

Y8 – Spring – Block 5 – Step 1 – Investigate positive powers of 10 Answers

Question	Answer
1	
2	
3	<p>a) 100 thousand    10 million    <math>10^8</math>    1 billion    10,000,000,000  b) <math>10^7</math>    100 million    1 billion    <math>10^{10}</math>    1,000,000,000,000</p>
4	<p>a) <math>1,000 \times 10 = 10,000 = 10^4</math>  <math>1,000 \times 100 = 100,000 = 10^5</math>  <math>1,000 \times 1,000 = 1,000,000 = 10^6</math>  <math>1,000 \times 10,000 = 10,000,000 = 10^7</math>  b) <math>100 \times 10,000 = 1,000,000 = 10^6</math>  <math>1,000 \times 10,000 = 10,000,000 = 10^7</math>  <math>100,000 \times 10,000 = 1,000,000,000 = 10^9</math></p>
5	<p>a) <math>1,000,000 \div 10 = 100,000 = 10^5</math>  <math>1,000,000 \div 100 = 10,000 = 10^4</math>  <math>1,000,000 \div 1,000 = 1,000 = 10^3</math>  <math>1,000,000 \div 10,000 = 100 = 10^2</math>  b) <math>100,000,000 \div 100 = 1,000,000 = 10^6</math>  <math>1,000,000,000 \div 1,000 = 1,000,000 = 10^6</math>  <math>100,000,000 \div 100,000 = 1,000 = 10^3</math></p>

Y8 – Spring – Block 5 – Step 1 – Investigate positive powers of 10 Answers (continued)

Question	Answer
6	a) 6,000,000 b) 8,000,000 c) 100,000,000
7	a) To multiply by 10, we move the digits 1 place to the left, which is not the same as adding a zero. b) 26      260 c) $2.6 \times 10,000 = 26,000$ $3.74 \times 10 = 37.4$ $3.74 \times 1,000 = 3,740$ $3.6 \times 10,000 = 36,000$ $3.74 \times 100 = 374$  $3.74 \times 10,000 = 37,400$ $1.8 \times 10^4 = 18,000$ $1.8 \times 10^6 = 1,800,000$ $1.8 \times 10^5 = 180,000$ $1.85 \times 10^6 = 1,850,000$

Question	Answer
1	a) $30,000 = 3 \times 10,000 = 3 \times 10^4$ b) $600,000 = 6 \times 100,000 = 6 \times 10^5$ c) $700 = 7 \times 100 = 7 \times 10^2$ d) $8,000,000 = 8 \times 1,000,000 = 8 \times 10^6$ e) three hundred thousand = $3 \times 100,000 = 3 \times 10^5$ f) four billion = $4 \times 1,000,000,000 = 4 \times 10^9$ g) twenty million = $2 \times 10,000,000 = 2 \times 10^7$
2	<div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; margin: 5px;"><math>50 \times 10^7</math> ✓</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;"><math>5 \times 10^{\frac{3}{4}}</math> ✓</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;"><math>0.5 \times 10^3</math> ✓</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;"><math>5 \times 10^6</math></div> <div style="border: 1px solid black; padding: 5px; margin: 5px;"><math>\frac{3}{4} \times 10^5</math> ✓</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;"><math>6 \times 10^{72}</math></div> <div style="border: 1px solid black; padding: 5px; margin: 5px;"><math>9 \times 10^{1.5}</math> ✓</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;"><math>1 \times 10^1</math></div> </div>
3	a) < b) > c) = d) = e) >
4	a) 900,000 b) 80,000,000 c) 400,000,000 d) 6,000 e) 700 f) 1,000,000
5	a) $60,000 = 6 \times 10,000 = 6 \times 10^4$ b) $70,000 = 7 \times 10,000 = 7 \times 10^4$ c) $65,000 = 6.5 \times 10,000 = 6.5 \times 10^4$ d) $63,000 = 6.3 \times 10,000 = 6.3 \times 10^4$ e) $780,000 = 7.8 \times 100,000 = 7.8 \times 10^5$ f) $9,900 = 9.9 \times 1,000 = 9.9 \times 10^3$ g) $680,000 = 6.8 \times 100,000 = 6.8 \times 10^5$ h) $834,000,000 = 8.34 \times 100,000,000 = 8.34 \times 10^8$
6	a) $5 \times 10^4$ b) $5.3 \times 10^4$ c) $5.32 \times 10^4$ d) $5 \times 10^5$ e) $5.2 \times 10^5$ f) $5.02 \times 10^5$

