

1 a)  $4\sqrt{7} \rightarrow \sqrt{16}\sqrt{7} \rightarrow \boxed{\sqrt{112}}$   
 b)  $\boxed{5\sqrt{2}} \leftarrow \sqrt{25}\sqrt{2} \leftarrow \sqrt{50}$   
 c)  $-11\sqrt{8} \rightarrow \sqrt{121}\sqrt{8} \rightarrow \boxed{\sqrt{968}}$   
 d)  $\boxed{-10\sqrt{2}} \leftarrow -\sqrt{100}\sqrt{2} \leftarrow -\sqrt{200}$

2. a)  $\sqrt{56} = \sqrt{4}\sqrt{14} = 2\sqrt{14}$   
 b)  $3\sqrt{75} = 3\sqrt{25}\sqrt{3} = 15\sqrt{3}$   
 c) ~~Wrong question~~ Wrong question  
 c)  $\sqrt[3]{24} = \sqrt[3]{8}\sqrt[3]{3} = 2\sqrt[3]{3}$   
 d)  $\sqrt{c^3d^2} = \sqrt{c^2d^2}\sqrt{c} = cd\sqrt{c}$

3. a)  $3\sqrt{8m^4} = 3\sqrt{4m^4}\sqrt{2} = 3(2m^2)\sqrt{2} = 6m^2\sqrt{2}$  MER  
 b)  $\sqrt[3]{24q^5} = \sqrt[3]{8q^3}\sqrt[3]{3q^2} = 2q\sqrt[3]{3q^2}$  GER  
 c)  $-2\sqrt[5]{160s^5t^6} = -2\sqrt[5]{32s^5t^5}\sqrt[5]{5t} = -2(2st)\sqrt[5]{5t} = -4st\sqrt[5]{5t}$  s, t ∈ R

4 a)  $3n\sqrt{5} \rightarrow \sqrt{9n^2}\sqrt{5} \rightarrow \boxed{\sqrt{45n^2}}$   
 b)  $\sqrt[3]{-432} \rightarrow \sqrt[3]{-216}\sqrt[3]{2} \rightarrow \boxed{-6\sqrt[3]{2}}$   
 c)  $\frac{1}{20}\sqrt[3]{70} \rightarrow \sqrt[3]{\frac{1}{80^3}}\sqrt[3]{70} \rightarrow \sqrt[3]{\frac{70}{80^3}} \rightarrow \boxed{\sqrt[3]{\frac{7}{80^2}}}$   
 d)  $\sqrt[3]{128x^4} \rightarrow \sqrt[3]{64x^3}\sqrt[3]{2x} \rightarrow \boxed{4x\sqrt[3]{2x}}$

5. a)  $15\sqrt{5}, 8\sqrt{25}\sqrt{5} \rightarrow 15\sqrt{5}, 40\sqrt{5}$   
 b)  $8\sqrt{16z^4}\sqrt{7z^4}, 48\sqrt{7z^4} \rightarrow 32z^2\sqrt{7z^4}, 48\sqrt{7z^4}$  (works)  
 $32z^4\sqrt{7}, 48z^2\sqrt{7}$  (book)  
 c)  $-35\sqrt[4]{w^2}, 3\sqrt[4]{81w^8}\sqrt[4]{w^2} \rightarrow -35\sqrt[4]{w^2}, 9w^2\sqrt[4]{w^2}$   
 d)  $6\sqrt[3]{2}, 6\sqrt[3]{27}\sqrt[3]{2} \rightarrow 6\sqrt[3]{2}, 18\sqrt[3]{2}$

6 a)  $\sqrt{54}\sqrt{100}\sqrt{98}$   
 $\sqrt{54}\sqrt{98}\sqrt{100}$   
 $3\sqrt{6}, 7\sqrt{2}, 10$   
 b)  $-\sqrt{12}, -\sqrt{16}, -\sqrt{18}, -\sqrt{14}$   
 $-\sqrt{18}, -\sqrt{16}, -\sqrt{14}, -\sqrt{12}$   
 $-3\sqrt{2}, -4, -2\sqrt{\frac{7}{2}}, -2\sqrt{3}$

$$6c) \sqrt[3]{21} \sqrt[3]{54} \sqrt[3]{21.952} \sqrt[3]{40}$$

$$\sqrt[3]{21} \sqrt[3]{21.952} \sqrt[3]{40} \sqrt[3]{54}$$

$$\sqrt[3]{21}, 2.8, 2\sqrt[3]{5}, 3\sqrt[3]{2}$$

7. get decimals from calculator and put in order.

$$8a) 4\sqrt{5} \quad b) 10.4\sqrt{2} - 7 \quad c) -4\sqrt[4]{11} + 14 \quad d) -\frac{2}{3}\sqrt{6} + 2\sqrt{10}$$

$$9a) 3.5\sqrt{3} - 3\sqrt{3} \quad b) 2.3\sqrt{2} + 9\sqrt{7} - 3\sqrt{7}$$

$$15\sqrt{3} - 3\sqrt{3} \quad 6\sqrt{2} + 9\sqrt{7} - 3\sqrt{7}$$

$$12\sqrt{3} \quad 6\sqrt{2} + 6\sqrt{7}$$

$$c) -8.3\sqrt{5} + 22.5 - 4\sqrt{5}$$

$$-24\sqrt{5} + 22.5 - 4\sqrt{5}$$

$$22.5 - 28\sqrt{5}$$

$$d) \frac{2}{3} 3\sqrt[3]{3} + \frac{1}{4} 5\sqrt[3]{3} - 4 \cdot 3\sqrt{11} + 5\sqrt{11}$$

