

Arbeidshefte

Potenser, røtter og standardform

Potensregler

$$a^p \cdot a^q = a^{p+q}$$

$$\frac{a^p}{a^q} = a^{p-q}$$

$$(a^p)^q = a^{p \cdot q}$$

$$\frac{1}{a^p} = a^{-p}$$

$$(a \cdot b)^p = a^p \cdot b^p$$

$$\left(\frac{a}{b}\right)^p = \frac{a^p}{b^p}$$

$$a^0 = 1$$

Røtter

$$\sqrt{(a)} = a^{\frac{1}{2}}$$

$$\sqrt[n]{a^m} = a^{\frac{m}{n}}$$

$$\sqrt{a^2} = a$$

$$\sqrt[n]{a^n} = a$$

$$\sqrt{a \cdot b} = \sqrt{a} \cdot \sqrt{b}$$

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

Standardform

$$a \cdot 10^n$$

der a er et tall mellom 1 og 10

Potensregler

Multiplisere potenstall

$$x^a \cdot x^b = x^{a+b}$$

Oppgave 1

Bruk regelen til å løse oppgavene

1) $x^2 \cdot x^3 =$

2) $c \cdot c^2 \cdot c^3 =$

3) $e \cdot e^2 \cdot e^3 =$

4) $a^3 \cdot a^4 \cdot a \cdot a^7 =$

5) $(3xy^2)(2x^2y^3) =$

6) $(2a^2b)(4ab^3) =$

7) $(mn^2)(m^2n) =$

8) $(4mn^2)(mn) =$

Oppgave 2

Bruk regelen til å løse oppgavene

1) $(-2c^4)(4cd)(-cd^2) =$

2) $(-1)(x)(-x^2)(x^3) =$

3) $(4k^2)(-3k)(3k^5) =$

4) $(3x^3)(-3x^5) =$

5) $(-4p^3)(-4p^6)(-2p^9) =$

6) $(4x^2y^3)(x^3y)(-x^2y^2) =$

7) $(2c^2d^2)(-5cd^4) =$

8) $(3x)(-4y^2)(6x^3y) =$

9) $(12c^3)(2g^3)(4ch) =$

Dividere potenstall

$$\frac{x^a}{x^b} = x^{a-b}$$

Oppgave 3

Bruk regelen til å løse oppgavene

1) $\frac{x^3}{x^2} =$

2) $\frac{-12m^5}{6m} =$

3) $\frac{9a^3b^5}{-3ab^2} =$

4) $\frac{16c^3}{-4c^2} =$

5) $\frac{d^3}{d^2} =$

6) $\frac{-3p^8}{6p^2} =$

7) $\frac{49r^{13}}{-7r^5} =$

8) $\frac{45k^7r^3}{-3k^5} =$

Oppgave 4

Bruk regelen til å løse oppgavene

$$1) \frac{-14c^5d^3}{-2c^9d} =$$

$$2) \frac{(5k)(-8k^5)}{10k^3} =$$

$$3) \frac{24x^2y}{-4x^2} =$$

$$4) \frac{9a^{13}}{a^3} =$$

$$5) \frac{b^{14}c^9}{b^5c^4} =$$

$$6) \frac{(3xy)(4x^2y)}{-6xy^3} =$$

$$7) \frac{4x^2y^3z^4}{2xy^2z^3} =$$

$$8) \frac{21k^9}{(3k)(7k^4)} =$$

Potenstall opphøyd i potens

$$(x^a)^b = x^{a \cdot b}$$

Oppgave 5

Bruk regelen til å løse oppgavene

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

2) $(x^4)^5 =$

3) $(a^3)^5 =$

4) $(a^{-1})^4 =$

5) $(x^{-2})^{-3} =$

6) $(b^3)^{-5} =$

7) $((b^2)^3)^2 =$

8) $(y^{14})^{-2}$

Produkt opphøyd i potens

$$(x \cdot y)^a = x^a \cdot y^a$$

Oppgave 6

Bruk regelen til å løse oppgavene

1) $(xy^2)^3 =$

2) $(x^2y)^2 =$

3) $(a^2b^2c)^2 =$

4) $(a^3b^2)^{-1} =$

5) $(a^{-1})^{-3} =$

6) $(ab)^7 =$

7) $(a \cdot b \cdot c)^3 =$

8) $(ab^2c^3)^{-1} =$

Brøk opphøyd i potens