Y8 – Spring – Block 5 – Step 2 – Work with numbers greater than 1 in standard form Answers

Question	Answer
7	a) 400,000 b) 410,000 c) 401,000 d) 400,100 e) 6,100 f) 61,000 g) 610,000 h) 160,000
8	a) $5.8 \times 10^7$ km b) 4,500,000,000 km c) $3.9 \times 10^{13}$
9	a) No. $9 \times 10^5 = 900,000$ $2 \times 10^6 = 2,000,000$ $2,000,000 > 900,000$ The power of 10 is higher in $2 \times 10^6$ , so $2 \times 10^6$ is greater. b) $4.2 \times 10^5$ $4 \times 10^7$ 401 million    410,000,000    4 billion $8.8 \times 10^7$ 800 million    8 billion $8 \times 10^{10}$ 800,000,000,000
10	a) $3 \times 10^5$ b) $2 \times 10^7$ c) $2.3 \times 10^7$ d) $7 \times 10^5$ e) $8 \times 10^4$ f) $9.17 \times 10^5$

Y8 – Spring – Block 5 – Step 3 – Investigate negative powers of 10 Answers

Question	Answer
1	$10^{-2} = \frac{1}{10^2} = \frac{1}{100}$ $10^{-3} = \frac{1}{10^3} = \frac{1}{1000}$ $10^{-4} = \frac{1}{10^4} = \frac{1}{10000}$
2	
3	
4	<p>a) <math>\frac{1}{10000}</math> <math>\frac{1}{1000}</math> <math>10^{-2}</math> 1 tenth 1 hundred</p> <p>b) <math>10^{-5}</math> <math>10^{-4}</math> 1 thousandth <math>\frac{1}{100}</math> <math>10^3</math></p>
5	<p>No. Tommy needs to compare the powers of 10. <math>-4</math> is less than <math>3</math>, so <math>10^{-4}</math> is less than <math>10^3</math></p> <p>a) <math>&lt;</math> b) <math>&gt;</math> c) <math>&gt;</math> d) <math>&lt;</math> e) <math>&gt;</math> f) <math>&lt;</math></p>

Y8 – Spring – Block 5 – Step 3 – Investigate negative powers of 10 Answers (continued)

Question	Answer
6	<p>a) <math>10^{-3} \times 10</math>  <math>= \frac{1}{1000} \times 10</math>  <math>= \frac{10}{1000}</math>  <math>= \frac{1}{100} = 0.01 = 10^{-2}</math></p> <p>b) <math>10^{-3} \div 10</math>  <math>= \frac{1}{1000} \div 10</math>  <math>= \frac{1}{10000} = 0.0001 = 10^{-4}</math></p> <p>Multiplying by 10 increases the index by 1          Dividing by 10 decreases the index by 1</p>
7	<p>a) <math>10^{-3}</math>          b) <math>10^{-2}</math>          c) <math>10^{-1}</math>          d) <math>10^{-5}</math>          e) <math>10^{-6}</math>          f) <math>10^{-9}</math></p>
8	<p>a) No.  <math>10^2 + 10^{-2} = 100 + 0.01 = 100.01</math></p> <p>b) No.          Any number to the power 0 is 1</p>

