

# High School Mathematics Test 2015

Year 8

## Indices

Non Calculator  
Section

### Skills and Knowledge Assessed:

- Investigate index notation and represent whole numbers as products of powers of prime numbers (ACMNA149)
- Use index notation with numbers to establish the index laws with positive integral indices and the zero index (ACMNA182)

Name \_\_\_\_\_

Answer all questions in the spaces provided on this test paper by:

*Writing the answer in the box provided.*

or

*Shading in the bubble for the correct answer from the four choices provided.*

Show any working out on the test paper. Calculators are **not** allowed.

1.  $4^5 = ?$

☐  $4 \times 4 \times 4 \times 4$

☐  $4 \times 4 \times 4 \times 4 \times 4$

☐  $5 \times 5 \times 5 \times 5$

☐  $5 \times 5 \times 5 \times 5 \times 5$

2. Write  $15^4$  as a repeated multiplication.

3.  $x^7 \times x^8 = ?$

☐  $x^1$

☐  $x^{15}$

☐  $x^{56}$

☐  $x^{78}$

4.  $245^6 \times 245^{11} = ?$

5.  $8^{18} \div 8^6 = ?$

☐  $1^3$

☐  $8^3$

☐  $8^{12}$

☐  $8^{24}$

6.

Write the answer to  $12^{39} \div 12^{15}$  in index notation.

7.

Simplify  $2m^3 \times 3m^4$ .

8.

 $h^4 \times h^6 \times h^5 = ?$ ☐  $h^{15}$ ☐  $h^{29}$ ☐  $h^{34}$ ☐  $h^{120}$ 

9.

 $6^9 \times 6^3 \times 6^7 = ?$ 

10.

Simplify  $m^7 \div m^7 = ?$ ☐ 0☐ 1☐  $m$ ☐  $m^{14}$ 

11.

Evaluate  $320^0$ .

12.

 $\frac{12x^8}{6x^2} = ?$ ☐  $2x^4$ ☐  $2x^6$ ☐  $6x^4$ ☐  $6x^6$ 

13.

Simplify  $6x^7 \times 4x^8$ .

14.	$(x^9)^2 = ?$	<input type="checkbox"/> $x^7$	<input type="checkbox"/> $x^{11}$	<input type="checkbox"/> $x^{18}$	<input type="checkbox"/> $x^{81}$
15.	$(2c^4)^3 = ?$	<input type="checkbox"/> $2c^7$	<input type="checkbox"/> $2c^{12}$	<input type="checkbox"/> $8c^7$	<input type="checkbox"/> $8c^{12}$
16.	$3a^2b^3 \times 4ab^4 = ?$	<div></div>			
17.	$\frac{y^5 \times y^7}{y^6} = ?$	<input type="checkbox"/> $y^6$	<input type="checkbox"/> $y^9$	<input type="checkbox"/> $y^{18}$	<input type="checkbox"/> $y^{29}$
18.	Simplify $\frac{8x^8 \times 2x^9}{4x^7}$ .	<div></div>			
19.	$\frac{(2y^6)^4}{4y^2 \times 2y^4} = ?$	<input type="checkbox"/> $2y^3$	<input type="checkbox"/> $2y^6$	<input type="checkbox"/> $2y^{12}$	<input type="checkbox"/> $2y^{18}$
20.	Simplify $\frac{8a^7 \times 2a^9}{(4a^4)^2}$ .	<div></div>			

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*Writing the answer in the box provided.*

or

*Shading in the bubble for the correct answer from the four choices provided.*

Show any working out on this test paper. Calculators are allowed.