$$\left(\frac{x}{y}\right)^a = \frac{x^a}{y^a}$$

Oppgave 7

Bruk regelen til å løse oppgavene

1) $\left(\frac{x^2}{y^3}\right)^2 =$

2) $\left(\frac{a^4}{b^3}\right)^2 =$

3) $\left(\frac{x^{-2}}{y^3}\right)^2 =$

Kvadratrøtter

$$\sqrt{x^2} = x$$
$$(\sqrt{x})^2 = x$$

Oppgave 8

1) $\sqrt{4} =$

2) $\sqrt{9} =$

3) $\sqrt{16} =$

4) $\sqrt{25} =$

5) $\sqrt{36} =$

6) $\sqrt{49} =$

7) $\sqrt{64} =$

8) $\sqrt{81} =$

9) $\sqrt{100} =$

10) $\sqrt{121} =$

11) $\sqrt{144} =$

12) $\sqrt{169} =$

Oppgave 9

$$\sqrt{x^2y} = \sqrt{x^2}\sqrt{y} = x\sqrt{y}$$

1) $\sqrt{8} =$

2) $\sqrt{12} =$

3) $\sqrt{18} =$

4) $\sqrt{72} =$

5) $\sqrt{50} =$

6) $\sqrt{200} =$

7) $\sqrt{27} =$

8) $\sqrt{75} =$

9) $\sqrt{x^3} =$

10) $\sqrt{x^5} =$

11) $\sqrt{x^2y} =$

12) $\sqrt{a^3b^5} =$

Kvadratrot av en brøk

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

Oppgave 10

1) $\sqrt{\frac{36}{9}} =$

2) $\sqrt{\frac{27x}{3x}} =$

3) $\sqrt{\frac{x^2}{25}} =$

4) $\sqrt{\frac{8x^3}{2x}} =$

5) $\sqrt{\frac{18x^3}{2x}} =$

6) $\sqrt{\frac{9}{64}} =$

Oppgave 11

1) $\sqrt{\frac{27x^2}{3}} =$

2) $\sqrt{\frac{50x^2}{2}} =$

3) $\sqrt{\frac{49a^2}{25a^3}} =$

4) $\sqrt{\frac{12b^2}{60}} =$

5) $\sqrt{\frac{2x^2}{18x^4}} =$

6) $\sqrt{\frac{3x^7}{108y^2}} =$

n-te-røtter

Oppgave 12

1) $\sqrt[3]{16} =$

2) $\sqrt[3]{27} =$

3) $\sqrt[4]{16} =$

4) $\sqrt[4]{81} =$

5) $\sqrt[3]{x^3} =$

6) $\sqrt[4]{x^4} =$

7) $\sqrt[3]{x^6} =$

8) $\sqrt[3]{16} - \sqrt[3]{2} =$

Oppgave 13

1) $\sqrt{18}\sqrt{3} + \frac{\sqrt{72}}{\sqrt{8}} =$

2) $(\sqrt{2})^2 - \frac{\sqrt{8}}{2} + \sqrt[3]{8} - \frac{\sqrt[3]{128}}{\sqrt[3]{2}} =$

3) $(\sqrt{6} - \sqrt{3})(\sqrt{6} + \sqrt{3}) =$

4) $\sqrt{45} + \sqrt{20} - \sqrt{10}\sqrt{8} =$

5) $9^{\frac{1}{2}} \cdot 6^0 \cdot 4^{-1} \cdot \sqrt[3]{8^2} =$

6) $4^{\frac{1}{2}} \cdot 2^{-1} \cdot \sqrt[4]{16} =$

Tall på standardform

Store tall :

$$430000 = 4,3 \cdot 10^5$$

Oppgave 14

1) $2\,000\,000 =$

2) $4\,000 =$

3) $34\,000 =$

4) $20\,100\,000\,000 =$

5) $174\,000\,000 =$

6) $9\,890\,000\,000\,000 =$

Små tall :

$$0,0000043 = 4,3 \cdot 10^{-6}$$

Oppgave 15

1) $0,000\,23 =$

2) $0,000\,000\,48 =$

3) $0,00234 =$

4) $0,019 =$

5) $0,000\,020\,3 =$

6) $0,000\,000\,000\,73 =$

FASIT

Oppgave 1

- | | | |
|----------|--------------|--------------|
| 1) x^5 | 4) a^{15} | 7) m^3n^3 |
| 2) c^6 | 5) $6x^3y^5$ | |
| 3) e^6 | 6) $8a^3b^4$ | 8) $4m^2n^3$ |