Question	Answer								
1	a) $0.007 = 7 \times 0.001 = 7 \times 10^{-3}$ b) $0.06 = 6 \times 0.01 = 6 \times 10^{-2}$ c) $0.0008 = 8 \times 0.0001 = 8 \times 10^{-4}$ d) $0.0000004 = 4 \times 0.0000001 = 4 \times 10^{-7}$ e) $\frac{7}{10000} = 7 \times 0.0001 = 7 \times 10^{-4}$ f) three thousandths = $3 \times 0.001 = 3 \times 10^{-3}$ g) 2 millionths = $2 \times 0.000001 = 2 \times 10^{-6}$								
2	<table border="0" style="width: 100%; text-align: center;"> <tr> <td style="border: 1px solid black; padding: 5px;"><math>4 \times 10^{-27}</math></td> <td style="border: 1px solid black; padding: 5px;"><math>6 \times 10^{-\frac{3}{4}}</math> ✓</td> <td style="border: 1px solid black; padding: 5px;"><math>0.05 \times 10^{-2}</math> ✓</td> <td style="border: 1px solid black; padding: 5px;"><math>5.4 \times 10^{-6}</math></td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;"><math>7 \times 10^5</math></td> <td style="border: 1px solid black; padding: 5px;"><math>1.6 \times 10^{-0.4}</math> ✓</td> <td style="border: 1px solid black; padding: 5px;"><math>10 \times 10^{-1.5}</math> ✓</td> <td style="border: 1px solid black; padding: 5px;"><math>10 \times 10^{-1}</math> ✓</td> </tr> </table>	$4 \times 10^{-27}$	$6 \times 10^{-\frac{3}{4}}$ ✓	$0.05 \times 10^{-2}$ ✓	$5.4 \times 10^{-6}$	$7 \times 10^5$	$1.6 \times 10^{-0.4}$ ✓	$10 \times 10^{-1.5}$ ✓	$10 \times 10^{-1}$ ✓
$4 \times 10^{-27}$	$6 \times 10^{-\frac{3}{4}}$ ✓	$0.05 \times 10^{-2}$ ✓	$5.4 \times 10^{-6}$						
$7 \times 10^5$	$1.6 \times 10^{-0.4}$ ✓	$10 \times 10^{-1.5}$ ✓	$10 \times 10^{-1}$ ✓						
3	a) = b) < c) < d) = e) =								
4	a) 0.006 b) 0.0007 c) 0.00008 d) 0.05 e) 0.000008 f) 0.1								
5	a) $0.008 = 8 \times 0.001 = 8 \times 10^{-3}$ b) $0.009 = 9 \times 0.001 = 9 \times 10^{-3}$ c) $0.0085 = 8.5 \times 0.001 = 8.5 \times 10^{-3}$ d) $0.0083 = 8.3 \times 0.001 = 8.3 \times 10^{-3}$ e) $0.027 = 2.7 \times 0.01 = 2.7 \times 10^{-2}$ f) $0.000062 = 6.2 \times 0.00001 = 6.2 \times 10^{-5}$ g) $0.67 = 6.7 \times 0.1 = 6.7 \times 10^{-1}$ h) $0.00000056 = 5.6 \times 0.0000001 = 5.6 \times 10^{-7}$								
6	a) $4 \times 10^{-4}$ b) $4.3 \times 10^{-4}$ c) $4.37 \times 10^{-4}$ d) $2 \times 10^{-3}$ e) $2.1 \times 10^{-3}$ f) $2.01 \times 10^{-3}$								

**Y8 – Spring – Block 5 – Step 4 – Work with numbers between 0 and 1 in standard form Answers**  
**(continued)**

Question	Answer
7	a) 0.003 b) 0.0031 c) 0.00381 d) 0.000827 e) 0.0000827 f) 0.00008207
8	a) $5 \times 10^{-5}$ m b) 0.000008 c) $8.7 \times 10^{-16}$
9	a) Yes. $6 \times 10^{-4} = 0.0006$ $8 \times 10^{-3} = 0.008$ $0.0006 < 0.008$ b) $7 \times 10^{-7}$ 0.007    0.017    7 hundredths $7.5 \times 10^{-2}$ $6 \times 10^{-7}$ 0.000000667    6 millionths $6.6 \times 10^{-6}$ $\frac{6}{100000}$
10	a) $7 \times 10^{-5}$ $7 \times 10^{-3}$ $7 \times 10^{-6}$ b) $6 \times 10^{-4}$ $6 \times 10^{-5}$ $6 \times 10^{-1}$ c) $5.38 \times 10^{-3}$ $5.38 \times 10^{-2}$ $5.38 \times 10^{-6}$



