

Brackets with Indices - Worksheet

Skill

Group A - Single number base

Write as a number to a single power:

1) $(5^2)^3$

2) $(5^2)^4$

3) $(5^2)^5$

4) $(3^4)^2$

5) $(3^5)^2$

6) $(3^6)^2$

7) $(2^5)^3$

8) $(2^6)^3$

9) $(2^7)^3$

10) $(7^3)^4$

11) $(7^3)^5$

12) $(7^3)^6$

Group B - Algebraic base with coefficient of 1

Write as a single power:

1) $(a^3)^2$

2) $(a^4)^2$

3) $(a^5)^2$

4) $(e^4)^3$

5) $(e^5)^3$

6) $(e^6)^3$

7) $(x^2)^3$

8) $(x^2)^4$

9) $(x^2)^5$

10) $(y^3)^5$

11) $(y^3)^6$

12) $(y^3)^7$

Group C - Algebraic base with coefficient greater than 1

Simplify:

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

2) $(3x^3)^2$

3) $(4x^3)^2$

4) $(3y^4)^2$

5) $(4y^4)^2$

6) $(5y^4)^2$

7) $(2a^5)^2$

8) $(2a^5)^3$

9) $(2a^5)^4$

10) $(2p^4)^3$

11) $(2p^5)^3$

12) $(2p^6)^3$

Brackets with Indices - Worksheet

Group D - Further questions

Simplify:

1) $(x^3)^0$

2) $(x^0)^5$

3) $(x^0)^2$

4) $(y^2)^{\frac{1}{2}}$

5) $(y^4)^{\frac{1}{2}}$

6) $(y^{\frac{1}{2}})^8$

7) $(xy^3)^2$

8) $(xy^2)^5$

9) $(xy^4)^3$

10) $(m^2n^4)^3$

11) $(m^2n^3)^2$

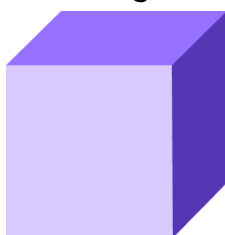
12) $(m^3n^2)^4$

Brackets with Indices - Worksheet

Applied

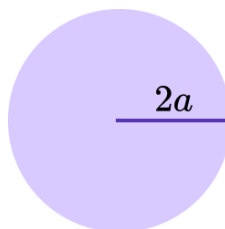
- 1) (a) A square has area $(3x)^2$. What is the length of one of its sides?
- (b) Simplify its area and write it in the form ax^b where a and b are integers.

- 2) (a) A cube has volume $(4y)^3$. What is the length of one of its sides?



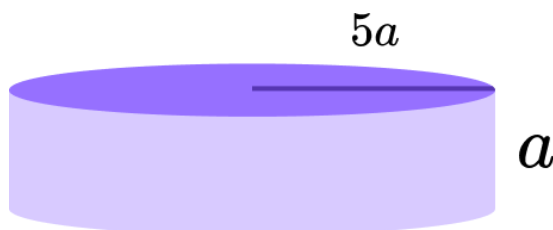
- (b) Simplify its area and write it in the form ax^b where a and b are integers.

- 3) (a) A circle has radius $2a$. What is its area in terms of π ?



- (b) A different circle has area $64\pi x^2$. What is its radius in terms of π ?

- 4) (a) Here is a cylinder with radius $5a$ and height a . What is its volume? Leave your answer in terms of π .



- (b) What is its total surface area? Leave your answer in terms of π .

Brackets with Indices - Exam Questions

1) Simplify:
 $(5a^3b^4)^2$

.....
(2 marks)

2) Simplify:
 $(3g^2h)^4$

.....
(2 marks)

3) Simplify:
 $(2xy^5)^3$

.....
(2 marks)

4) $(2x^a y)^2 = 4x^6 y^2$
Write down the value of a.

.....
(2 marks)

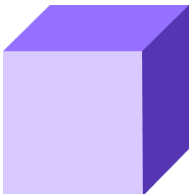
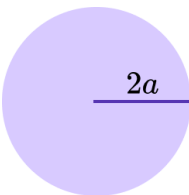
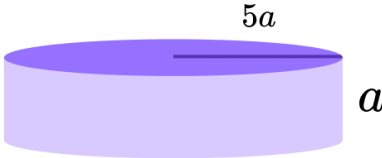
Brackets with Indices - Answers

