$ | (f) $3w^2 + 10w - 8$ | (d) $(2p + 9)(p + 1)$ | (e) $(3x - 2)(2x - 1)$ | (f) $(3w - 2)(w + 4)$ |
| (g) $5q^2 + 9q + 4$ | (h) $4m^2 - 9m + 2$ | (i) $6b^2 + 7b - 20$ | (g) $(5q + 4)(q + 1)$ | (h) $(4m - 1)(m - 2)$ | (i) $(2b + 5)(3b - 4)$ |
| (j) $3a^2 + 14a + 15$ | (k) $3p^2 - 37p + 12$ | (l) $4d^2 - 4d - 15$ | (j) $(3a + 5)(a + 3)$ | (k) $(3p - 1)(p - 12)$ | (l) $(2d + 3)(2d - 5)$ |
| (m) $6y^2 + 11y + 3$ | (n) $24c^2 - 22c + 3$ | (o) $36v^2 + v - 2$ | (m) $(3y + 1)(2y + 3)$ | (n) $(6c - 1)(4c - 3)$ | (o) $(4v + 1)(9v - 2)$ |
| | | (r) $12m^2 - 31m + 7$ | | | (r) $(3m - 7)(4m - 1)$ |
| | | (u) $9c^2 + 18c + 8$ | | | (u) $(3c + 4)(3c + 2)$ |
| | | (x) $8b^2 - 2b - 15$ | | | (x) $(4b + 5)(2b - 3)$ |

Pegasys

Daily Practice 5.2.2018

Q1. Write with a fractional index $\sqrt[3]{x^4} = x^{\frac{4}{3}}$

Q2. Find the value of a house that was worth £88 000 and appreciated by 4%
 $88000 \times 1.04 = \underline{\underline{£91520}}$

Q3. Multiply out and simplify $(2k - 3)(k + 4)$
 $2k^2 + 8k - 3k - 12 = \underline{\underline{2k^2 + 5k - 12}}$

Q4. Simplify $\frac{\sqrt{24} + \sqrt{72}}{\sqrt{16} + \sqrt{36}}$
 $\frac{2\sqrt{6} + 6\sqrt{2}}{2 + 6} = \underline{\underline{\frac{2\sqrt{6} + 6\sqrt{2}}{8}}}$

Mia 3B book pg.157

Today we will be completing mixed questions on factorisation.
 Homework due Thursday!

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Daily Practice 7.2.2018

Q1. Find 19% of 2100
 $2100 \div 100 \times 19 = \underline{\underline{399}}$

Q2. Calculate the height of a cylinder with a radius of 4cm and a volume of 603.19cm³
 $\frac{603.19}{\pi \times 4^2} = h$

Q3. $2\frac{1}{3} - \frac{3}{5} = \frac{7}{3} - \frac{3}{5} = \frac{35}{15} - \frac{9}{15} = \frac{26}{15} = \underline{\underline{1\frac{11}{15}}}$

Q4. Multiply out and simplify $(x - 3)(x + 4)$
 $x^2 + 4x - 3x - 12 = \underline{\underline{x^2 + x - 12}}$

Q5. Solve $\frac{3x+9}{4} = 3$
 $3x + 9 = 12$
 $3x = 3$
 $x = \underline{\underline{1}}$

Mia 3B book pg.157

Today we will be completing mixed questions on factorisation.
 Homework due Thursday!

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Mixed Factorisation

Always look for a common factor first.

Look out for difference of two squares i.e. $a^2 - b^2$

Trinomials will always be of the form $ax^2 + bx + c$

Some may look like a trinomial but you may only be able to get common factor and go no further.

