

11. [Indices]

Skill 11.1 Evaluating whole numbers in index form.

MM5.2 11 22 33 44
MM10 1 22 33 44

- Observe the index. The index tells you how many times to multiply the base by itself.

5 to the power of 4
Base 5^4 Index

$5^4 = 5 \times 5 \times 5 \times 5$ 5 multiplied by itself 4 times

$6^0 = 1$ number to the power of 0 = 1	$3^1 = 3$ number to the power of 1 = itself	$4^2 = 4 \times 4 = 16$ 4 squared	$2^3 = 2 \times 2 \times 2 = 8$ 2 cubed
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Q. $2^5 =$ A. $2^5 =$
 $= 2 \times 2 \times 2 \times 2 \times 2$ 2 multiplied by itself 5 times
 $= 32$

a) $3^4 =$ $= 3 \times 3 \times 3 \times 3 =$ <input type="text" value="81"/>	b) $2^3 =$ $= 2 \times 2 \times 2 =$ <input type="text"/>	c) $2^6 =$ $=$ <input type="text"/>
d) $5^2 =$ $=$ <input type="text"/>	e) $1^7 =$ $=$ <input type="text"/>	f) $4^2 =$ $=$ <input type="text"/>
g) $7^2 =$ $=$ <input type="text"/>	h) $6^3 =$ $=$ <input type="text"/>	i) $10^3 =$ $=$ <input type="text"/>
j) $3^5 =$ $=$ <input type="text"/>	k) $7^3 =$ $=$ <input type="text"/>	l) $9^2 =$ $=$ <input type="text"/>
m) $8^1 =$ $=$ <input type="text"/>	n) $9^0 =$ $=$ <input type="text"/>	o) $0^7 =$ $=$ <input type="text"/>
p) $4^3 =$ $=$ <input type="text"/>	q) $1^{10} =$ $=$ <input type="text"/>	r) $10^4 =$ $=$ <input type="text"/>

Skill 11.2 Evaluating powers with fraction bases.

MM5.2 11 2 2 3 3 4 4
MM10 1 1 2 2 3 3 4 4

- Observe the index. The index tells you how many times to multiply the numerator by itself and the denominator by itself.

numerator, 2 to the power of 3

Base $\left(\frac{2}{5}\right)^3$ Index

denominator, 5 to the power of 3

2 multiplied by itself 3 times

$$\left(\frac{2}{5}\right)^3 = \frac{2 \times 2 \times 2}{5 \times 5 \times 5} = \frac{8}{125}$$

5 multiplied by itself 3 times

Q. $\left(\frac{3}{7}\right)^2 =$

A. $\left(\frac{3}{7}\right)^2 =$

$$= \frac{3 \times 3}{7 \times 7}$$

3 multiplied by itself 2 times

$$= \frac{9}{49}$$

7 multiplied by itself 2 times

a) $\left(\frac{3}{10}\right)^3 =$

$$= \frac{3 \times 3 \times 3}{10 \times 10 \times 10} = \frac{27}{1000}$$

b) $\left(\frac{1}{5}\right)^3 =$

$$= \frac{1 \times 1 \times 1}{5 \times 5 \times 5} = \frac{1}{125}$$

c) $\left(\frac{2}{7}\right)^2 =$

$$= \frac{2 \times 2}{7 \times 7} = \frac{4}{49}$$

d) $\left(\frac{1}{10}\right)^2 =$

$$= \frac{1 \times 1}{10 \times 10} = \frac{1}{100}$$

e) $\left(\frac{2}{3}\right)^3 =$

$$= \frac{2 \times 2 \times 2}{3 \times 3 \times 3} = \frac{8}{27}$$

f) $\left(\frac{3}{8}\right)^2 =$

$$= \frac{3 \times 3}{8 \times 8} = \frac{9}{64}$$

g) $\left(\frac{6}{11}\right)^2 =$

$$= \frac{6 \times 6}{11 \times 11} = \frac{36}{121}$$

h) $\left(\frac{4}{9}\right)^2 =$

$$= \frac{4 \times 4}{9 \times 9} = \frac{16}{81}$$

i) $\left(\frac{1}{4}\right)^4 =$

$$= \frac{1 \times 1 \times 1 \times 1}{4 \times 4 \times 4 \times 4} = \frac{1}{256}$$