**Y8 – Spring – Block 5 – Step 5 – Compare and order numbers in standard form Answers**

Question	Answer
1	<p>Yes.  <math>5 \times 10^4 = 50,000</math>    <math>6.7 \times 10^3 = 6,700</math>  <math>50,000 &gt; 6,700</math>                      The power of 10 in <math>5 \times 10^4</math> is greater than the power of 10 in <math>6.7 \times 10^3</math>                      a) <math>&lt;</math>                      b) <math>&gt;</math>                      c) <math>=</math>                      d) <math>&gt;</math></p>
2	<p>Yes.  <math>3 \times 10^{-2} = 0.03</math>    <math>4 \times 10^{-3} = 0.004</math>  <math>0.03 &gt; 0.004</math>                      The power of 10 in <math>3 \times 10^{-2}</math> is greater than the power of 10 in <math>4 \times 10^{-3}</math>                      a) <math>&gt;</math>                      b) <math>&gt;</math>                      c) <math>=</math>                      d) <math>&lt;</math></p>
3	<p>a) <math>10</math>                      <math>10^6</math> ✓                      b) <math>10^3</math> ✓                  <math>10^{-3}</math>                      c) <math>10^{-3}</math> ✓                <math>10^{-4}</math>                      d) <math>9.4 \times 10^3</math>              <math>4.9 \times 10^4</math> ✓                      e) <math>9.4 \times 10^{-3}</math>              <math>4.9 \times 10^4</math> ✓                      f) <math>9.4 \times 10^{-3}</math> ✓            <math>4.9 \times 10^{-4}</math></p>
4	4.06    4.169    4.56    4.6
5	<p>a) <math>8.9 \times 10^{11}</math>              <math>2 \times 10^{12}</math>              <math>5.39 \times 10^{12}</math> ✓              <math>9 \times 10^{11}</math>                      b) <math>6.48 \times 10^{10}</math>              <math>6.3 \times 10^{11}</math>              <math>6.4 \times 10^9</math> ✓              <math>6.014 \times 10^{10}</math> ✓                      c) <math>5.2 \times 10^{-3}</math>              <math>5.2 \times 10^{-1}</math> ✓              <math>5.22 \times 10^{-2}</math> ✓              <math>5.21 \times 10^{-2}</math> ✓                      d) <math>3.5 \times 10^{-3}</math> ✓              <math>3.59 \times 10^{-3}</math> ✓              <math>3.6 \times 10^{-3}</math>              <math>3.6 \times 10^{-2}</math></p>
6	<p>a) <math>3.47 \times 10^6</math>    <math>3.5 \times 10^6</math>    <math>3.4 \times 10^7</math>    <math>3 \times 10^8</math>                      b) <math>2.14 \times 10^{-2}</math>    <math>2.4 \times 10^{-2}</math>    <math>2.05 \times 10^{-1}</math>    <math>2.41 \times 10^{-1}</math>                      c) <math>8.5 \times 10^{-2}</math>    <math>8.5 \times 10^{-1}</math>    <math>8.051 \times 10^1</math>    <math>8.5 \times 10^2</math></p>
7	<p>a) Mercury, Mars, Venus, Earth, Uranus, Neptune, Saturn, Jupiter                      b) electron, proton, neutron</p>

Y8 – Spring – Block 5 – Step 6 – Mentally calculate with numbers in standard form Answers

Question	Answer
1	a) Q1: He has multiplied the powers instead of adding them. correct answer: $3^{11}$ Q2: He has divided the powers instead of subtracting them. correct answer: $7^6$ Q3: He has multiplied the bases, but the base number should stay the same. correct answer: $2^{11}$ Q4: He has assumed that $6 = 6^0$ , not $6^1$ correct answer: $6^7$ b) $5^{13}$ $8^3$ $10^7$ $10^2$
2	a) $7 \times 10^5$ b) $7 \times 10^6$ c) $7 \times 10^2$ d) $3.5 \times 10^{-5}$ e) $3.5 \times 10^{-7}$ f) $3.5 \times 10^{-3}$
3	a) $9 \times 10^6$ b) $8 \times 10^{-3}$ c) $6.8 \times 10^8$ d) $8.4 \times 10^5$ e) $9.6 \times 10^{-7}$ f) $8 \times 10^3$
4	a) Yes. $30 \times 10^4 = 3 \times 10 \times 10^4 = 3 \times 10^5$ b) $20 \times 10^6 = 2 \times 10 \times 10^6 = 2 \times 10^7$
5	a) $5 \times 10^5$ b) $2 \times 10^9$ c) $2 \times 10^{-3}$ d) $4 \times 10^{-1}$
6	a) $4.6 \times 10^4$ b) $3.5 \times 10^3 \times 10^7$ $= 3.5 \times 10^{10}$ c) $2.1 \times 10^2 \times 10^{-4}$ $= 2.1 \times 10^{-2}$ d) $7 \times 10^4$ e) $8.2 \times 10^{-2} \times 10^9$ $= 8.2 \times 10^7$ f) $6 \times 10^{-3} \times 10^{-4}$ $= 6 \times 10^{-7}$ The digits in the number part of the standard form number stay the same.

