6.2 - I will simplify roots

$\sqrt{50} = \sqrt{2 \cdot \boxed{5^2}} = \boxed{5\sqrt{2}}$

5 10
5 2

$\sqrt{108} = \sqrt{\boxed{2^2} \cdot \boxed{3^2} \cdot 3} = 2 \cdot 3\sqrt{3} = \boxed{6\sqrt{3}}$

9 12
3 3   3 4
2 2

$\sqrt{32} = \sqrt{\boxed{2^4} \cdot 2} = 2^2\sqrt{2} = \boxed{4\sqrt{2}}$

8   2
4 2   4 2
2 2   2 2

$\sqrt[3]{32} = \sqrt[3]{\boxed{2^3} \cdot 2^2} = \boxed{2\sqrt[3]{4}}$

8 4
4 2   2 2
2 2

$\sqrt[4]{32} = \sqrt[4]{\boxed{2^4} \cdot 2} = \boxed{2\sqrt[4]{2}}$

$\sqrt[5]{32} = \sqrt[5]{2^5} = \boxed{2}$

$$\sqrt{64x^4y^3z^6} = \boxed{8x^2yz^3\sqrt{y}}$$

$$y^2 \wedge y$$

$$\sqrt[3]{-162} = \sqrt[3]{-1 \cdot 2 \cdot 3^3 \cdot 3} = \boxed{-3\sqrt[3]{6}}$$

$$-1 \overset{\wedge}{} 162$$
$$2 \overset{\wedge}{} 81$$
$$9 \overset{\wedge}{} 9$$
$$3 \; 3 \quad 3 \; 3$$

$$\sqrt[5]{224r^7} = \sqrt[5]{2^5 \cdot 7 \cdot r^5 \cdot r^2} = \boxed{2r\sqrt[5]{7r^2}}$$

$$2 \overset{\wedge}{} 112$$
$$2 \overset{\wedge}{} 56$$
$$2 \overset{\wedge}{} 28$$
$$4 \overset{\wedge}{} 7$$
$$2 \; 2$$

$$\sqrt[4]{405x^3y^2} = \sqrt[4]{3^4 \cdot 5 \cdot x^3y^2} = \boxed{3\sqrt[4]{5x^3y^2}}$$

$$5 \overset{\wedge}{} 81$$
$$9 \overset{\wedge}{} 9$$
$$3 \; 3 \quad 3 \; 3$$

$$\sqrt[6]{448x^7y^7} = \sqrt[6]{2^6 \cdot 7 \cdot x^6 \cdot x \cdot y^6 \cdot y} = 2xy\sqrt[6]{7xy}$$

Factor tree for 448:
- 2, 224
- 2, 112
- 2, 56
- 2, 28
- 4, 7
- 2, 2

$$\sqrt[4]{128x^7y^7} = \sqrt[4]{2^4 \cdot 2^3 \cdot x^4 \cdot x^3 \cdot y^4 \cdot y^3} = 2xy\sqrt[4]{8x^3y^3}$$

Factor tree for 128:
- 2, 64
- 8, 8
- 4, 2, 4, 2
- 2, 2, 2, 2

$$\sqrt[3]{729x^{12}y^{16}} = \sqrt[3]{3^6 \cdot x^{12} \cdot y^{15} \cdot y} = 3^2x^4y^5\sqrt[3]{y}$$

$$= 9x^4y^5\sqrt[3]{y}$$

Factor tree for 729:
- 3, 243
- 3, 81
- 9, 9
- 3, 3, 3, 3

$$-3x\sqrt{-30x^4y^3z} = -3x\sqrt{-1 \cdot 30 \cdot x^4 \cdot y^2 \cdot y \cdot z}$$

$$= -3i\,x^3y\sqrt{30yz}$$

Factor tree for 30:
- -1, 30
- 6, 5
- 3, 2

WS