j) $\left(\frac{2}{3}\right)^5 =$

$$= \frac{2 \times 2 \times 2 \times 2 \times 2}{3 \times 3 \times 3 \times 3 \times 3} = \frac{32}{243}$$

k) $\left(\frac{4}{5}\right)^3 =$

$$= \frac{4 \times 4 \times 4}{5 \times 5 \times 5} = \frac{64}{125}$$

l) $\left(\frac{7}{10}\right)^3 =$

$$= \frac{7 \times 7 \times 7}{10 \times 10 \times 10} = \frac{343}{1000}$$

m) $\left(\frac{3}{4}\right)^3 =$

$$= \frac{3 \times 3 \times 3}{4 \times 4 \times 4} = \frac{27}{64}$$

n) $\left(\frac{5}{8}\right)^2 =$

$$= \frac{5 \times 5}{8 \times 8} = \frac{25}{64}$$

o) $\left(\frac{6}{11}\right)^2 =$

$$= \frac{6 \times 6}{11 \times 11} = \frac{36}{121}$$

p) $\left(\frac{3}{4}\right)^4 =$

$$= \frac{3 \times 3 \times 3 \times 3}{4 \times 4 \times 4 \times 4} = \frac{81}{256}$$

q) $\left(\frac{3}{10}\right)^4 =$

$$= \frac{3 \times 3 \times 3 \times 3}{10 \times 10 \times 10 \times 10} = \frac{81}{10000}$$

r) $\left(\frac{9}{13}\right)^2 =$

$$= \frac{9 \times 9}{13 \times 13} = \frac{81}{169}$$

Skill 11.3 Multiplying powers with the same base.

MM5.2 1 1 2 2 3 3 4 4
MM10 1 1 2 2 3 3 4 4

- Add the indices of like numbers or like pronumerals.

Example: $8^3 \times 8^4 = \underbrace{8 \times 8 \times 8}_8 \times \underbrace{8 \times 8 \times 8 \times 8}_8$
 $= 8^{3+4}$
 $= 8^7$

In general: $a^m \times a^n = a^{m+n}$

- The size of the new index tells you how many times to multiply the base by itself.

Q. Evaluate 6×6^2

A. 6×6^2
 $= 6^{1+2}$ *add the indices*
 $= 6^3$
 $= 6 \times 6 \times 6$
 $= 216$

a) Evaluate $2^3 \times 2$

$= 2^{3+1} = 2^4$
 $= 2 \times 2 \times 2 \times 2 = \boxed{16}$

b) Evaluate $3^2 \times 3^3$

$= \dots = \dots$
 $= \dots = \boxed{}$

c) Evaluate 2×2^2

$= \dots = \dots$
 $= \dots = \boxed{}$

d) Evaluate $5^3 \times 5$

$= \dots = \dots$
 $= \dots = \boxed{}$

e) Evaluate 4×4^2

$= \dots = \dots$
 $= \dots = \boxed{}$

f) Evaluate $3^2 \times 3^2$

$= \dots = \dots$
 $= \dots = \boxed{}$

g) Evaluate 3×3^4

$= \dots = \dots$
 $= \dots = \boxed{}$

h) Evaluate $5^2 \times 5$

$= \dots = \dots$
 $= \dots = \boxed{}$

i) Evaluate $6^3 \times 6$

$= \dots = \dots$
 $= \dots = \boxed{}$

j) Simplify $x^3 \times x^6$

$= \dots = \boxed{}$

k) Simplify $z \times z^3$

$= \dots = \boxed{}$

l) Simplify $y^3 \times y^2$

$= \dots = \boxed{}$

m) Simplify $d \times d^6$

$= \dots = \boxed{}$

n) Simplify $ab^2 \times a^4b^2$

$= a^{1+4} \times b^{2+2} = \boxed{a^5b^4}$

o) Simplify $fg^2 \times f^4g$

$= \dots = \boxed{}$

p) Simplify $cd^3 \times c^2d^2$

$= \dots = \boxed{}$

q) Simplify $bc \times b^3c^2$

$= \dots = \boxed{}$

r) Simplify $u^3v^2 \times uv^3$

$= \dots = \boxed{}$

s) Simplify $l^2m^3 \times lm^4$

$= \dots = \boxed{}$

t) Simplify $a^3b \times ab$

$= \dots = \boxed{}$

u) Simplify $g^2h^2 \times gh^2$

$= \dots = \boxed{}$

Skill 11.4 Dividing powers with the same base.