Question	Answer
7	a) $4 \times 10^6$ b) $4.2 \times 10^6$ c) $1.5 \times 10^{-6}$ d) $1 \times 10^6$ e) $2 \times 10^{-5}$ f) $8 \times 10^7$

Y8 – Spring – Block 5 – Step 7 – Add and subtract numbers in standard form Answers

Question	Answer
1	a) 101,010 b) 320,700 c) 315 d) 314
2	Rosie $2 \times 10^7 + 3 \times 10^7 = 20,000,000 + 30,000,000 = 50,000,000 = 5 \times 10^7$ a) $7 \times 10^6$ b) $9 \times 10^{-2}$ c) $9 \times 10^4$ d) $9.3 \times 10^5$ e) $5 \times 10^7$ f) $4 \times 10^{-4}$
3	$12 \times 10^5 = 1.2 \times 10 \times 10^5 = 1.2 \times 10^6$ a) $1.7 \times 10^7$ b) $1.7 \times 10^5$ c) $1.7 \times 10^{-1}$ d) $1.7 \times 10^{-4}$
4	a) Jack has used the wrong place values for 45,000 and has added 450,000 instead. b) $3.85 \times 10^5$
5	a) $2.93 \times 10^5$ b) $3.65 \times 10^6$ c) $2.87 \times 10^{-2}$ d) $7.59 \times 10^{-3}$ e) $2.17 \times 10^5$ f) $5.73 \times 10^4$ g) $5.73 \times 10^{-2}$ h) $7.02 \times 10^{-4}$
6	a) 12                      1.2                      84 <b>8.4</b> b) 1                              7 <b>8</b> 15

Y8 – Spring – Block 5 – Step 8 – Multiply and divide numbers in standard form Answers

Question	Answer
1	a) $6 \times 10^6$ $6 \times 10^{12}$ $32 \times 10^6$ $32 \times 10^{12}$ b) $9 \times 10^5$ $9 \times 10^6$ $9 \times 10^{50}$ $90 \times 10^{50}$ c) $4 \times 10^3$ $4 \times 10^6$ $6 \times 10^6$ $8 \times 10^3$ d) $0.5 \times 10^{-3}$ $5 \times 10^{-3}$ $0.5 \times 10^6$ $5 \times 10^6$
2	Students need to justify why they prefer one method over the other.
3	a) $8 \times 10^{11}$ b) $6 \times 10^{12}$ c) $9 \times 10^3$ d) $8.2 \times 10^3$
4	a) $1.5 \times 10^{10}$ b) $4.8 \times 10^{12}$ c) $1.24 \times 10^{12}$ d) $3.2 \times 10^4$
5	Students need to justify why they prefer one method over the other.
6	a) $3 \times 10^2$ b) $2 \times 10^{-6}$ c) $4.5 \times 10^7$ d) $3 \times 10^{-10}$
7	$\frac{1}{2} \times 10^8$ $5 \times 10^7$ $5 \times 10^9$ $5 \times 10^4$
8	a) $5 \times 10^6$ b) $2.5 \times 10^7$ c) $5 \times 10^{-7}$ d) $7.5 \times 10^{-9}$
9	a) $>$ b) $<$ c) $<$
10	$4 \times 10^{27}$

