Test 6 Simplify $\sqrt{-2160} = i\sqrt{2160}$

$= i\sqrt{2\cdot 2\cdot 2\cdot 2\cdot 3\cdot 3\cdot 3\cdot 5}$

$= i\cdot 2\cdot 2\cdot 3\sqrt{3\cdot 5} = \boxed{12i\sqrt{15}}$

2	2160
2	1080
2	540
2	270
3	135
3	45
3	15
	5

Assume $x \geq 0$

$\sqrt{x^3} = \sqrt{x\cdot x\cdot x} = x\sqrt{x}$

$\sqrt{x^3} = \sqrt{x^{2+1}} = \sqrt{x^2\cdot x^1} = x^{\frac{2}{2}}\sqrt{x} = x^1\sqrt{x} = x\sqrt{x}$

$\sqrt{x^{57}} = \sqrt{x^{56+1}} = \sqrt{x^{56}\cdot x^1} = x^{\frac{56}{2}}\sqrt{x} = x^{28}\sqrt{x}$

$\sqrt[3]{x^{57}} = x^{\frac{57}{3}} = x^{19}$ $\qquad \frac{57}{3} = 19$

$\sqrt[3]{x^{59}} = \sqrt[3]{x^{57+2}}$ $\qquad \frac{59}{3} = 19.\overline{666}$

$3\cdot 19 = 57$

$59 = 57 + 2$

$59 - 57 = 2$

$= \sqrt[3]{x^{57}\cdot x^2}$

$= x^{\frac{57}{3}}\sqrt[3]{x^2} = \boxed{x^{19}\sqrt[3]{x^2}}$

$\sqrt[5]{x^{57}} = \sqrt[5]{x^{55+2}} = x^{\frac{55}{5}}\sqrt[5]{x^2}$

$= x^{11}\sqrt[5]{x^2}$

(11)

$$\sqrt{-9}\,\sqrt{-2}$$
$$=(i\sqrt{9})(i\sqrt{2})$$
$$=i^2\sqrt{9}\sqrt{2}$$
$$=-1\cdot 3\sqrt{2} = -3\sqrt{2}$$

$\sqrt{a}\sqrt{b} = \sqrt{ab}$, if $\sqrt{a}$ & $\sqrt{b}$ are real. But here, they're NOT real.

$$(a+b)(a-b) = a^2-b^2$$
$$(a-b)^2 = a^2-2ab+b^2$$

$$(a+bi)(a-bi) = a^2-(bi)^2 = a^2-b^2i^2 = a^2+b^2$$

Write in the form $a+bi$

$$\frac{7+9i}{8+9i} = \left(\frac{7+9i}{8+9i}\right)\left(\frac{8-9i}{8-9i}\right) = \frac{56-63i+72i-81i^2}{8^2+9^2}$$

$$=\frac{56+9i+81}{64+81} = \boxed{\frac{137+9i}{145}}$$ is ok

$$=\boxed{\frac{137}{45}+\frac{9}{145}i}$$ is classier.

On test 6, we had

$\frac{7+9i}{6+9i}$. Do it.

$$\frac{(7+9i)(6-9i)}{6^2+9^2} = \frac{42-63i+54i-81i^2}{117}$$

+81

$$=\frac{123-9i}{117}$$

$(a+b)^2 = a^2+2ab+b^2$

9) $\sqrt{x} + 3 = \sqrt{x+39}$

$\underbrace{(\sqrt{x} + 3)}_{a+b}^2 = (\sqrt{x+39})^2$

$\underbrace{(\sqrt{x})^2}_{a^2} \underbrace{+}_{+} \underbrace{2(\sqrt{x})(3)}_{2ab} \underbrace{+}_{+} \underbrace{3^2}_{b^2} = x+39$

$x + 6\sqrt{x} + 9 = x + 39$

$6\sqrt{x} + 9 = 39$

$-9 = -9$

$6\sqrt{x} = 30$

$\sqrt{x} = \frac{30}{6} = 5$

$\sqrt{x} = 5$

$(\sqrt{x})^2 = 5^2$

$\boxed{x = 25}$

$\sqrt{x} + 3 = \sqrt{x+39}$

$\sqrt{25} + 3 = \sqrt{25+39}$

$5 + 3 = \sqrt{64}$

$8 = 8$ ✓

Solve $x^2-6x+8=0$ in 3 ways!

1. Factoring
2. Completing the square
3. Quadratic Formula.

$(a-b)^2 = a^2-2ab+b^2$

1. Factors of 8 that sum to −6

$(-2)(-4) = +8$

$-2-4=-6$

$x^2-6x+8 =$

$x^2-4x-2x+8 =$

$x(x-4)-2(x-4) =$

$(x-4)(x-2) = 0 \Longrightarrow$

$x=4$ oR $x=2$

2. $x^2-6x+8=0$

$x^2-6x = -8$

$\frac{6}{2}=3 \rightarrow 3^2 = 9$

$x^2-6x+3^2 = -8+9$

$(x-3)^2 = 1$

$x-3 = \pm\sqrt{1} = \pm 1$

$+3 \quad = +3$

$x = 3\pm 1$

$3+1 = \boxed{4=x}$ $3-1 = \boxed{2=x}$

③ $x^2 - 6x + 8 = 0$

$a = 1,\ b = -6,\ c = 8$

$b^2 - 4ac = (-6)^2 - 4(1)(8)$

$= 36 - 32 = 4$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-6) \pm \sqrt{4}}{2(1)}$

$= \frac{6 \pm 2}{2}$

$\frac{6+2}{2} = \frac{8}{2} = \boxed{4 = x}$

$\frac{6-2}{2} = \frac{4}{2} = \boxed{2 = x}$