	Question	Answer
	Skill Questions	
Group A	<p>Write as a number to a single power.</p> <p>1) $(5^2)^3$</p> <p>2) $(5^2)^4$</p> <p>3) $(5^2)^5$</p> <p>4) $(3^4)^2$</p> <p>5) $(3^5)^2$</p> <p>6) $(3^6)^2$</p> <p>7) $(2^5)^3$</p> <p>8) $(2^6)^3$</p> <p>9) $(2^7)^3$</p> <p>10) $(7^3)^4$</p> <p>11) $(7^3)^5$</p> <p>12) $(7^3)^6$</p>	<p>1) 5^6</p> <p>2) 5^8</p> <p>3) 5^{10}</p> <p>4) 3^8</p> <p>5) 3^{10}</p> <p>6) 3^{12}</p> <p>7) 2^{15}</p> <p>8) 2^{18}</p> <p>9) 2^{21}</p> <p>10) 7^{12}</p> <p>11) 7^{15}</p> <p>12) 7^{18}</p>
Group B	<p>Write as a single power.</p> <p>1) $(a^3)^2$</p> <p>2) $(a^4)^2$</p> <p>3) $(a^5)^2$</p> <p>4) $(e^4)^3$</p> <p>5) $(e^5)^3$</p> <p>6) $(e^6)^3$</p> <p>7) $(x^2)^3$</p> <p>8) $(x^2)^4$</p> <p>9) $(x^2)^5$</p> <p>10) $(y^3)^5$</p> <p>11) $(y^3)^6$</p> <p>12) $(y^3)^7$</p>	<p>1) a^6</p> <p>2) a^8</p> <p>3) a^{10}</p> <p>4) e^{12}</p> <p>5) e^{15}</p> <p>6) e^{18}</p> <p>7) x^6</p> <p>8) x^8</p> <p>9) x^{10}</p> <p>10) y^{15}</p> <p>11) y^{18}</p> <p>12) y^{21}</p>

Brackets with Indices - Answers

Group C	Simplify. 1) $(2x^3)^2$ 2) $(3x^3)^2$ 3) $(4x^3)^2$ 4) $(3y^4)^2$ 5) $(4y^4)^2$ 6) $(5y^4)^2$ 7) $(2a^5)^2$ 8) $(2a^5)^3$ 9) $(2a^5)^4$ 10) $(2p^4)^3$ 11) $(2p^5)^3$ 12) $(2p^6)^3$	1) $4x^6$ 2) $9x^6$ 3) $16x^6$ 4) $9y^8$ 5) $16y^8$ 6) $25y^8$ 7) $4a^{10}$ 8) $8a^{15}$ 9) $16a^{20}$ 10) $8p^{12}$ 11) $8p^{15}$ 12) $8p^{18}$
Group D	Simplify. 1) $(x^3)^0$ 2) $(x^0)^5$ 3) $(x^0)^2$ 4) $(y^2)^{\frac{1}{2}}$ 5) $(y^4)^{\frac{1}{2}}$ 6) $(y^{\frac{1}{2}})^8$ 7) $(xy^3)^2$ 8) $(xy^2)^5$ 9) $(xy^4)^3$ 10) $(m^2 n^4)^3$ 11) $(m^2 n^3)^2$ 12) $(m^3 n^2)^4$	1) 1 2) 1 3) 1 4) y 5) y^2 6) y^4 7) $x^2 y^6$ 8) $x^5 y^{10}$ 9) $x^3 y^{12}$ 10) $m^6 n^{12}$ 11) $m^4 n^6$ 12) $m^{12} n^8$

Brackets with Indices - Answers

	Question	Answer
	Applied Questions	
1)	(a) A square has area $(3x)^2$. What is the length of one of its sides?	(a) $3x$
	(b) Simplify its area and write it in the form ax^b where a and b are integers.	(b) $9x^2$
2)	(a) A cube has volume $(4y)^3$. What is the length of one of its sides? 	(a) $4y$
	(b) Simplify its area and write it in the form ax^b where a and b are integers.	(b) $64y^3$
3)	(a) A circle has radius $2a$. What is its area in terms of π ? 	(a) Area = $4\pi a^2$
	(b) A different circle has area $64\pi x^2$. What is its radius in terms of π ?	(b) Radius = $8x$
4)	(a) Here is a cylinder with radius $5a$ and height a . What is its volume? Leave your answer in terms of π . 	(a) Volume = $25\pi a^3$
	(b) What is its total surface area? Leave your answer in terms of π .	(b) Total surface area = $60\pi a^2$

Brackets with Indices - Mark Scheme

	Question	Answer	
	Exam Questions		
1)	Simplify: $(5a^3b^4)^2$	$25 \times a^6 \times b^8$ (1 for 2 correct terms) $= 25a^6b^8$ (1)	(2)
2)	Simplify: $(3g^2h)^4$	$81 \times g^8 \times h^4$ (1 for 2 correct terms) $= 81g^8h^4$ (1)	(2)
3)	Simplify: $(2xy^5)^3$	$8 \times x^3 \times y^{15}$ (1 for 2 correct terms) $= 8x^3y^{15}$ (1)	(2)
4)	$(2x^ay)^2 = 4x^6y^2$ Write down the value of a.	$a = 3$ (1)	(1)

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