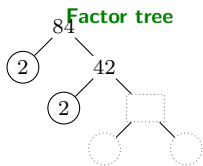


Algebraic Fractions: Starters

Starter 1: Prime Factors & HCF (1 of 3)

drzewko czynników



uprościć

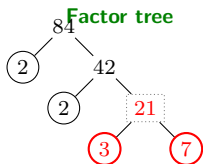
1. Simplify $\sqrt{20}$.
2. Work out 2^{-1} and $9^{\frac{1}{2}}$.

drzewko czynników

3. Complete the factor tree. Write 84 as a product of prime factors in index form.

Starter 1: Prime Factors & HCF (1 of 3)

drzewko czynników



uproszczyć

1. Simplify $\sqrt{20}$. $\sqrt{4 \times 5} = 2\sqrt{5}$

2. Work out 2^{-1} and $9^{\frac{1}{2}}$. $\frac{1}{2}$ and 3

drzewko czynników

3. Complete the factor tree. Write 84 as a product of prime factors in index form.

84 = $2^2 \times 3 \times 7$

Starter 1: Prime Factors & HCF (2 of 3)

diagram Venna

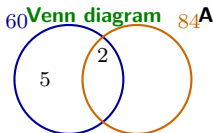


diagram Venna

4. $60 = 2^2 \times 3 \times 5$. Complete Venn diagram A

for 60 and 84, then find the

największy wspólny dzielnik

HCF

and the

najmniejsza wspólna wielokrotność

LCM

of 60

and 84.

uprościć

5. Simplify $\frac{60}{84}$ by dividing by the

największy wspólny dzielnik

HCF

. Which

diagram Venna

Starter 1: Prime Factors & HCF (2 of 3)

diagram Venna

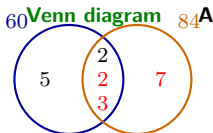


diagram Venna

4. $60 = 2^2 \times 3 \times 5$. Complete Venn diagram A

for 60 and 84, then find the
największy wspólny dzielnik

HCF

and the

najmniejsza wspólna wielokrotność

LCM

of 60

największy wspólny dzielnik

and 84.

HCF

= 12;

najmniejsza wspólna wielokrotność

LCM

$$= 2^2 \times 3 \times 5 \times 7 = 420$$

uproszczyć

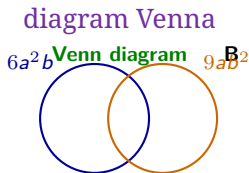
5. Simplify $\frac{60}{84}$ by dividing by the
największy wspólny dzielnik

HCF

. Which

diagram Venna

czynnik pierwszy największy wspólny dzielnik
Starter 1: Prime Factors & HCF (3 of 3)

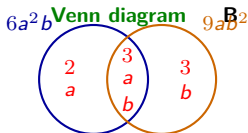


6. uprościć $\frac{x^5}{x^2}$ by writing out the xs and
skracanie
cancelling .

- diagram Venna
7. (Challenge) Complete Venn diagram B for
uprościć
 $6a^2b$ and $9ab^2$. Use it to simplify $\frac{6a^2b}{9ab^2}$.

Starter 1: Prime Factors & HCF (3 of 3)

diagram Venna



6. **Simplify** $\frac{x^5}{x^2}$ by writing out the xs and **skracanie** **cancelling** x^2 **bottom, leaving** $x^3 = x^{5-2}$

diagram Venna

7. (Challenge) Complete **Venn diagram** B for $6a^2b$ and $9ab^2$. Use it to **simplify** $\frac{6a^2b}{9ab^2}$. **The** **największy wspólny dzielnik** **HCF** **is** $3ab$, so

$$\frac{6a^2b}{9ab^2} = \frac{2a}{3b}$$

wykładnik

Starter 2:

Index

Laws (1 of 3)

iloczyn

czynniki pierwsze

wykładnik

1. Write 72 as a **product** of **prime factors** in **index** form.

uproszczyć

2. **Simplify** $\sqrt{8} + \sqrt{18}$.

uproszczyć

3. **Simplify** $x^4 \times x^3$ and $y^8 \div y^2$.

Starter 2:

Index

Laws (1 of 3)

iloczyn

czynniki pierwsze

wykładnik

1. Write 72 as a product of prime factors in index form.

$$72 = 2^3 \times 3^2$$

uproszczyć

2. Simplify $\sqrt{8} + \sqrt{18}$. $2\sqrt{2} + 3\sqrt{2} = 5\sqrt{2}$

uproszczyć

3. Simplify $x^4 \times x^3$ and $y^8 \div y^2$. x^7 and y^6

Starter 2: Index Laws (2 of 3)

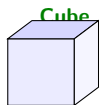
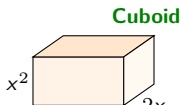
ułamki

sześcián

prostopadłościan

objętość

sześcián

 $2x$  $3x$ $2x$ 4. Write 2^{-3} and x^{-2} as fractions.5. Find the volume of the cube. Is it $2x^3$ or $8x^3$?