MM5.2 11 22 3 4
MM10 11 22 3 4

- Subtract the indices of like numbers or like pronumerals.

$$\begin{aligned} \text{Example: } 8^5 \div 8^3 &= \frac{8^5}{8^3} = \frac{8 \times 8 \times \cancel{8} \times \cancel{8} \times \cancel{8}}{\cancel{8} \times \cancel{8} \times \cancel{8}} \\ &= 8^{5-3} = 8^2 = 64 \end{aligned}$$

$$\text{In general: } a^m \div a^n = a^{m-n}$$

- The size of the new index tells you how many times to multiply the base by itself.
Hint: A number or a pronumeral without an index actually is to the power of 1.

Q. Evaluate $2^9 \div 2^3$

A. $2^9 \div 2^3$

$$= 2^{9-3} \quad \text{subtract the exponents}$$

$$= 2^6$$

$$= 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$$= \mathbf{64}$$

a) Evaluate $4^3 \div 4$

$$= 4^{3-1} = 4^2$$

$$= 4 \times 4$$

$$= \mathbf{16}$$

b) Evaluate $3^8 \div 3^4$

$$= \dots =$$

$$= \dots =$$

c) Evaluate $2^7 \div 2^2$

$$= \dots =$$

$$= \dots =$$

d) Evaluate $6^4 \div 6$

$$= \dots =$$

$$= \dots =$$

e) Evaluate $9^6 \div 9^4$

$$= \dots =$$

$$= \dots =$$

f) Evaluate $5^8 \div 5^5$

$$= \dots =$$

$$= \dots =$$

g) Evaluate $\frac{8^8}{8^5}$

$$= 8^{8-5} = 8^3$$

$$= \dots =$$

h) Evaluate $\frac{7^4}{7^2}$

$$= \dots =$$

$$= \dots =$$

i) Evaluate $\frac{10^9}{10^6}$

$$= \dots =$$

$$= \dots =$$

j) Simplify $t^4 \div t^3$

$$= \dots =$$

k) Simplify $p^8 \div p^2$

$$= \dots =$$

l) Simplify $r^9 \div r^2$

$$= \dots =$$

m) Simplify $\frac{j^8}{j^3}$

$$= \dots =$$

n) Simplify $\frac{q^9}{q^4}$

$$= \dots =$$

o) Simplify $\frac{y^7}{y^5}$

$$= \dots =$$

p) Simplify $\frac{p^6 q^4}{p^3 q^2}$

$$= (p^6 \div p^3) \times (q^4 \div q^2)$$

$$= p^{6-3} \times q^{4-2} = \mathbf{p^3 q^2}$$

q) Simplify $\frac{a^5 b^3}{ab}$

$$= \dots =$$

$$= \dots =$$

r) Simplify $\frac{t^4 u^6}{tu^2}$

$$= \dots =$$

$$= \dots =$$

- Multiply the coefficients.
- Add the indices of like pronumerals.

Example: $2a^3 \times 3a^2 = (2 \times 3) \times (a \times a \times a) \times (a \times a)$
 $= 6a^{3+2} = 6a^5$

Hint: A number or a pronumeral without an index actually is to the power of 1.

Q. Simplify $7a \times a^3$

A. $7a \times a^3$

multiply the coefficients $= (7 \times 1) \times (a^1 \times a^3)$
 $= 7a^{1+3}$ *add the indices*
 $= 7a^4$

