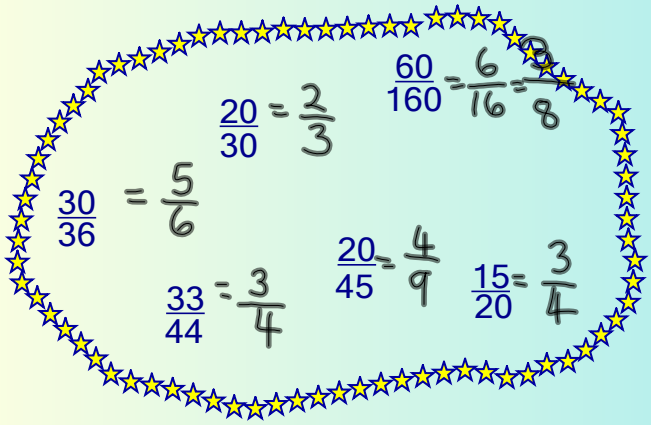
Cancelling fractions

Cancel the following fractions:



$\frac{2\times3\times4\times5}{3\times5\times7} = \frac{8}{7} = 1\frac{1}{7}$

$\frac{5\times7\times7\times7\times11}{7\times11}$ 245

$\frac{2\times2\times2\times3\times5\times5}{2\times2\times3\times5} = 10$

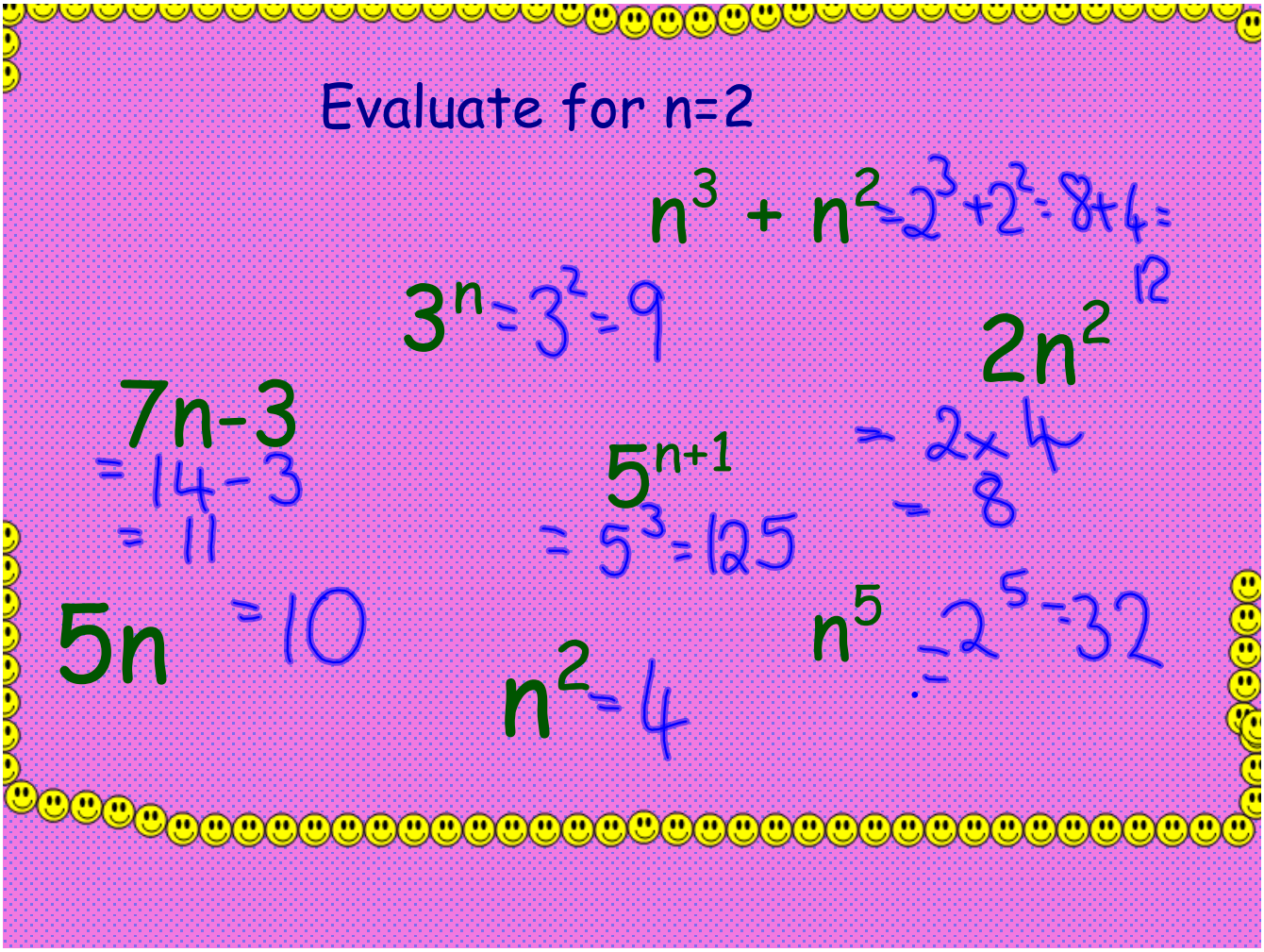
$\frac{a\times a\times b\times c}{a\times b\times c} = a$