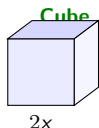
objętość

prostopadłościan

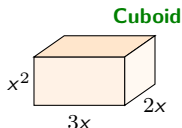
6. Find the volume of the cuboid.

Starter 2: Index Laws (2 of 3)

sześcián



prostopadłościan



ułamki

4. Write 2^{-3} and x^{-2} as fractions. $\frac{1}{8}$ and $\frac{1}{x^2}$

objętość

sześcián

5. Find the volume of the cube. Is it $2x^3$ or

$$8x^3? \quad (2x)^3 = 2^3 x^3 = 8x^3$$

objętość

prostopadłościan

6. Find the volume of the cuboid.

$$3x \times 2x \times x^2 = 6x^4$$

Starter 2:

Index

Laws (3 of 3)

podnieść do kwadratu; kwadrat

7. The

square

has

podnieść do kwadratu; kwadrat

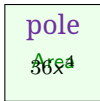
Square

area $36x^4$, so its side length is $(36x^4)^{\frac{1}{2}}$.

uproszczyć

Simplify this.

?



8. (Extension) Complete the working.

$$8^{-\frac{2}{3}} = \frac{1}{8^{\frac{2}{3}}} = \frac{1}{(\sqrt[3]{8})^2} = \frac{1}{\boxed{}^2} = \boxed{}$$

objętość

sześcián

9. (Challenge) Divide the volume of the cube

objętość

prostopadłościan

by the volume of the cuboid

ułamek

Write the answer as a fraction in its

najprostsza postać

simplest form

Starter 2: Index Laws (3 of 3)

podnieść do kwadratu; kwadrat

7. The

square

has

podnieść do kwadratu; kwadrat

Square

area $36x^4$, so its side length is $(36x^4)^{\frac{1}{2}}$.

uproszczyć

Simplify this. $36^{\frac{1}{2}} \times x^{4 \times \frac{1}{2}} = 6x^2$

8. (Extension) Complete the working.

$$8^{-\frac{2}{3}} = \frac{1}{8^{\frac{2}{3}}} = \frac{1}{(\sqrt[3]{8})^2} = \frac{1}{2^2} = \frac{1}{4}$$

objętość

sześcián

9. (Challenge) Divide the volume of the cube

objętość

prostokątnościan

by the volume of the cuboid

ułamek

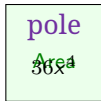
Write the answer as a fraction in its

najprostsza postać

simplest form

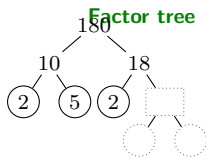
$$\frac{8x^3}{6x^4} = \frac{4}{3x}$$

?

 $6x^2$

Starter 3: pierwiastki niewymierne Surds nawiasy & Single Brackets (1 of 3)
największy wspólny dzielnik

drzewko czynników



1. Find the HCF of

18 and 24.

2. Work out $16^{\frac{1}{2}}$ and $16^{-\frac{1}{2}}$.

drzewko czynników

3. Complete the factor tree. Write

iloczyn czynniki pierwsze

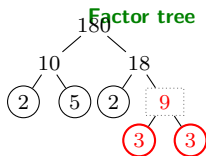
180 as a product of prime factors in

wykładnik

index form.

Starter 3: pierwiastki niewymierne Surds nawiasy & Single Brackets (1 of 3)
największy wspólny dzielnik

drzewko czynników



1. Find the HCF of

18 and 24. 6

2. Work out $16^{\frac{1}{2}}$ and $16^{-\frac{1}{2}}$. 4 and $\frac{1}{4}$

drzewko czynników

3. Complete the factor tree. Write
iloczyn czynniki pierwsze

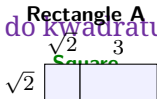
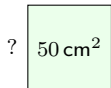
180 as a product of prime factors in
wykładnik

index form. $180 = 2^2 \times 3^2 \times 5$

Starter 3: Surds & Single Brackets (2 of 3)

4. Use the prime factors to simplify

podnieść do kwadratu; kwadrat



$$\sqrt{180}.$$

podnieść do kwadratu; kwadrat

5. The square has pole

area 50 cm^2 . Find its side length as a uproszczony pierwiastek niewymierny
simplified surd,
obwód

and its perimeter.

