

# High School Mathematics Test 2014

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.	$5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 = ?$ <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><input type="checkbox"/> <math>5 \times 7</math></span> <span><input type="checkbox"/> <math>7 \times 5</math></span> <span><input type="checkbox"/> <math>5^7</math></span> <span><input type="checkbox"/> <math>7^5</math></span> </div>
2.	$4^5 = ?$ <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><input type="checkbox"/> <math>4 \times 4 \times 4 \times 4</math></span> <span><input type="checkbox"/> <math>4 \times 4 \times 4 \times 4 \times 4</math></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><input type="checkbox"/> <math>4 + 4 + 4 + 4 + 4</math></span> <span><input type="checkbox"/> <math>5 \times 5 \times 5 \times 5</math></span> </div>
3.	Write $6 \times 6 \times 6 \times 6$ in index notation. <div style="text-align: right; margin-top: 20px;"> <div style="border: 1px solid black; width: 60px; height: 40px; display: inline-block;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle; margin-left: 5px;"></div> </div>
4.	$2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 = ?$ <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <span><input type="checkbox"/> <math>5 \times 2 \times 4 \times 3</math></span> <span><input type="checkbox"/> <math>2^5 + 3^4</math></span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><input type="checkbox"/> <math>10 \times 12</math></span> <span><input type="checkbox"/> <math>2^5 \times 3^4</math></span> </div>
5.	$6^5 \times 6^7 = ?$ <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><input type="checkbox"/> <math>6^2</math></span> <span><input type="checkbox"/> <math>6^{12}</math></span> <span><input type="checkbox"/> <math>36^{12}</math></span> <span><input type="checkbox"/> <math>6^{30}</math></span> </div>
6.	Write the answer to $7^3 \times 7^5$ in index notation <div style="text-align: right; margin-top: 20px;"> <div style="border: 1px solid black; width: 60px; height: 40px; display: inline-block;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; vertical-align: middle; margin-left: 5px;"></div> </div>
7.	$3^{16} \div 3^8 = ?$ <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span><input type="checkbox"/> <math>1^2</math></span> <span><input type="checkbox"/> <math>3^2</math></span> <span><input type="checkbox"/> <math>3^8</math></span> <span><input type="checkbox"/> <math>3^{24}</math></span> </div>

8.	$\frac{8^7}{8^4} = ?$	<input type="text"/>	<input type="text"/>
9.	$5^{18} \div 5^9 = ?$	<input type="checkbox"/> $1^2$	<input type="checkbox"/> $5^2$ <input type="checkbox"/> $5^8$ <input type="checkbox"/> $5^9$
10.	Write the answer to $7^{15} \times 7^3 \times 7^2$ in index notation	<input type="text"/>	<input type="text"/>
11.	$2^9 \times 2^5 \times 2^{10} = ?$	<input type="checkbox"/> $2^6$	<input type="checkbox"/> $2^{24}$ <input type="checkbox"/> $2^{45}$ <input type="checkbox"/> $2^{450}$
12.	$8^{15} \div 8^{14} = ?$	<input type="text"/>	
13.	$6^8 \div 6^8 = ?$	<input type="checkbox"/> $-1$	<input type="checkbox"/> $0$ <input type="checkbox"/> $1$ <input type="checkbox"/> $6$
14.	Write the answer to $7^{10} \div 7^{10}$ in index notation and give its numerical value.	<input type="text"/>	<input type="text"/> = <input type="text"/>
15.	$\frac{3^5 \times 3^7}{3^6} = ?$	<input type="checkbox"/> $3^2$	<input type="checkbox"/> $3^6$ <input type="checkbox"/> $3^{10}$ <input type="checkbox"/> $3^{12}$
16.	$\frac{5^6 \times 5^8}{5^3} = ?$	<input type="text"/>	<input type="text"/>
17.	$(2^5)^3 = ?$	<input type="checkbox"/> $2^2$	<input type="checkbox"/> $2^8$ <input type="checkbox"/> $4^8$ <input type="checkbox"/> $2^{15}$

18.

$$(7^8)^4 = ?$$

19.

$$(2^2 \times 2^3)^4 = ?$$

$2^{20}$

$2^{24}$

$4^{20}$

$4^{24}$

20.

$$\left(\frac{5^{12}}{5^3}\right)^4 = ?$$

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*Indices*

Calculator Allowed  
Short Answer  
Section

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 allowed.