Oppgave 2

- | | | |
|--------------|----------------|----------------|
| 1) $8c^6d^3$ | 4) $-9x^8$ | 7) $-10c^3d^6$ |
| 2) x^6 | 5) $-32p^{18}$ | 8) $-72x^4y^3$ |
| 3) $-36k^8$ | 6) $-4x^7y^6$ | 9) $96c^4g^3h$ |

Oppgave 3

- | | | |
|---------------|---------------------|----------------|
| 1) x | 4) $-4c$ | 7) $-7r^8$ |
| 2) $-2m^4$ | 5) d | |
| 3) $-3a^2b^3$ | 6) $-\frac{p^6}{2}$ | 8) $-15k^2r^3$ |

Oppgave 4

- | | | |
|-----------------------|----------------------|-----------|
| 1) $\frac{7d^2}{c^4}$ | 4) $9a^{10}$ | 7) $2xyz$ |
| 2) $-4k^3$ | 5) b^9c^5 | |
| 3) $-6y$ | 6) $-\frac{2x^2}{y}$ | 8) k^4 |

Oppgave 5

- | | | |
|-------------|--------------------|-----------------------|
| 1) x^6 | 4) $\frac{1}{a^4}$ | 7) b^{12} |
| 2) x^{20} | 5) x^6 | |
| 3) a^{15} | 6) b^{-15} | 8) $\frac{1}{y^{28}}$ |

Oppgave 6

- | | | |
|----------------|-----------------------|------------------------|
| 1) x^3y^6 | 4) $\frac{1}{a^3b^2}$ | 7) $a^3b^3c^3$ |
| 2) x^4y^2 | 5) a^3 | |
| 3) $a^4b^4c^2$ | 6) a^7b^7 | 8) $\frac{1}{ab^2c^3}$ |

Oppgave 7

1) $\frac{x^4}{y^6}$

2) $\frac{a^8}{b^6}$

3) $\frac{1}{x^4y^6}$

Oppgave 8

1) 2

5) 6

9) 10

2) 3

6) 7

10) 11

3) 4

7) 8

11) 12

4) 5

8) 9

12) 13

Oppgave 9

1) $2\sqrt{2}$

5) $5\sqrt{2}$

9) $x\sqrt{x}$

2) $2\sqrt{3}$

6) $10\sqrt{2}$

10) $x^2\sqrt{x}$

3) $3\sqrt{2}$

7) $3\sqrt{3}$

11) $x\sqrt{y}$

4) $6\sqrt{2}$

8) $5\sqrt{3}$

12) $ab^2\sqrt{ab}$

Oppgave 10

1) 2

3) $\frac{x}{5}$

5) $3x$

2) 3

4) $2x$

6) $\frac{3}{8}$

Oppgave 11

1) $3x$

3) $\frac{7}{5\sqrt{a}}$

5) $\frac{1}{3x}$

2) $5x$

4) $\frac{b}{\sqrt{5}}$

6) $\frac{x^3\sqrt{x}}{6y}$

Oppgave 12

1) $2\sqrt[3]{2}$

4) 3

7) x^2

2) 3

5) x

3) 2

6) x

8) $\sqrt[3]{2}$

Oppgave 13

1) $3(\sqrt{6} + 1)$

3) 3

5) 3

2) $-\sqrt{2}$

4) $\sqrt{5}$

6) 2

Oppgave 14

1) $2,0 \cdot 10^6$

3) $3,4 \cdot 10^4$

5) $1,74 \cdot 10^8$

2) $4,0 \cdot 10^3$

4) $2,01 \cdot 10^{10}$

6) $9,89 \cdot 10^{12}$

Oppgave 15

1) $2,3 \cdot 10^{-4}$

3) $2,34 \cdot 10^{-3}$

5) $2,03 \cdot 10^{-5}$

2) $4,8 \cdot 10^{-7}$

4) $1,9 \cdot 10^{-2}$

6) $7,3 \cdot 10^{-10}$