6. Complete rectangle A to wymnażać nawiasy

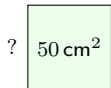
expand

$$\sqrt{2}(\sqrt{2} + 3).$$

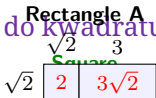
Starter 3: pierwiastki niewymierne Surds nawiasy & Single Brackets (2 of 3)
czynniki pierwsze uproszczyć

4. Use the prime factors to simplify

podnieść do kwadratu; kwadrat



5√2 cm



$$\sqrt{180}.$$

$$\sqrt{2^2 \times 3^2 \times 5} = 2 \times 3 \times \sqrt{5} = 6\sqrt{5}$$

podnieść do kwadratu; kwadrat

5. The square has pole

area 50 cm^2 . Find its side length as a uproszczony pierwiastek niewymierny
simplified surd,
obwód

and its perimeter.

$$\sqrt{50} = 5\sqrt{2} \text{ cm}; \quad 4 \times 5\sqrt{2} = 20\sqrt{2} \text{ cm}$$

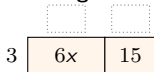
6. Complete rectangle A to wymnażać nawiasy

expand

$$\sqrt{2}(\sqrt{2} + 3). \quad 2 + 3\sqrt{2}$$

Starter 3: pierwiastki niewymierne Surds nawiasy & Single Brackets (3 of 3)

Rectangle B



7. Complete rectangle B to
rozkładać na czynniki

factorise
uproszczyć
simplify $\frac{6x + 15}{3}$.

$6x + 15$. Then

8. (Challenge) Sam says $\frac{6 + \sqrt{18}}{3} = 2 + \sqrt{18}$.

uproszczyć

Explain Sam's mistake, then simplify it
correctly.

Starter 3: pierwiastki niewymierne Surds & Single Brackets (3 of 3) nawiasy

Rectangle B

	2x	5
3	6x	15

7. Complete rectangle B to
rozkładać na czynniki

factorise $6x + 15$. Then
uproszczyć
simplify $\frac{6x + 15}{3}$. 3(2x + 5); 2x + 5, not

$$2x + 15$$

8. (Challenge) Sam says $\frac{6 + \sqrt{18}}{3} = 2 + \sqrt{18}$.

uproszczyć
Explain Sam's mistake, then simplify it
wyrazy
correctly. Divide both terms by 3:

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

Starter 4: Double Brackets (1 of 3)

Grid A

	x	5
x	x^2	
2		

1. Is 3^{-2} equal to -9 , -6 or $\frac{1}{9}$?

uprościć

2. Simplify $\sqrt{50} - \sqrt{8}$. Is it $\sqrt{42}$?

wymnażać nawiasy

3. Complete grid A to expand

$$(x + 2)(x + 5).$$

Starter 4: Double Brackets (1 of 3)

Grid A

	x	5
x	x^2	$5x$
2	$2x$	10

1. Is 3^{-2} equal to -9 , -6 or $\frac{1}{9}$? $\frac{1}{3^2} = \frac{1}{9}$

2. Simplify $\sqrt{50} - \sqrt{8}$. Is it $\sqrt{42}$? No:

$$5\sqrt{2} - 2\sqrt{2} = 3\sqrt{2}$$

3. Complete grid A to

$$(x + 2)(x + 5). \quad x^2 + 7x + 10$$

Starter 4: Double Brackets (2 of 3)

Grid B

		x	
x	x^2		
			12

pole

$$\text{Area} = x^2 + 7x + 12$$

4. Write 12 as a product of prime factors, then list its factor pairs. Which pair adds

to 7?

5. Complete grid B to factorise

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

6. A rectangle has area $x^2 + 7x + 12$ and width $x + 3$. Find its length. Use this to simplify

$$\frac{x^2 + 7x + 12}{x + 3}.$$

Starter 4: Double Brackets (2 of 3)

Grid B

	x	4
x	x^2	$4x$
3	$3x$	12

pole

$$\text{Area} = x^2 + 7x + 12$$

4. Write 12 as a product of prime factors, then list its factor pairs. Which pair adds to 7? $2^2 \times 3$; 1×12 , 2×6 , 3×4 ; $3 + 4 = 7$
5. Complete grid B to factorise $x^2 + 7x + 12$. $(x + 3)(x + 4)$, in either order
6. A rectangle has area $x^2 + 7x + 12$ and width $x + 3$. Find its length. Use this to simplify
- $$\frac{x^2 + 7x + 12}{x + 3} = \frac{(x + 3)(x + 4)}{x + 3} = x + 4$$

Starter 4: Double Brackets (3 of 3)

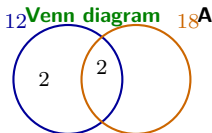
7. Factorise $x^2 - 9$. Use the difference of two squares to expand $(3 + \sqrt{2})(3 - \sqrt{2})$.
8. (Challenge) $391 = 20^2 - 3^2$. Use this to write 391 as a product of prime factors.