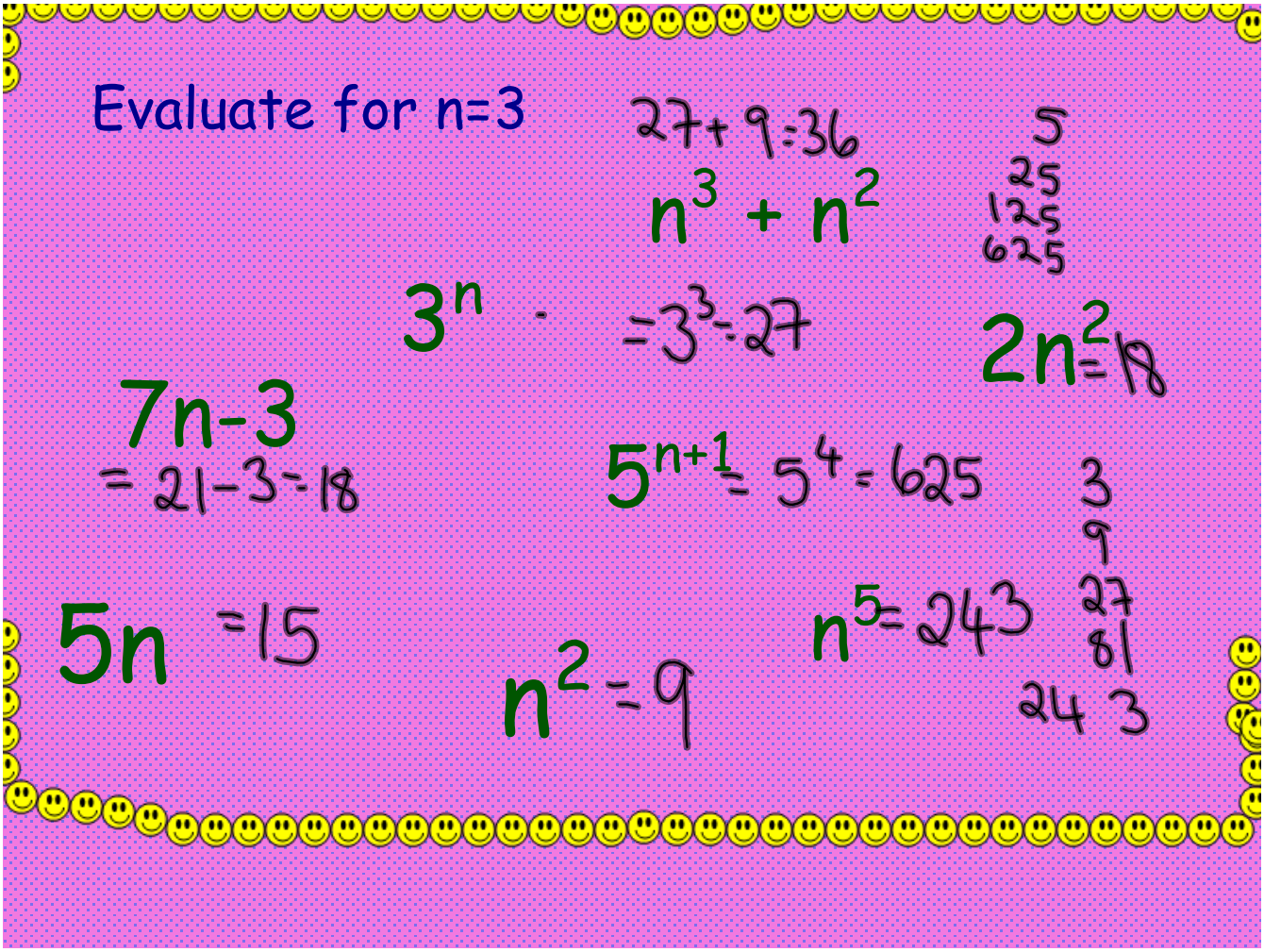
$\frac{a\times a\times b\times c\times c}{a\times a\times a\times b\times c} = \frac{a}{a}$