a) Simplify $3t^4 \times 3t$

$= (3 \times 3) \times (t^4 \times t^1)$
 $= 9t^{4+1} = \boxed{9t^5}$

b) Simplify $x^3 \times 2x$

$=$
 $= \boxed{}$

c) Simplify $2p^2 \times 2p$

$=$
 $= \boxed{}$

d) Simplify $2b \times 3b^2$

$=$
 $= \boxed{}$

e) Simplify $2d^2 \times 4d^4$

$=$
 $= \boxed{}$

f) Simplify $3m^3 \times 5m^5$

$=$
 $= \boxed{}$

g) Simplify $4s^2 \times 6s^3$

$=$
 $= \boxed{}$

h) Simplify $5a^4 \times 2a^6$

$=$
 $= \boxed{}$

i) Simplify $7k^2 \times k^7$

$=$
 $= \boxed{}$

j) Simplify $6c^6 \times 3c^5$

$=$
 $= \boxed{}$

k) Simplify $2y \times y^7$

$=$
 $= \boxed{}$

l) Simplify $7w^8 \times 4w$

$=$
 $= \boxed{}$

m) Simplify $2r \times 8r$

$=$
 $= \boxed{}$

n) Simplify $5g^4 \times 5g^4$

$=$
 $= \boxed{}$

o) Simplify $y^8 \times 6y^5$

$=$
 $= \boxed{}$

p) Simplify $10a^2 \times 2a^4$

$=$
 $= \boxed{}$

q) Simplify $7p^3 \times 5p^6$

$=$
 $= \boxed{}$

r) Simplify $3d^7 \times 12d$

$=$
 $= \boxed{}$

Skill 11.6 Dividing powers with coefficients and with the same base.

MM5.2 11 22 33 44
MM10 11 22 33 44

- Divide the coefficients.
- Subtract the indices of like pronumerals.

$$\begin{aligned} \text{Example: } 12a^5 \div 4a^2 &= (12 \div 4) \times (a^5 \div a^2) \\ &= 3 \times a^{5-2} \\ &= 3a^3 \end{aligned}$$

OR

$$\begin{aligned} \frac{12a^5}{4a^2} &= \frac{12 \times a \times a \times a \times \cancel{a} \times \cancel{a}}{4 \times \cancel{a} \times \cancel{a}} \\ &= \frac{12a^3}{4} = 3a^3 \end{aligned}$$

Hint: A number or a pronumeral without an index actually is to the power of 1.

Q. Simplify $10j^6 \div 5j^3$

A. $10j^6 \div 5j^3 =$

$$= (10 \div 5) \times (j^6 \div j^3)$$

subtract the indices

$$= 2 \times j^{6-3}$$

$$= 2j^3$$

a) Simplify $8c^4 \div 2c^3$

$$= (8 \div 2) \times (c^4 \div c^3)$$

$$= 4 \times c$$

$$= \boxed{4c}$$

b) Simplify $6a^5 \div 2a^2$

$$=$$

$$=$$

$$= \boxed{}$$

c) Simplify $8h^7 \div 2h^3$

$$=$$

$$=$$

$$= \boxed{}$$

d) Simplify $10m^9 \div 2m$

$$=$$

$$=$$

$$= \boxed{}$$

e) Simplify $5z^8 \div 5z^4$

$$=$$

$$=$$

$$= \boxed{}$$

f) Simplify $12f^7 \div 2f^2$

$$=$$

$$=$$

$$= \boxed{}$$

g) Simplify $\frac{8u^{11}}{4u^7}$

$$= (8 \div 4) \times (u^{11} \div u^7)$$

$$= 2 \times u^{11-7}$$

$$= \boxed{}$$

h) Simplify $\frac{12b^3}{6b}$

$$=$$

$$=$$

$$= \boxed{}$$

i) Simplify $\frac{6w^5}{2w^2}$

$$=$$

$$=$$

$$= \boxed{}$$

j) Simplify $\frac{18v^{12}}{9v^9}$

$$=$$

$$=$$

$$= \boxed{}$$

k) Simplify $\frac{25x^{13}}{5x}$

$$=$$

$$=$$

$$= \boxed{}$$

l) Simplify $\frac{16n^7}{2n^2}$

$$=$$

$$=$$

$$= \boxed{}$$

m) Simplify $\frac{7e^{10}}{e^6}$

$$=$$

$$=$$

$$= \boxed{}$$

n) Simplify $\frac{14q^6}{7q^6}$

$$=$$

$$=$$

$$= \boxed{}$$

o) Simplify $\frac{9w^6}{3w^2}$

$$=$$

$$=$$

$$= \boxed{}$$

- Raise each number or pronumeral in the product to the index.

Example: $(ab)^3 = a^3 \times b^3 = a^3b^3$

In general: $(ab)^m = a^m \times b^m$

- Multiply from left to right.

Hint: A number or a pronumeral without an index actually is to the power of 1.