Starter 4: Double Brackets (3 of 3)

7. Factorise $x^2 - 9$. Use the difference of two squares to
rozkladać na czynniki różnica dwóch kwadratów
wymnażać nawiasy
expand $(3 + \sqrt{2})(3 - \sqrt{2})$. $(x + 3)(x - 3)$; $9 - 2 = 7$
iloczyn
8. (Challenge) $391 = 20^2 - 3^2$. Use this to write 391 as a product of
czynniki pierwsze liczba pierwsza
prime factors . $(20 + 3)(20 - 3) = 23 \times 17$, both prime

Starter 5: najmniejsza wspólna wielokrotność LCM & Fractions ułamki (1 of 3)

diagram Venna



uproszczyć

1. Simplify $a^3 \times a^{-1}$.
2. Work out $\sqrt{8} \times \sqrt{2}$.
3. $12 = 2^2 \times 3$ and $18 = 2 \times 3^2$. Complete diagram Venna

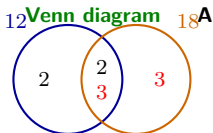
Venn diagram A, then find the największy wspólny dzielnik

HCF and the najmniejsza wspólna wielokrotność LCM of 12

and 18.

Starter 5: najmniejsza wspólna wielokrotność LCM ułamki & Fractions (1 of 3)

diagram Venna



uproszczyć

1. Simplify $a^3 \times a^{-1}$. $a^{3+(-1)} = a^2$

2. Work out $\sqrt{8} \times \sqrt{2}$. $\sqrt{16} = 4$

3. $12 = 2^2 \times 3$ and $18 = 2 \times 3^2$. Complete diagram Venna

Venn diagram A, then find the największy wspólny dzielnik

HCF and the najmniejsza wspólna wielokrotność

LCM of 12 and 18. HCF = 6;

najmniejsza wspólna wielokrotność LCM

$= 2^2 \times 3^2 = 36$

najmniejsza wspólna wielokrotność

ułamki

Starter 5: 3)

LCM

& Fractions (2 of

4. Complete: $\frac{5}{12} + \frac{7}{18} = \frac{\boxed{}}{36} + \frac{\boxed{}}{36} = \frac{\boxed{}}{36}$

ułamek

5. Write $\frac{x}{12} - \frac{x}{18}$ as a single fraction .

uproszczyć

6. Work out $\frac{3}{4} \times \frac{8}{9}$. Then simplify $\frac{3x}{4} \div \frac{9x}{10}$.

Starter 5:

LCM

& Fractions (2 of

3)

4. Complete: $\frac{5}{12} + \frac{7}{18} = \frac{15}{36} + \frac{14}{36} = \frac{29}{36}$

ułamek

5. Write $\frac{x}{12} - \frac{x}{18}$ as a single fraction .

$$\frac{3x}{36} - \frac{2x}{36} = \frac{x}{36}$$

uproszczyć

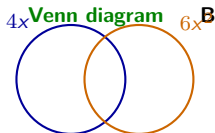
6. Work out $\frac{3}{4} \times \frac{8}{9}$. Then simplify $\frac{3x}{4} \div \frac{9x}{10}$.

$$\frac{24}{36} = \frac{2}{3}; \quad \frac{3x}{4} \times \frac{10}{9x} = \frac{30x}{36x} = \frac{5}{6}$$

najmniejsza wspólna wielokrotność ułamki

Starter 5: LCM & Fractions (3 of 3)

diagram Venna



7. $4x = 2 \times 2 \times x$ and $6x^2 = 2 \times 3 \times x \times x$.

diagram Venna

Complete Venn diagram B, then find the najmniejsza wspólna wielokrotność

LCM

of $4x$

and $6x^2$.

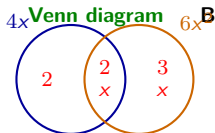
ułamek

8. (Challenge) Write $\frac{5}{4x} + \frac{1}{6x^2}$ as a single fraction .

najmniejsza wspólna wielokrotność ułamki

Starter 5: LCM & Fractions (3 of 3)

diagram Venna



7. $4x = 2 \times 2 \times x$ and $6x^2 = 2 \times 3 \times x \times x$.

diagram Venna

Complete Venn diagram B, then find the najmniejsza wspólna wielokrotność

LCM

of 4x

and $6x^2$. $2 \times 2 \times 3 \times x \times x = 12x^2$

ułamek

8. (Challenge) Write $\frac{5}{4x} + \frac{1}{6x^2}$ as a single fraction .

$$\frac{15x}{12x^2} + \frac{2}{12x^2} = \frac{15x + 2}{12x^2}$$