$\frac{a^3\times b}{a} = a^2b$ $\frac{ax\ bx\ ax\ bx\ bx\ b}{ax\ bx\ c\ x\ b} = \frac{abb}{c} = \frac{ab^2}{c}$

$\frac{a^2\times b^2}{a\times b} = ab$ $\frac{a^4\ b^3\ c^{10}}{a^3\ b\ c^6} = ab^2c^4$

$\frac{a\ a\ b\ b}{a\ b}$


Evaluate for n=2
$n^3 + n^2 = 2^3 + 2^2 = 8 + 4 = 12$
$3^n = 3^2 = 9$
$2n^2 = 2 \times 4 = 8$
$7n - 3 = 14 - 3 = 11$
$5^{n+1} = 5^3 = 125$
$5n = 10$
$n^2 = 4$
$n^5 = 2^5 = 32$


Evaluate for n=3
27+9=36
$n^3 + n^2$
5
25
125
625
3^n
$=3^3=27$
$2n^2=18$
$7n-3$
$=21-3=18$
$5^{n+1}=5^4=625$
3
9
27
81
243
$5n=15$
$n^2=9$
$n^5=243$

Indices

3x3x3x3x3x3x3

could be written as $3^2 \times 3^2 \times 3^2 \times 3$

How else could it be written?

$3^3 \times 3^3 \times 3$ 3^7 $3^6 \times 3$

$3^5 \times 3^2$ $3^4 \times 3^3$

Evaluate:

$2^6 = 64$
$2^5 = 32$
$2^4 = 16$
$2^3 = 8$
$2^2 = 4$
$2^1 = 2$
$2^0 = 1$ ←
$2^{-1} = \frac{1}{2}$

$3^6 = 729$
$3^5 = 243$
$3^4 = 81$
$3^3 = 27$
$3^2 = 9$
$3^1 = 3$
$3^0 = 1$
$3^{-1} = \frac{1}{3}$

$6^{-1} = \frac{1}{6}$ $5^{-2} = \frac{1}{5^2} = \frac{1}{25}$ $10^{-3} = \frac{1}{1000}$

$7^0 = 1$

$2^{-2} = \frac{1}{4}$

Any number to the power 0 = 1 : $n^0 = 1$

Any number to a negative power is 1 over the number: $n^{-1} = 1/n$, $n^{-2} = 1/n^2$ etc