Q. Simplify $5(2x)^3$

A. $5(2x)^3$
 $= 5 \times 2^3 \times x^3$
 $= 5 \times 8 \times x^3$
 $= 40x^3$

a) Simplify $(2x)^4$

$= 2^4 \times x^4$
 $= 16 \times x^4 = 16x^4$

b) Simplify $(5y)^3$

$=$
 $=$

c) Simplify $(2v)^6$

$=$
 $=$

d) Simplify $(tu)^4$

$=$
 $=$

e) Simplify $(fg)^2$

$=$
 $=$

f) Simplify $(de)^f$

$=$
 $=$

g) Simplify $(6m)^3$

$=$
 $=$

h) Simplify $(7r)^2$

$=$
 $=$

i) Simplify $(3p)^4$

$=$
 $=$

j) Simplify $(2b)^2$

$=$
 $=$

k) Simplify $(5y)^3$

$=$
 $=$

l) Simplify $(4k)^3$

$=$
 $=$

m) Simplify $6(2y)^3$

$= 6 \times 2^3 \times y^3$
 $= 6 \times 8 \times y^3 = 48y^3$

n) Simplify $2(2q)^2$

$=$
 $=$

o) Simplify $4(2n)^3$

$=$
 $=$

p) Simplify $5(2v)^5$

$=$
 $=$

q) Simplify $3(4s)^2$

$=$
 $=$

r) Simplify $8(3h)^2$

$=$
 $=$

- Multiply the indices of the number or pronumeral.

Example: $(a^2)^4 = a^2 \times a^2 \times a^2 \times a^2 = a^{2+2+2+2}$
 $= a^{2 \times 4}$
 $= a^8$

In general: $(a^m)^n = a^{m \times n}$

Hint: A number or a pronumeral without an index actually is to the power of 1.

Q. Simplify $(m^y)^z$

A. $(m^y)^z$
 $= m^{y \times z}$ *multiply the exponents*
 $= m^{yz}$

a) Simplify $(y^4)^2$

$= y^4 \times y^4 = y^{4+4}$

$= y^{4 \times 2} = \boxed{y^8}$

b) Simplify $(r^4)^4$

$=$
 $=$ $=$ $\boxed{}$

c) Simplify $(x^2)^5$

$=$
 $=$ $=$ $\boxed{}$

d) Simplify $(a^e)^f$

$=$ $=$ $\boxed{}$

e) Simplify $(p^q)^r$

$=$ $=$ $\boxed{}$

f) Simplify $(t^u)^v$

$=$ $=$ $\boxed{}$

g) Simplify $(d^2)^2$

$=$
 $=$ $=$ $\boxed{}$

h) Simplify $(h^3)^2$

$=$
 $=$ $=$ $\boxed{}$

i) Simplify $(n^4)^3$

$=$
 $=$ $=$ $\boxed{}$

j) Simplify $(w^5)^0$

$=$
 $=$ $=$ $\boxed{}$

k) Simplify $(a^4)^5$

$=$
 $=$ $=$ $\boxed{}$

l) Simplify $(g^2)^5$

$=$
 $=$ $=$ $\boxed{}$

m) Simplify $2(b^3)^2$

$= 2 \times (b^3)^2$

$= 2 \times b^{3 \times 2} = \boxed{4b^6}$

n) Simplify $4(q^3)^3$

$=$
 $=$ $=$ $\boxed{}$

o) Simplify $5(z^3)^2$

$=$
 $=$ $=$ $\boxed{}$

p) Simplify $6(c^4)^3$

$=$
 $=$ $=$ $\boxed{}$

q) Simplify $8(w^4)^2$

$=$
 $=$ $=$ $\boxed{}$

r) Simplify $7(k^3)^5$

$=$
 $=$ $=$ $\boxed{}$

- Observe the index.