1.  $5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 = ?$

☐  $5 \times 8$

☐  $8 \times 5$

☐  $5^8$

☐  $8^5$

2.  $7^6 = ?$

☐  $6 \times 6 \times 6 \times 6 \times 6 \times 6 \times 6$

☐  $7 \times 7 \times 7 \times 7 \times 7 \times 7$

☐  $6 + 6 + 6 + 6 + 6 + 6 + 6$

☐  $7 + 7 + 7 + 7 + 7 + 7$

3.  $z^5 \times z^4 = ?$

4.  $\frac{m^{24}}{m^6} = ?$

☐  $m^4$

☐  $m^6$

☐  $m^{12}$

☐  $m^{18}$

5.  $6^5 \times 6^7 = ?$

6.	$\frac{a^{35}}{a^{11}} = ?$	<input type="text"/>
7.	$\frac{33k^{16}}{3k^8} = ?$ <input type="checkbox"/> $11k^8$ <input type="checkbox"/> $11k^2$ <input type="checkbox"/> $30k^8$ <input type="checkbox"/> $30k^2$	
8.	$\frac{30a^7}{6a^4} = ?$	<input type="text"/>
9.	$\frac{15p^{18}q^3}{5p^9q} = ?$ <input type="checkbox"/> $3p^2q^3$ <input type="checkbox"/> $3p^9q^2$ <input type="checkbox"/> $10p^2q^3$ <input type="checkbox"/> $10p^9q^2$	
10.	$a^{12} \times a^5 \times a^4 = ?$	<input type="text"/>
11.	$2a^3 \times 3a^5 \times 6a^{10} = ?$ <input type="checkbox"/> $11a^{18}$ <input type="checkbox"/> $11a^{150}$ <input type="checkbox"/> $36a^{18}$ <input type="checkbox"/> $36a^{150}$	
12.	$5m^2n^3 \times 8m^4n^4 = ?$	<input type="text"/>
13.	$1\,000\,000\,000 = ?$ <input type="checkbox"/> $10^3$ <input type="checkbox"/> $10^6$ <input type="checkbox"/> $10^8$ <input type="checkbox"/> $10^9$	

14.	$\frac{5a^6 \times 4a^8}{10a^3} = ?$	<div></div>
15.	$\frac{3m^5 \times 4m^7}{6m^{18}} = ?$  <div><input type="checkbox"/> <math>\frac{2}{m^6}</math></div> <div><input type="checkbox"/> <math>\frac{6}{m^6}</math></div> <div><input type="checkbox"/> <math>2m^6</math></div> <div><input type="checkbox"/> <math>6m^6</math></div>	
16.	$(a^7)^5 = ?$  <div><input type="checkbox"/> <math>a^2</math></div> <div><input type="checkbox"/> <math>a^{12}</math></div> <div><input type="checkbox"/> <math>a^{35}</math></div> <div><input type="checkbox"/> <math>a^{75}</math></div>	
17.	$(2x^8)^5 = ?$	<div></div>
18.	$(2m^2 \times 4m^3)^3 = ?$  <div><input type="checkbox"/> <math>216m^{15}</math></div> <div><input type="checkbox"/> <math>216m^{18}</math></div> <div><input type="checkbox"/> <math>512m^{15}</math></div> <div><input type="checkbox"/> <math>512m^{18}</math></div>	
19.	$\left( \frac{5a^2 \times 12a^{12}}{10a^3} \right)^3 = ?$	<div></div>
20.	$\frac{5s^4t^3 \times 4s^7t^6}{16t^3s^{15}} = ?$	<div></div>

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### ANSWERS

No.	WORKING	ANSWER
1.	$4^5 = 4 \times 4 \times 4 \times 4 \times 4$	2 <sup>nd</sup> answer
2.	$15^4 = 15 \times 15 \times 15 \times 15$	$15 \times 15 \times 15 \times 15$
3.	$x^7 \times x^8 = x^{7+8} = x^{15}$	2 <sup>nd</sup> answer
4.	$245^6 \times 245^{11} = 245^{6+11} = 245^{17}$	$245^{17}$
5.	$8^{18} \div 8^6 = 8^{18-6} = 8^{12}$	3 <sup>rd</sup> answer
6.	$12^{39} \div 12^{15} = 12^{39-15} = 12^{24}$	$12^{24}$
7.	$2m^3 \times 3m^4 = 6m^7$	$6m^7$
8.	$h^4 \times h^6 \times h^5 = h^{4+6+5} = h^{15}$	1 <sup>st</sup> answer
9.	$6^9 \times 6^3 \times 6^7 = 6^{9+3+7} = 6^{19}$	$6^{19}$
10.	$m^7 \div m^7 = m^{7-7} = m^0 = 1$	2 <sup>nd</sup> answer
11.	$320^0 = 1$	1