$$4x^2 - y^2$$

$$3ab + 12b^2$$

$$x^2 + 8x - 20$$

$$x^2 - 3x - 28$$

$$4x^2 - 100$$

$$72a^2 - 2$$

$$2n^2 - 2n - 144$$

$$6x^2 - 8x - 8$$

$$7a^2 - 28b^2c^2$$

Mixed Examples

- | | | | |
|----------------------|----------------------|-----------------------|-----------------------|
| 1. $x^2 - 4x$ | 2. $x^2 + 12x + 35$ | 3. $a^2 - 36$ | 4. $x^2 + 5x - 14$ |
| 5. $x^2 - 12x + 32$ | 6. $x^2 - 9x - 36$ | 7. $5x^2 + 60$ | 8. $x^2 - 8x - 20$ |
| 9. $a^2 - 14a + 40$ | 10. $x^2 + 10x - 24$ | 11. $2d^2 + 9d - 5$ | 12. $3g^2 - 48$ |
| 13. $h^2 + 15h + 14$ | 14. $n^2 + 6n - 16$ | 15. $5p^2 - 2p - 7$ | 16. $2u^2 - 18w^2$ |
| 17. $y^2 + 7y - 18$ | 18. $n^2 - 24n + 80$ | 19. $w^2 - 3w - 54$ | 20. $6x - 10x^2$ |
| 21. $h^2 + 7h - 30$ | 22. $d^2 - 9c^2$ | 23. $x^2 + 19x + 60$ | 24. $9y^2 - 18y$ |
| 25. $3y^2 - 12$ | 26. $5p^2 - 2p - 16$ | 27. $2x^2 + 32x$ | 28. $2x^2 - 32$ |
| 29. $3u^2 + 5u - 8$ | 30. $18x^2 - 50y^2$ | 31. $6m^2 - 23m - 4$ | 32. $3c + 18c^2$ |
| 33. $7p^2 + 3p - 4$ | 34. $5 - 20h^2$ | 35. $2x^2 + 11x - 21$ | 36. $30 - x - x^2$ |
| 37. $3x^2 - 4x - 15$ | 38. $2u - 14u^2$ | 39. $5m^2 - 20m^2$ | 40. $2p^2 + 13p - 24$ |
| 41. $9x^2 - 12x$ | 42. $2x^2 - 2x - 4$ | 43. $5x^2 - 9x - 18$ | 44. $7m^2 - 63n^2$ |

Daily Practice

8.2.2018

Q1. Simplify $m^7 \div m^5$

Q2. State the gradient of the line joining (-5, 2) and (3, 7)

Q3. Simplify $\sqrt{8} + 3\sqrt{2} + \sqrt{50}$

Q4. Simplify $\frac{1}{m^2}(m^{\frac{1}{2}} - m^3)$

① m^4 ③ $\frac{\sqrt{9}\sqrt{2} + 3\sqrt{2} + \sqrt{25}\sqrt{2}}{2\sqrt{2} + 3\sqrt{2} + 5\sqrt{2}} = \frac{10\sqrt{2}}{10\sqrt{2}}$

② $\frac{y_2 - y_1}{x_2 - x_1} = \frac{7 - 2}{3 - (-5)} = \frac{5}{8}$

④ $m^{\frac{1}{2}}(m^{\frac{1}{2}} - m^3) = \underline{\underline{m - m^{\frac{7}{2}}}}$

Today we will be completing a check-up on multiplying out and factorising.

Q1. Factorise each of the following fully using common factors :

(a) $3x + 6$

$3(x+2)$ ✓

(b) $16a - 12b$

$4(4a-3b)$ ✓

②

(c) $x^2 + 3x$

$x(x+3)$ ✓

(d) $6mn + 8mp - 4mq$

$2m(3n+4p-2q)$ ✓

④

Q2. Factorise each of the following differences of squares :

(a) $x^2 - y^2$

$(x+y)(x-y)$ ✓

(b) $9a^2 - b^2$

$(3a+b)(3a-b)$ ✓

(c) $25p^2 - 4q^2$

$(5p+2q)(5p-2q)$ ✓ ✓

(d) $1 - 16x^4$

$(1-4x^2)(1+4x^2)$ ✓ ✓

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

②

④

Q3. Factorise each of the following quadratic expressions :

(a) $r^2 + 6r + 8$

$(r+4)(r+2)$ ✓ ✓

(b) $s^2 - 4s + 4$

$(s-2)(s-2)$ ✓ ✓

or $(s-2)^2$ ✓

$s^2 - 4s + 4$
 $(s-2)(s-2)$
 or
 $(s-2)^2$

④

(c) $w^2 - w - 6$

$(w-3)(w+2)$ ✓ ✓

(d) $m^2 + m - 12$

$(m+4)(m-3)$ ✓ ✓

④

(e) $2k^2 + 3k + 1$

$(2k+1)(k+1)$

④

(f) $24x^2 + 2x - 1$

$(6x-1)(4x+1)$

(g) $1 - h - 2h^2$

$(1-2h+1)(h)$

or

$(-2h+1)(h+1)$

⑥ $-(2h^2+h-1)$
 $-(2h-1)(h+1)$

(h) $9a^2 + 6a - 8$

$(3a-2)(3a+4)$

Q4. Fully factorise each of these expressions. There is a mixture of types.

(a) $4a^2b - 8ab^2$

$4ab(a-2b)$

$4a(ab-2b^2)$

$2ab(2a-4b)$

④

(b) $6x - 24x^2$

$6x(1-4x^2)$
 $= 6x(1+2x)(1-2x)$

(c) $4b^2 + 14b - 8$

$2(2b^2+7b-4)$

$2(2b-1)(b+4)$

$(2b+8)(2b-1)$
 $(4b-2)(b+4)$

②

(d) $1 - x^4$

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

②

or
 $(1+x)(1-x)(1+x^2)$

TOTAL MARKS 75 35

Attachments

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