1.	$3^6 = ?$ <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <span><input type="checkbox"/> 18</span> <span><input type="checkbox"/> 27</span> <span><input type="checkbox"/> 36</span> <span><input type="checkbox"/> 729</span> </div>
2.	Evaluate $4^8$ .  <div style="text-align: right; margin-top: 20px;"> <div style="border: 1px solid black; width: 100px; height: 30px;"></div> </div>
3.	$2^{17} \times 2^{28} = ?$ <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <span><input type="checkbox"/> <math>2^{11}</math></span> <span><input type="checkbox"/> <math>4^{11}</math></span> <span><input type="checkbox"/> <math>2^{45}</math></span> <span><input type="checkbox"/> <math>2^{476}</math></span> </div>
4.	$6.5^9 \times 6.5^{12} = ?$  <div style="text-align: right; margin-top: 20px;"> <div style="border: 1px solid black; width: 130px; height: 40px;"></div> </div>
5.	$5^{39} \div 5^{13} = ?$ <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <span><input type="checkbox"/> <math>1^3</math></span> <span><input type="checkbox"/> <math>5^3</math></span> <span><input type="checkbox"/> <math>5^{26}</math></span> <span><input type="checkbox"/> <math>5^{52}</math></span> </div>
6.	Write the answer to $7^{39} \div 7^{37}$ in index notation and give its numerical value.  <div style="text-align: right; margin-top: 20px;"> <div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; width: 60px; height: 40px; position: relative;"> <div style="position: absolute; top: -15px; left: 50%; transform: translateX(-50%); border: 1px solid black; width: 20px; height: 15px;"></div> </div> <span>=</span> <div style="border: 1px solid black; width: 100px; height: 40px;"></div> </div> </div>
7.	$\frac{8^{99}}{8^{11}} = ?$ <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <span><input type="checkbox"/> <math>1^{88}</math></span> <span><input type="checkbox"/> <math>8^9</math></span> <span><input type="checkbox"/> <math>8^{88}</math></span> <span><input type="checkbox"/> <math>8^{110}</math></span> </div>

8.	$8^3 \times 8^4 \times 8^5 = ?$ <input type="checkbox"/> $8^{12}$ <input type="checkbox"/> $8^{17}$ <input type="checkbox"/> $8^{60}$ <input type="checkbox"/> $64^{17}$
9.	$6^7 \times 6^5 \times 6^8 = ?$ <div style="text-align: right;"> <input type="text"/>  <input type="text"/> </div>
10.	Simplify $18^5 \div 18^5 = ?$ <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 18 <input type="checkbox"/> 90
11.	Evaluate $2.45^0$ . <div style="text-align: right;"><input type="text"/></div>
12.	Which of the following has a value of 1? <input type="checkbox"/> $75^0$ <input type="checkbox"/> $75^1$ <input type="checkbox"/> $\frac{75^2}{75}$ <input type="checkbox"/> $75^3$
13.	$2^{18} \div 2^6 \div 2^3 = ?$ <div style="text-align: right;"> <input type="text"/>  <input type="text"/> </div>
14.	When $p = 3$ , what is the value of $\frac{p^{12}}{p^9}$ ? <input type="checkbox"/> 3 <input type="checkbox"/> 9 <input type="checkbox"/> 27 <input type="checkbox"/> 81
15.	$(5^9)^6 = ?$ <input type="checkbox"/> $5^{15}$ <input type="checkbox"/> $5^{54}$ <input type="checkbox"/> $5^{69}$ <input type="checkbox"/> $5^{96}$
16.	$(3^5)^4 = ?$ <div style="text-align: right;"><input type="text"/></div>
17.	$\frac{10^3 \times 10^9}{10^2} = ?$ <input type="checkbox"/> $1^6$ <input type="checkbox"/> $10^6$ <input type="checkbox"/> $10^8$ <input type="checkbox"/> $10^{10}$

18.

Simplify  $\frac{8^8 \times 8^9}{8^{12}}$ .

  

19.

$$\frac{12^{11} \times 12^5}{12^2 \times 12^3} = ?$$

☐  $12^2$

☐  $12^3$

☐  $12^{11}$

☐  $12^{12}$

20.

Simplify  $\frac{8^5 \times 8^9}{(8^4)^2}$ .