Question	Answer
1	<p>a) <input type="text" value="3"/> <input type="text" value="."/> <input type="text" value="8"/> <input type="text" value="×10^x"/> <input type="text" value="1"/> <input type="text" value="0"/>      <input type="text" value="3"/> <input type="text" value="."/> <input type="text" value="8"/> <input type="text" value="×10^x"/> <input type="text" value="(-)"/> <input type="text" value="1"/> <input type="text" value="0"/></p> <p>b) 45,030,000 or <math>4.503 \times 10^7</math></p> <p>c) <math>1 \times 10^{29}</math></p> <p>Depending on the calculator, the answer to part b) may be shown as either an ordinary number or in standard form, but the answer to part c) can only be shown in standard form.</p>
2	<p>a) <math>4.665 \times 10^8</math></p> <p>b) <math>7.021 \times 10^{-3}</math></p> <p>c) <math>5.644 \times 10^{10}</math></p> <p>d) <math>4.4 \times 10^{11}</math></p> <p>e) <math>4.4 \times 10^3</math></p> <p>f) <math>4.4 \times 10^{21}</math></p>
3	<p>a) <math>9.74 \times 10^8</math></p> <p>b) <math>8.54 \times 10^8</math></p> <p>c) <math>9 \times 10^4</math></p> <p>d) <math>4 \times 10^{-12}</math></p> <p>e) <math>2.312 \times 10^{13}</math></p> <p>f) <math>5 \times 10^{-5}</math></p>
4	<p>a) <math>6.42 \times 10^{13}</math></p> <p>b) <math>5.58 \times 10^{13}</math></p> <p>c) <math>2.352 \times 10^{49}</math></p> <p>d) <math>3.36 \times 10^{50}</math></p> <p>e) <math>7.5 \times 10^{-25}</math></p> <p>f) <math>1.4112 \times 10^{63}</math></p> <p>g) <math>3.5952 \times 10^{50}</math></p> <p>h) <math>2.16 \times 10^{41}</math></p>
5	<p>a) <math>4.271 \times 10^7</math> m</p> <p>b) <math>1.56 \times 10^8</math> m (to 3 s.f.)</p> <p>c) <math>1.5 \times 10^4</math> seconds 15,000 seconds</p>
6	<p>a) <math>5 \times 10^9</math></p> <p>b) <math>2.5 \times 10^9</math></p> <p>c) <math>3 \times 10^{15}</math></p> <p>d) <math>2 \times 10^{-3}</math></p> <p>e) <math>4 \times 10^{-4}</math></p> <p>f) <math>1.5 \times 10^{-20}</math></p> <p>Parts c) and d) would be straightforward to work out without a calculator, because the number part is a square number and the index is even. The other parts could be changed into a form with a square number and an even index.</p>

Y8 – Spring – Block 5 – Step 9 – Use a calculator to work with numbers in standard form Answers  
(continued)

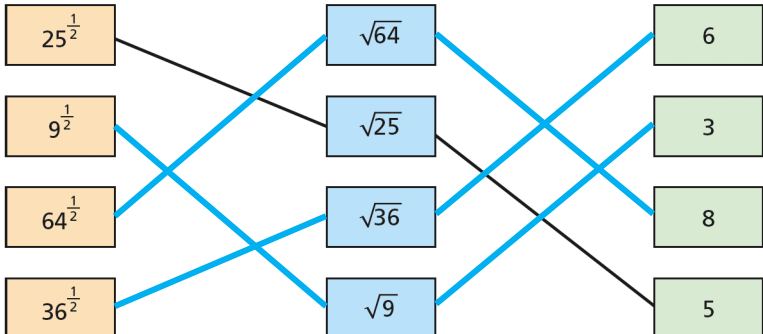
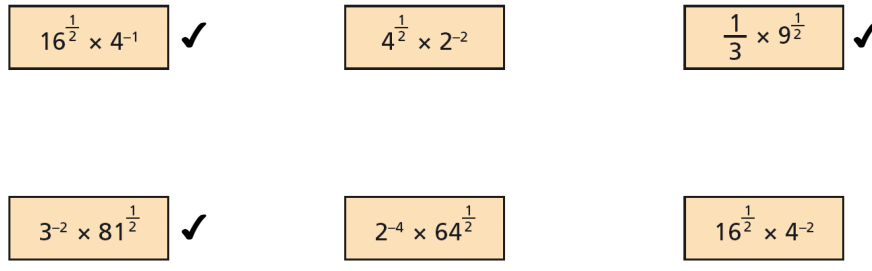


Question	Answer
7	a) $3 \times 10^{-2}$ g b) $4.3 \times 10^{18}$ g c) $1.43 \times 10^{20}$ (to 3 s.f.)

Question	Answer								
1	<p>a) <math>10^{-2} = \frac{1}{10^2} = \frac{1}{100}</math>  <math>10^{-3} = \frac{1}{10^3} = \frac{1}{1000}</math>  <math>10^{-4} = \frac{1}{10^4} = \frac{1}{10000}</math></p> <p>b) <math>3^0 = 1</math>  <math>3^{-1} = \frac{1}{3^1} = \frac{1}{3}</math>  <math>3^{-2} = \frac{1}{3^2} = \frac{1}{3} \times \frac{1}{3} = \frac{1}{9}</math>  <math>3^{-3} = \frac{1}{3^3} = \frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} = \frac{1}{27}</math></p> <p>c) <math>\frac{1}{3 \times 4}</math>                      <math>\frac{1}{3} \times -4</math>                      <math>\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} \times \frac{1}{3}</math></p>								
2									
3	<p>a) Mo</p> <p><math>5 \times 10^{-2} = 0.05</math>    <math>5^{-2} = \frac{1}{25} = 0.04</math></p> <p>b) <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>5</td> <td><math>\times 10^x</math></td> <td>(-)</td> <td>2</td> </tr> <tr> <td>5</td> <td><math>x^y</math></td> <td>(-)</td> <td>2</td> </tr> </table></p>	5	$\times 10^x$	(-)	2	5	$x^y$	(-)	2
5	$\times 10^x$	(-)	2						
5	$x^y$	(-)	2						
4	<p>a) <math>\frac{1}{16}</math>  b) <math>\frac{1}{8}</math>  c) <math>\frac{1}{7}</math>  d) 1</p>								
5	<p><math>\frac{1}{20}</math></p>								