$$(-5)^2 = -5 \times -5 = +25$$

Even index
Positive result

$$(-5)^3 = -5 \times -5 \times -5 = +25 \times -5 = -125$$

Odd index
Negative result

Q. Evaluate $(-4)^3$

A. (-4^3) odd index
 $= -4 \times -4 \times -4$
 $= -64$ negative result

a) Evaluate $(-9)^2$ even index
 $= -9 \times -9 = 81$
 positive result

b) Evaluate $(-2)^2$
 $= \dots = \dots$

c) Evaluate $(-1)^5$
 $= \dots = \dots$

d) Evaluate $(-4)^2$
 $= \dots = \dots$

e) Evaluate $(-8)^2$
 $= \dots = \dots$

f) Evaluate $(-2)^4$
 $= \dots = \dots$

g) Evaluate $(-1)^7$
 $= \dots = \dots$

h) Evaluate $(-2)^6$
 $= \dots = \dots$

i) Evaluate $(-3)^3$
 $= \dots = \dots$

j) Evaluate $(-5)^1$
 $= \dots = \dots$

k) Evaluate $(-4)^4$
 $= \dots = \dots$

l) Evaluate $(-7)^3$
 $= \dots = \dots$

m) Evaluate $(-6)^3$
 $= \dots = \dots$

n) Evaluate $(-7)^2$
 $= \dots = \dots$

o) Evaluate $(-5)^4$
 $= \dots = \dots$

p) Evaluate $(-3)^4$
 $= \dots = \dots$

q) Evaluate $(-5)^3$
 $= \dots = \dots$

r) Evaluate $(-10)^4$
 $= \dots = \dots$

s) Evaluate $(-10)^3$
 $= \dots = \dots$

t) Evaluate $(-12)^2$
 $= \dots = \dots$

u) Evaluate $(-1)^{12}$
 $= \dots = \dots$

v) Evaluate $(-15)^2$
 $= \dots = \dots$

w) Evaluate $(-11)^3$
 $= \dots = \dots$

x) Evaluate $(-1)^{123}$
 $= \dots = \dots$

Skill 11.10 Raising a number to a negative power.

MM5.2 11 22 33 44
MM10 11 22 33 44

- Write the reciprocal of the base number.
- Raise this reciprocal to the corresponding positive index.

$$a^{-2} = \left(\frac{1}{a}\right)^2 = \frac{1}{a^2}$$

Negative index Base Positive index Reciprocal

In general: $a^{-n} = \frac{1}{a^n}$

Q. Evaluate 4^{-2}

A. 4^{-2}

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

Write the reciprocal of 4

$$= \frac{1}{4 \times 4}$$

Multiply 4 by itself 2 times

$$= \frac{1}{16}$$

a) Evaluate 10^{-3}

$$= \frac{1}{10 \times 10 \times 10} = \frac{1}{1000}$$

b) Evaluate 3^{-3}

$$= \frac{1}{3 \times 3 \times 3} = \frac{1}{27}$$

c) Evaluate 2^{-2}

$$= \frac{1}{2 \times 2} = \frac{1}{4}$$

d) Evaluate 4^{-3}

$$= \frac{1}{4 \times 4 \times 4} = \frac{1}{64}$$

e) Evaluate 7^{-1}

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

f) Evaluate 8^{-2}

$$= \frac{1}{8 \times 8} = \frac{1}{64}$$

g) Evaluate 9^{-2}

$$= \frac{1}{9 \times 9} = \frac{1}{81}$$

h) Evaluate 2^{-4}

$$= \frac{1}{2 \times 2 \times 2 \times 2} = \frac{1}{16}$$

i) Evaluate 5^{-4}

$$= \frac{1}{5 \times 5 \times 5 \times 5} = \frac{1}{625}$$

j) Evaluate 6^{-3}

$$= \frac{1}{6 \times 6 \times 6} = \frac{1}{216}$$

k) Evaluate 5^{-2}

$$= \frac{1}{5 \times 5} = \frac{1}{25}$$

l) Evaluate 3^{-5}

$$= \frac{1}{3 \times 3 \times 3 \times 3 \times 3} = \frac{1}{243}$$

m) Evaluate 2^{-5}

$$= \frac{1}{2 \times 2 \times 2 \times 2 \times 2} = \frac{1}{32}$$

n) Evaluate 10^{-4}

$$= \frac{1}{10 \times 10 \times 10 \times 10} = \frac{1}{10000}$$

o) Evaluate 4^{-4}

$$= \frac{1}{4 \times 4 \times 4 \times 4} = \frac{1}{256}$$

p) Evaluate 2^{-6}

$$= \frac{1}{2 \times 2 \times 2 \times 2 \times 2 \times 2} = \frac{1}{64}$$

q) Evaluate 3^{-3}

$$= \frac{1}{3 \times 3 \times 3} = \frac{1}{27}$$

r) Evaluate 6^{-2}

$$= \frac{1}{6 \times 6} = \frac{1}{36}$$

s) Evaluate 10^{-2}

$$= \frac{1}{10 \times 10} = \frac{1}{100}$$

t) Evaluate 5^{-3}

$$= \frac{1}{5 \times 5 \times 5} = \frac{1}{125}$$

u) Evaluate 1^{-25}

$$= \frac{1}{1 \times 1 \times 1 \times \dots \times 1} = \frac{1}{1} = 1$$