12.	$\frac{12x^8}{6x^2} = 2x^6$	2 <sup>nd</sup> answer
13.	Simplify $6x^7 \times 4x^8 = 24x^{15}$	$24x^{15}$
14.	$(x^9)^2 = x^{9 \times 2} = x^{18}$	3 <sup>rd</sup> answer
15.	$(2c^4)^3 = 2^3 \times c^{4 \times 3} = 8c^{12}$	4 <sup>th</sup> answer
16.	$3a^2b^3 \times 4ab^4 = 12a^3b^7$	$12a^3b^7$
17.	$\frac{y^5 \times y^7}{y^6} = \frac{y^{12}}{y^6}$ $= y^6$	1 <sup>st</sup> answer
18.	$\frac{8x^8 \times 2x^9}{4x^7} = \frac{16x^{17}}{4x^7} = 4x^{10}$	$4x^{10}$
19.	$\frac{(2y^6)^4}{4y^2 \times 2y^4} = \frac{16y^{24}}{8y^6}$ $= 2y^{18}$	4 <sup>th</sup> answer
20.	$\frac{8a^7 \times 2a^9}{(4a^4)^2} = \frac{16a^{16}}{16a^8} = a^8$	$a^8$



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## ANSWERS

No.	WORKING	ANSWER
1.	$5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 = 5^8$	3 <sup>rd</sup> answer
2.	$7^6 = 7 \times 7 \times 7 \times 7 \times 7 \times 7$	2 <sup>nd</sup> answer
3.	$z^5 \times z^4 = z^9$	$z^9$
4.	$\frac{m^{24}}{m^6} = m^{18}$	4 <sup>th</sup> answer
5.	$6^5 \times 6^7 = 6^{12}$	$6^{12}$
6.	$\frac{a^{35}}{a^{11}} = a^{24}$	$a^{24}$
7.	$\frac{33k^{16}}{3k^8} = 11k^8$	1 <sup>st</sup> answer
8.	$\frac{30a^7}{6a^4} = 5a^3$	$5a^3$
9.	$\frac{15p^{18}q^3}{5p^9q} = 3p^9q^2$	2 <sup>nd</sup> answer
10.	$a^{12} \times a^5 \times a^4 = a^{21}$	$a^{21}$

11.	$2a^3 \times 3a^5 \times 6a^{10} = 36a^{18}$	3 <sup>rd</sup> answer
12.	$5m^2 n^3 \times 8m^4 n^4 = 40m^6 n^7$	$40m^6 n^7$
13.	$1\,000\,000\,000 = 1000 \times 1000 \times 1000$ $= 10^3 \times 10^3 \times 10^3$ $= 10^9$	4 <sup>th</sup> answer
14.	$\frac{5a^6 \times 4a^8}{10a^3} = \frac{20a^{14}}{10a^3} = 2a^{11}$	$2a^{11}$
15.	$\frac{3m^5 \times 4m^7}{6m^{18}} = \frac{12m^{12}}{6m^{18}}$ $= \frac{2}{m^6}$	1 <sup>st</sup> answer
16.	$(a^7)^5 = a^{35}$	3 <sup>rd</sup> answer
17.	$(2x^8)^5 = 2^5 \times x^{40} = 32x^{40}$	$32x^{40}$
18.	$(2m^2 \times 4m^3)^3 = (8m^5)^3$ $= 8^3 \times m^{15}$ $= 512m^{15}$	3 <sup>rd</sup> answer
19.	$\left(\frac{5a^2 \times 12a^{12}}{10a^3}\right)^3 = \left(\frac{60a^{14}}{10a^3}\right)^3$ $= (6a^{11})^3$ $= 6^3 \times a^{33}$ $= 216a^{33}$	$216a^{33}$
20.	$\frac{5s^4 t^3 \times 4s^7 t^6}{16t^3 s^{15}} = \frac{20s^{11} t^9}{16t^3 s^{15}}$ $= \frac{5t^6}{4s^4}$	$\frac{5t^6}{4s^4}$