Y8 - Spring - Block 5 - Step 10 - Understand and use negative indices Answers (continued)

Question	Answer
6	a) $<$ b) $>$ c) $>$ d) $=$ e) $<$
7	a) $\frac{8}{9}$ b) $1\frac{1}{8}$ c) $\frac{1}{20}$ d) 4
8	a) $4^{-3}$ $4^{-2}$ $4^{-1}$ $4^0$ $4^1$ b) $10^{-2}$ $7^{-2}$ $5^0$ $2^2$ $2^3$ c) $2 \times 3^{-1}$ $3 \times 2^{-1}$ $3 - 2^{-1}$ $3 + 2^{-1}$ $3 \div 2^{-1}$
9	a) $5 \times 10^7$ b) $2 \times 10^9$ c) $4 \times 10^8$

Question	Answer
1	a) $3^9$ b) $4^8$ c) $7^8$ d) $8^6$ e) $6^{16}$ f) $9^1$
2	a)  b) 8 $\frac{1}{16}$ <b>4</b> 16.5 c) <b>12</b> 72 $\frac{1}{144}$ $\frac{1}{12}$
3	a) 10 b) 9 c) 2 d) 7
4	a) 16 b) 1 c) 4 d) 0.2 e) 72 f) $\frac{2}{3}$
5	
6	a) $4^{\frac{1}{3}} = \sqrt[3]{4}$ b)  c) 

Y8 – Spring – Block 5 – Step 11 – Understand and use fractional indices Answers (continued)

Question	Answer												
7	a) 4 b) 2 c) 5 d) 1												
8	<table border="0" style="width: 100%; text-align: center;"> <tr> <td><math>15^{\frac{1}{3}}</math></td> <td><math>20^{\frac{1}{2}}</math></td> <td><math>64^{\frac{1}{2}}</math> ✓</td> <td><math>64^{\frac{1}{3}}</math> ✓</td> </tr> <tr> <td><math>21^{\frac{1}{3}}</math></td> <td><math>27^{\frac{1}{3}}</math> ✓</td> <td><math>49^{\frac{1}{2}}</math> ✓</td> <td><math>49^{\frac{1}{3}}</math></td> </tr> <tr> <td><math>60^{\frac{1}{3}}</math></td> <td><math>60^{\frac{1}{2}}</math></td> <td><math>25^{\frac{1}{3}}</math></td> <td><math>25^{\frac{1}{2}}</math> ✓</td> </tr> </table>	$15^{\frac{1}{3}}$	$20^{\frac{1}{2}}$	$64^{\frac{1}{2}}$ ✓	$64^{\frac{1}{3}}$ ✓	$21^{\frac{1}{3}}$	$27^{\frac{1}{3}}$ ✓	$49^{\frac{1}{2}}$ ✓	$49^{\frac{1}{3}}$	$60^{\frac{1}{3}}$	$60^{\frac{1}{2}}$	$25^{\frac{1}{3}}$	$25^{\frac{1}{2}}$ ✓
$15^{\frac{1}{3}}$	$20^{\frac{1}{2}}$	$64^{\frac{1}{2}}$ ✓	$64^{\frac{1}{3}}$ ✓										
$21^{\frac{1}{3}}$	$27^{\frac{1}{3}}$ ✓	$49^{\frac{1}{2}}$ ✓	$49^{\frac{1}{3}}$										
$60^{\frac{1}{3}}$	$60^{\frac{1}{2}}$	$25^{\frac{1}{3}}$	$25^{\frac{1}{2}}$ ✓										
9	a) 8 b) 10 c) 36 d) 1 e) $\frac{1}{3}$ f) 7 g) 0.5 h) 33												