$$2\sqrt[3]{3} + \frac{5}{4}\sqrt[3]{3} - 12\sqrt{11} + 5\sqrt{11}$$

$$\frac{13}{4}\sqrt[3]{3} - 7\sqrt{11}$$

$$10a) 8\sqrt{a^3} \text{ or } 8a\sqrt{a} \quad (a \geq 0)$$

$$b) 3\sqrt{2}\sqrt{x} + 3 \cdot 2\sqrt{2}\sqrt{x} - \sqrt{x}$$

$$3\sqrt{2x} + 6\sqrt{2x} - \sqrt{x}$$

$$9\sqrt{2x} - \sqrt{x} \quad (x \geq 0)$$

$$c) -4 \cdot 5\sqrt[3]{5r} + 2r\sqrt[3]{5r}$$

$$-20\sqrt[3]{5r} + 2r\sqrt[3]{5r}$$

$$(-20 + 2r)\sqrt[3]{5r}$$

$$d) \frac{w}{5}(-4) + \frac{8w}{5} - \frac{2.5\sqrt{2w}}{5} - 4\sqrt{2w}$$

$$-\frac{4w}{5} + \frac{8w}{5} - 2\sqrt{2w} - 4\sqrt{2w}$$

$$\frac{4w}{5} - 6\sqrt{2w} \quad (w \geq 0)$$

pg 279

$$11. \quad W = 6.3 \sqrt{1013 - 965}$$
$$W = 6.3 \sqrt{48}$$
$$W = 25.2 \sqrt{3} \text{ m/s}$$

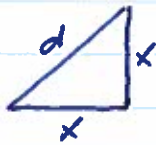
$$12. \quad 12^2 + 12^2 = h^2$$
$$288 = h^2$$
$$h = \sqrt{288} \quad h = \sqrt{144 \cdot 2} \quad h = 12\sqrt{2} \text{ cm}$$

$$13. \quad \sqrt[3]{25(704)^2} - \sqrt[3]{25(80)^2}$$
$$\sqrt[3]{25(64)(11)^2} - \sqrt[3]{25(8^2)(11)^2}$$
$$16 \sqrt[3]{25(11)^2} - 4 \sqrt[3]{25(11)^2}$$
$$12 \sqrt[3]{25(11)^2} \quad \text{or} \quad 12 \sqrt[3]{3025}$$

$$14. \quad \sqrt{120}$$
$$2\sqrt{30} \quad \text{or} \quad 10.95 \rightarrow \sim 11 \text{ seconds}$$

$$15a) \quad \pi r^2 = 38\pi$$
$$r^2 = 38$$
$$r = \sqrt{38} \quad \therefore d = 2\sqrt{38} \text{ m}$$

b) let  $x$  = edge

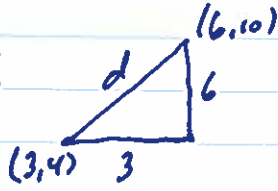


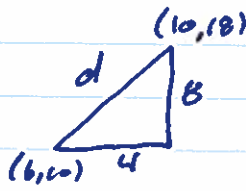
$$x^2 + x^2 = d^2$$
$$2x^2 = (2\sqrt{38})^2$$
$$2x^2 = 4(38)$$
$$x^2 = 2(38)$$
$$x^2 = 76$$

$$x = \sqrt{76} \quad x = 2\sqrt{19} \text{ m}$$
$$\therefore \text{perimeter} = 8\sqrt{19} \text{ m}$$

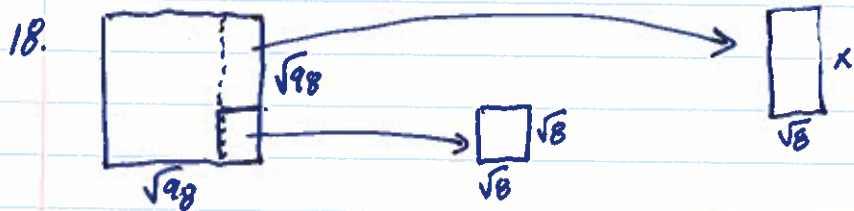
$$16. \quad \text{perimeter} = 8 + 10 + 12$$
$$\text{perimeter} = 30$$
$$\therefore s = 15 \text{ (half perimeter)}$$

$$A = \sqrt{15(7)(5)(3)}$$
$$A = \sqrt{15 \cdot 15 \cdot 7}$$
$$A = 15\sqrt{7} \text{ mm}^2$$

17.   $d^2 = 6^2 + 3^2$   
 $d^2 = 45$   
 $d = \sqrt{45}$   
 $d = 3\sqrt{5}$

  $d^2 = 8^2 + 4^2$   
 $d^2 = 80$   
 $d = \sqrt{80}$   
 $d = 4\sqrt{5}$

$\therefore$  travels  $7\sqrt{5}$



$$x = \sqrt{98} - \sqrt{8}$$

$$x = 7\sqrt{2} - 2\sqrt{2}$$

$$x = 5\sqrt{2}$$

$$\text{perimeter} = 2(5\sqrt{2} + 2\sqrt{2})$$

$$= 14\sqrt{2} \text{ m}$$

19.  $5y\sqrt{4y^3} \rightarrow 5y\sqrt{4y^2}\sqrt{y}$   
 $5y \cdot 2y\sqrt{y}$   
 $10y^2\sqrt{y}$

20.  $2\sqrt{216}$        $3\sqrt{96}$        $4\sqrt{58}$        $6\sqrt{24}$   
 $2\sqrt{36}\sqrt{6}$        $3\sqrt{16}\sqrt{6}$        $\uparrow$        $6\sqrt{4}\sqrt{6}$   
 $12\sqrt{6} \checkmark$        $12\sqrt{6} \checkmark$       6 is not a factor       $12\sqrt{6} \checkmark$