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Answers:

1. C F D E A C B
2. E H A I D G B F C
3. $3^{-3} = \frac{1}{27}$ $7^{-1} = \frac{1}{7}$ $9^{-2} = \frac{1}{81}$

$4^{-3} = \frac{1}{64}$ $11^{-1} = \frac{1}{11}$

Evaluate:

$5^{-2} = \frac{1}{25}$

$5^3 = 125$

$4^0 = 1$

$10^7 = 10\,000\,000$

$7^{-1} = \frac{1}{7}$

$14^2 = 196$

$2^6 = 64$

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Express as a single power

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

$4^2 \times 4^8 = 4^{10}$

$9^5 \times 9^{11} = 9^{16}$

To multiply a number raised to a power by the same number raised to a power ADD the powers.

$\frac{3x3x3x3}{3 \times 3} = 3^2$ ($3^4 \div 3^2$)

$\frac{5^7}{5^2} = 5^5$

To divide a number raised to a power by the same number raised to a power SUBTRACT the powers.

page 192 onwards C 2 evens only

$a^m \div a^n =$

Recap on simplifying

Express as a single power:

$6^5 \times 6^2 = 6^7$

$5^{-1} \times 5^9 = 5^8$

$5^{-1} \div 5^9 = 5^{-10}$

$7^0 \times 7^7 = 7^7$

$6^5 \div 6^2 = 6^3$

Brackets and powers

What does $(3^2)^3$ mean?

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

$(4^5)^2 =$

$4^5 \times 4^5 = 4^{10}$

$(5^2)^5 =$

5^{10}

Using letters as well as numbers

$axaxaxaxa = a^5$

$b^0 = 1$

$d^2 \times d^7 = d^9$

$\frac{cxcxcxcxc}{cxc} = c^3$

$e^{-2} = \frac{1}{e^2}$

Simplifying expressions

$3n \times 5n^2 =$ $15n^3$

$2a^3 \times 7a^5 =$ $14a^8$

$4b \times 5b^3 \times b^9 =$ $20b^{13}$

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page 194 D questions

Dividing Terms

$$\frac{a \times a \times b \times c \times c}{a \times b \times c}$$

$a^3 \div a^2 =$ _____

$b^7 \div b^2 =$ _____

$7^{11} \div 7^4 =$

page 195 E2, E4

E1,E3, E5 onwards

Negative powers

$101^{-1} = \frac{1}{101}$

$11^{-2} = \frac{1}{11^2} = \frac{1}{121}$

$7^{-2} = \frac{1}{7^2} = \frac{1}{49}$

$5^{-3} = \frac{1}{5^3} = \frac{1}{125}$

$2^{-5} = \frac{1}{2^5} = \frac{1}{32}$

page 199 H1-H9

Reciprocal

The reciprocal of a number is its inverse.
To find it turn the number upside down!

$\left(\frac{7}{8}\right)^{-1} = \frac{8}{7}$ $\left(\frac{1}{5}\right)^{-1} = 5$ $\left(\frac{3}{4}\right)^{-1} = \frac{4}{3}$

$0.25^{-1} = \left(\frac{1}{4}\right)^{-1} = 4$ $6^{-1} = \frac{1}{6}$

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More Simplifying expressions

$10n^4 \div 5\,n^2 =$

$21a^3 \div 7a =$

$5b^3 \div b^3 =$

$15a^2 \div 3a^3 =$

$\frac{20a^4}{5a}$

$\frac{10a^5}{30a}$

$\frac{6b^3}{7b^5}$

page 200 mixed questions

Work out :