# High School Mathematics Test 2014

## Indices ANSWERS

Non Calculator Section ( 1 mark each)
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Q no		Answer
1.	$5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 = 5^7$	3 <sup>rd</sup> Answer
2.	$4^5 = 4 \times 4 \times 4 \times 4 \times 4$	2 <sup>nd</sup> Answer
3.	$6 \times 6 \times 6 \times 6 = 6^4$	$6^4$
4.	$2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 = 2^5 \times 3^4$	4 <sup>th</sup> Answer
5.	$6^5 \times 6^7 = 6^{12}$	2 <sup>nd</sup> Answer
6.	$7^3 \times 7^5 = 7^8$	$7^8$
7.	$3^{16} \div 3^8 = 3^8$	3 <sup>rd</sup> Answer
8.	$\frac{8^7}{8^4} = 8^3$	$8^3$
9.	$5^{18} \div 5^9 = 5^9$	4 <sup>th</sup> Answer
10.	$7^{15} \times 7^3 \times 7^2 = 7^{20}$	$7^{20}$
11.	$2^9 \times 2^5 \times 2^{10} = 2^{24}$	2 <sup>nd</sup> Answer
12.	$8^{15} \div 8^{14} = 8^1 = 8$	8

13.	$6^8 \div 6^8 = 6^0 = 1$	3 <sup>rd</sup> Answer
14.	$7^{10} \div 7^{10} = 7^0 = 1$	$7^0 = 1$
15.	$\frac{3^5 \times 3^7}{3^6} = \frac{3^{12}}{3^6} = 3^6$	2 <sup>nd</sup> Answer
16.	$\frac{5^6 \times 5^8}{5^3} = \frac{5^{14}}{5^3} = 5^{11}$	$5^{11}$
17.	$(2^5)^3 = 2^{5 \times 3} = 2^{15}$	4 <sup>th</sup> Answer
18.	$(7^8)^4 = 7^{8 \times 4} = 7^{32}$	$7^{32}$
19.	$(2^2 \times 2^3)^4 = (2^5)^4 = 2^{20}$	1 <sup>st</sup> Answer
20.	$\left(\frac{5^{12}}{5^3}\right)^4 = (5^9)^4 = 5^{36}$	$5^{36}$



# High School Mathematics Test 2014

Calculator Allowed Short Answer Section ( 1 mark each)
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Q no		Answer
1.	$3^6 = 729$	4 <sup>th</sup> Answer
2.	$4^8 = 65\,536$	65 536
3.	$2^{17} \times 2^{28} = 2^{45}$	3 <sup>rd</sup> Answer
4.	$6.5^9 \times 6.5^{12} = 6.5^{21}$	$6.5^{21}$
5.	$5^{39} \div 5^{13} = 5^{26}$	3 <sup>rd</sup> Answer
6.	$7^{39} \div 7^{37} = 7^2 = 49$	$7^2 = 49$
7.	$\frac{8^{99}}{8^{11}} = 8^{88}$	3 <sup>rd</sup> Answer
8.	$8^3 \times 8^4 \times 8^5 = 8^{12}$	1 <sup>st</sup> Answer
9.	$6^7 \times 6^5 \times 6^8 = 6^{20}$	$6^{20}$
10.	$18^5 \div 18^5 = 18^0 = 1$	2 <sup>nd</sup> Answer
11.	$2.45^0 = 1$	1
12.	$75^0 = 1$	1 <sup>st</sup> Answer
13.	$2^{18} \div 2^6 \div 2^3 = 2^{12} \div 2^3 = 2^9$	$2^9$

14.	When $p = 3$ ; $\frac{p^{12}}{p^9} = p^3 = 3^3 = 27$	3 <sup>rd</sup> Answer
15.	$(5^9)^6 = 5^{54}$	2 <sup>nd</sup> Answer
16.	$(3^5)^4 = 3^{20}$	$3^{20}$
17.	$\frac{10^3 \times 10^9}{10^2} = \frac{10^{12}}{10^2} = 10^{10}$	4 <sup>th</sup> Answer
18.	$\frac{8^8 \times 8^9}{8^{12}} = \frac{8^{17}}{8^{12}} = 8^5$	$8^5$
19.	$\frac{12^{11} \times 12^5}{12^2 \times 12^3} = \frac{12^{16}}{12^5} = 12^{11}$	3 <sup>rd</sup> Answer
20.	$\frac{8^5 \times 8^9}{(8^4)^2} = \frac{8^{14}}{8^8} = 8^6$	$8^6$