

**Radicals & Exponents**

Completely show all work and reasoning. Use a pencil and highlight your answers.

1. Rewrite each without the fractional exponent.

a)  $2^{\frac{5}{3}}$

b)  $x^{\frac{3}{4}}$

c)  $19^{\frac{1}{2}}$

d)  $4^{\frac{6}{7}}$

2. Rewrite each without the radical.

a)  $\sqrt[3]{50}$

b)  $\sqrt[7]{5^{11}}$

c)  $\sqrt[8]{70^3}$

d)  $\sqrt[5]{2^9}$

3. Simplify each expression WITHOUT a calculator. Your answer should still be in exponential form.

a)  $8^{\frac{5}{3}}$

b)  $625^{\frac{3}{2}}$

c)  $64^{\frac{2}{3}}$

4. Simplify each expression. The variables represent non-negative numbers.

a)  $\sqrt[3]{-343}$

b)  $\sqrt[7]{x^{21}}$

c)  $\sqrt[4]{\frac{x^8}{16}}$

d)  $\sqrt{40}$

e)  $\sqrt[3]{54}$

f)  $\sqrt[5]{64}$

g)  $\sqrt{c^7 d^9}$

h)  $\sqrt[8]{p^5 q^{19}}$

i)  $\sqrt[3]{\frac{y^{20}}{z^{12}}}$

5. Rewrite each expression with a single base.

a)  $5^x \cdot 5^7$

b)  $\frac{216^x}{6}$

c)  $81\left(\frac{1}{3}\right)^x$

6. Write at least one equivalent expression by deconstructing each exponent.

a)  $10^{-x+2}$

b)  $6^{\frac{x}{8}}$

c)  $2^{5x+1}$

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7. Haley has been studying the growth of a culture of bacteria. She knows the population has been consistently growing by 7% each day. Today she noted there are 450 bacteria in the culture.

a) Write recursive and explicit functions,  $P(t)$ , representing the growth over  $t$  hours.

Recursive:

Explicit:

c) How many bacteria are there 2 and a half days from now?

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b) How many bacteria are there 6 days from now?

d) How many bacteria were there 10 days ago?

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8. Factor completely.

a)  $y^2 - 14y + 49$

b)  $-27c^2 - 45c$

c)  $h^2 - 17h - 60$

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9. Solve for the variable by factoring and using the zero product property.

a)  $x^2 - 5x - 24 = 0$

b)  $a^2 - 81 = 0$

c)  $4w^2 + 22w = 0$