$9^4 \times 9^{-3}$

$3^7 \times 3^3$

$5^6 \div 5^4$

4^{-1}

5^3

10^6

6^2

$4^2 \times 4^{-3}$

23^0

$(2^3)^2$

Fractional powers

$2^8 = 256$ ×√
$2^4 = 16$ ×√
$2^2 = 4$ ×√
$2^1 = 2$

Alternative: Ede

Fractional Powers

$4^{1/2} \times 4^{1/2} = 4^1$
$2 \times 2 = 4$

$25^{1/2} \times 25^{1/2} = 25$
$5 \times 5 = 25$

$a^{1/2}$ means $\sqrt{a}$

$a^{1/3}$ means $\sqrt[3]{a}$

Work out:

$16^{1/2} = \sqrt{16} = 4$

$8^{1/3} = \sqrt[3]{8} = 2$

$125^{1/3} = \sqrt[3]{125} = 5$

$144^{1/2} = \sqrt{144} = 12$

$16^{1/4} = \sqrt[4]{16} = 2$

$9^{-1/2} = \frac{1}{9^{1/2}} = \frac{1}{3}$

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$9^{\frac{3}{2}} = 3^3 = 27$

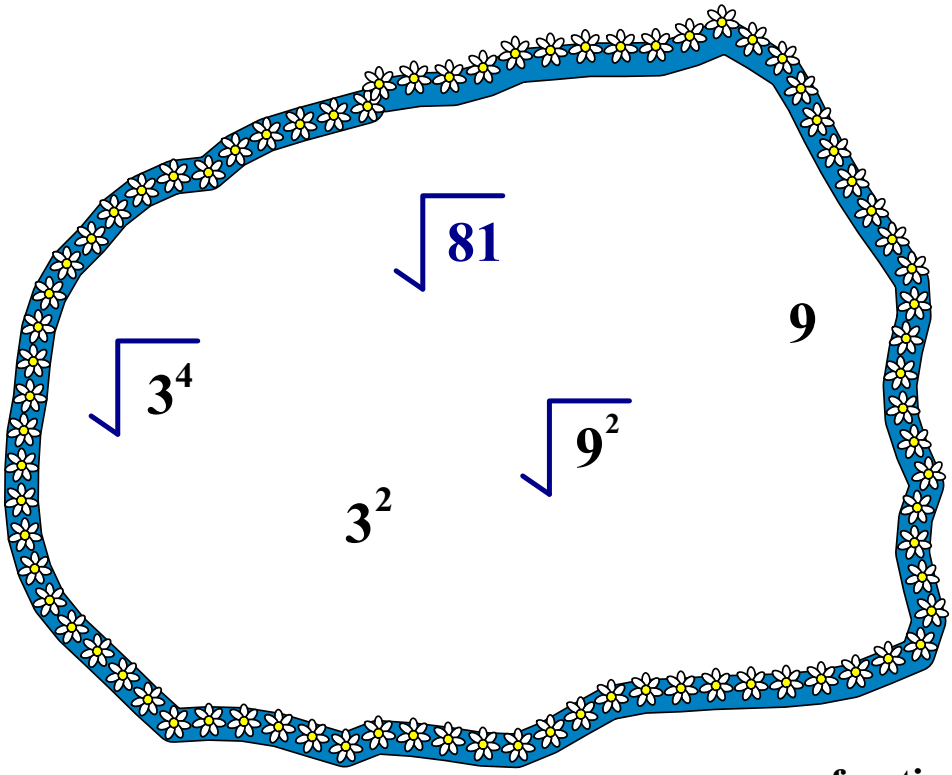
$\frac{3}{2} \times \frac{1}{2} \times 3$

$2^4 \div 2^{-1} = 2^5 = 32$

$8^{\frac{2}{3}} = 2^2 = 4$

$8^{-\frac{2}{3}} = \frac{1}{4}$

$8^{-\frac{2}{3}} = \frac{1}{8^{\frac{2}{3}}} = \frac{1}{2^2} = \frac{1}{4}$



fractional powers

Rules For Indices

$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n}$$

$$(a^m)^n = a^{mn}$$

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

$$a^{\frac{1}{m}} = \sqrt[m]{a}$$

Attachments

standard form video.wmv