PROBLEMS AND SOLUTIONS
INTRODUCTION TO IRRATIONAL AND IMAGINARY NUMBERS
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Please Send Questions and Comments to ingrid.stewart@csn.edu. Thank you!

PLEASE NOTE THAT YOU CANNOT USE A CALCULATOR ON THE ACCUPLACER - ELEMENTARY ALGEBRA TEST! YOU MUST BE ABLE TO DO THE FOLLOWING PROBLEMS WITHOUT A CALCULATOR!

Problem 1:
If possible, find the square root of $144$.

Problem 2:
If possible, find the cube root of $-27$.

Problem 3:
If possible, find the cube root of $144$ rounded to three decimal places.

Problem 4:
If possible, find the cube root of $-7$ rounded to three decimal places.

Problem 5:
Given the number $81$, find its square root, cube root, and 4th root, if possible. Round to three decimal places, if necessary.

Problem 6:
If possible, find the square root of $-81$.

Problem 7:
If possible, find the square root of $-3$.

Problem 8:
Given the number $-64$, find its square root and cube root, if possible.
Problem 9:
Write \( \sqrt[4]{81} \) as an exponential expression and simplify.

Problem 10:
Write \( \sqrt[3]{27} \) as an exponential expression and simplify.

Problem 11:
Write \( \sqrt{9} \) as an exponential expression and simplify.

Problem 12:
Write \( \sqrt{y^{10}} \) as an exponential expression and simplify.

Problem 13:
Write \( \sqrt[\frac{x}{y^6}] \) as an exponential expression and simplify.

Problem 14:
Write \( \sqrt[4]{16b^8} \) as an exponential expression and simplify.

**NOTE:** It is expected that you have permanently committed to memory the following values:

\[
\begin{align*}
2^2 &= 4 & 2^3 &= 8 & 2^4 &= 16 & 2^5 &= 32 & 2^6 &= 64 \\
3^2 &= 9 & 3^3 &= 27 & 3^4 &= 81 \\
4^2 &= 16 & 4^3 &= 64 \\
5^2 &= 25 & 5^3 &= 125 \\
6^2 &= 36 & 7^2 &= 49 & 8^2 &= 64 & 9^2 &= 81 & 10^2 &= 100 \\
11^2 &= 121 & 12^2 &= 144 & 13^2 &= 169 & 14^2 &= 196 & 15^2 &= 225 \\
16^2 &= 256 & 17^2 &= 289 & 18^2 &= 324 & 19^2 &= 361 & 20^2 &= 400
\end{align*}
\]

Problem 15:
Write \( \sqrt[3]{27x^2y^6} \) as an exponential expression and simplify.
Problem 16:
Write $\sqrt[3]{x^2}$ as an exponential expression.

Problem 17:
Write $\sqrt[4]{a^3}$ as an exponential expression.

Problem 18:
Write $\sqrt[3]{a^3}$ as an exponential expression.

SOLUTIONS
You can find detailed solutions below the link for this problem set!

<p>| | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1.</td>
<td>12</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>5.241</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>-1.913</td>
<td>5.</td>
</tr>
<tr>
<td>6.</td>
<td>Imaginary Number</td>
<td></td>
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<tr>
<td>7.</td>
<td>Imaginary Number</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Imaginary Number, -4</td>
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</tr>
<tr>
<td>9.</td>
<td>81 $^{\frac{1}{4}}$, 3</td>
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</tr>
<tr>
<td>10.</td>
<td>$27^{\frac{1}{3}}, 3$</td>
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<tr>
<td>11.</td>
<td>$9^{\frac{1}{2}}, 3$</td>
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<tr>
<td>12.</td>
<td>$y^5$</td>
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<tr>
<td>13.</td>
<td>$\frac{x}{y^{\frac{3}{2}}}$</td>
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<tr>
<td>14.</td>
<td>$2b^2$</td>
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</tr>
<tr>
<td>15.</td>
<td>$3x^{\frac{2}{3}}y^{\frac{1}{2}}$</td>
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<tr>
<td>16.</td>
<td>$x^\frac{2}{3}$</td>
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<tr>
<td>17.</td>
<td>$a^\frac{3}{4}$</td>
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</tr>
<tr>
<td>18.</td>
<td>$a^2$</td>
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