Polynomial Quiz Review

Solve for b:

1. $\sqrt{b+15} = \sqrt{3b+1}$

$\rightarrow (\sqrt{b+15})^2 = (\sqrt{3b+1})^2$ square both

$b+15 = 3b+1$ solve for b

$14 = 2b$

$\boxed{7 = b}$

check: check for extraneous solution

$\sqrt{7+15} = \sqrt{3 \cdot 7+1}$

$\sqrt{22} = \sqrt{22}$ ✓

2. $\sqrt{2x} = \sqrt{x-4}$ solve for x

$(\sqrt{2x})^2 = (\sqrt{x-4})^2$

$2x = x-4$

$x = -4$

check

$\sqrt{2 \cdot -4} = \sqrt{-4-4}$

$\sqrt{-8} = \sqrt{-8}$ $\rightarrow$ no real soluti

b/c of square root of neg. These graphs never intersec

Simplify.

3. $\sqrt[6]{256s^{11}t^{18}}$

$= \sqrt[6]{2^6 \cdot 2^2 \, s^6 \, s^5 (t^3)^6}$ $\rightarrow$ match as many gro of six as po

$2 \, s \, t^3 \sqrt[6]{4s^5}$

$\boxed{2s|t^3|\sqrt[6]{4s^5}}$ $\rightarrow |t^3|$ b/c a neg whole answer neg. The answer must be positive since we have an even index

s already has to be positive b/c s" would have made the whole problem invalid if s were neg.

Solve for w.

4. $\sqrt[3]{2w-1} + 11 = 18$

$\sqrt[3]{2w-1} = 7$ isolate radical

$\left(\sqrt[3]{2w-1}\right)^3 = 7^3$ cube both sides

$2w-1 = 343$

$2w = 344$

$\boxed{w = 172}$

→ no check required since an odd index won't have nonreal solutions

Simplify:

5 $243^{\frac{3}{5}} = \sqrt[5]{243^3}$

(not simplified) solve in calculator 5th root of 243^3

Convert to radical form:

6. $c^{\frac{1}{8}} = \sqrt[8]{c^1} = \boxed{\sqrt[8]{c}}$

denominator becomes index, numerator becomes power under radical.

Simplify.

7. $2\sqrt{12} - 3\sqrt{27} + 2\sqrt{48}$

$= 2\cdot 2\sqrt{3} - 3\cdot 3\sqrt{3} + 2\cdot 4\sqrt{3}$

$= 4\sqrt{3} - 9\sqrt{3} + 8\sqrt{3} = \boxed{3\sqrt{3}}$ combine like terms

simplify the radicals

12 → 4, 3; 27 → 9, 3; 48 → 16, 3

$\sqrt{12} = \sqrt{4\cdot 3} = 2\sqrt{3}$ $\sqrt{27} = \sqrt{9\cdot 3} = 3\sqrt{3}$ $\sqrt{48} = \sqrt{16\cdot 3} = 4\sqrt{3}$

Simplify.

8. $6\sqrt[3]{9n^2} \cdot 3\sqrt[3]{24n}$

$= 6\cdot 3\cdot \sqrt[3]{9n^2}\cdot\sqrt[3]{24n}$

$= 18\sqrt[3]{216n^3}$ → you can multiply under like indices

$= 18\sqrt[3]{6^3n^3}$

$= 18\cdot 6\cdot n$

$\boxed{=108n}$

9. $(5\sqrt{3}-6)(5\sqrt{3}+6)$

$25\cdot 3 \cancel{+30\sqrt{3}} \cancel{-30\sqrt{3}} - 36$

$75 - 36 = \boxed{39}$

* you can check this on your calculator

10. Simplify $\sqrt{-225}$

$= \sqrt{225} \cdot \sqrt{-1}$

$= \boxed{15i}$

11. Simplify $\sqrt{169x^8y^4}$

$= \sqrt{13^2(x^4)^2(y^2)^2}$

$\boxed{13x^4y^2}$

12. Simplify $\sqrt[3]{-64}$

$= \boxed{-4}$

check: $(-4)^3 = (-4)(-4)(-4)$

16

-64

*recall that odd indices can have negative roots!