

6 a)

$$\frac{6}{\sqrt[3]{32a^5b^6c^{10}d}} \cdot \frac{\sqrt[3]{2ac^2d^2}}{\sqrt[3]{2ac^2d^2}}$$

10 a)  $9-i$

b)  $\frac{6+\sqrt{-18}}{3}$

$$= \frac{6+3i\sqrt{2}}{3}$$

$$= \boxed{2+i\sqrt{2}}$$

b)  $\frac{1}{\sqrt[6]{x^7y^{14}}} \cdot \frac{\sqrt[6]{x^5y^4}}{\sqrt[6]{x^5y^4}}$

7 a)  $7.3 \times 10^{10}$

b)  $5.6 \times 10^{-8}$

c)  $(2+3i)(6-2i)$   
 $12-4i+18i-6i^2$   
 $12+14i-6(-1)$   
 $\boxed{18+14i}$

8 a) 0.000436

b) 28,500,000

d)  $\frac{7+5i}{2+3i} \cdot \frac{2-3i}{2-3i}$

$$= \frac{14-2i+10i-15i^2}{4-6i+6i-9i^2}$$

$$= \frac{14+15+9i}{4+9} = \frac{29+9i}{13}$$

or  $\frac{29}{13} - \frac{11}{13}i$

9 a)  $\sqrt{x+4} - 6 = -4$

$$\sqrt{x+4} = 2$$

$$x+4 = 2^2 = 4$$

$$\boxed{x=0}$$

b)  $\sqrt{5x-x^2} = \sqrt{6}$

$$5x-x^2 = 6$$

$$0 = x^2 - 5x + 6$$

$$0 = (x-3)(x-2)$$

$$\boxed{x=2} \quad \boxed{x=3}$$

$\boxed{x=2}$  ✓  $\sqrt{10-4} = \sqrt{6}$  OK

$\boxed{x=3}$  ✓  $\sqrt{15-9} = \sqrt{6}$  OK

e)  $i^{236} = (i^2)^{118}$

$$= (-1)^{118}$$

$$= \boxed{1}$$

$$\frac{2}{3} \frac{2}{16}$$

~~30000~~

11 conjugate of  $6+3i = \boxed{6-3i}$

Practice Test  
Chapter 5 (va)  
Solutions  
MTH 1033

$$1) \left(\frac{3}{4}\right)^{-3} = \left(\frac{4}{3}\right)^3 = \frac{64}{27}$$

$$2) \textcircled{a} (4x^{-4}y^9z^{-2})(3x^4y^0z^{-2})$$

$$\frac{12x^4y^9z^{-4}}{x^4z^4} = \frac{12y^9}{z^4}$$

$$\textcircled{b} \frac{30x^{-3}y^6}{6x^9y^8z^7} = \frac{5y^6}{x^{12}y^2z^7} = \frac{5}{x^{12}y^2z^7} = \frac{x^2\sqrt{10x}}{4}$$

$$\textcircled{c} \frac{3(x^4y^{-5})^{-7}}{(2x^8y^{-4})^{-2}} = \frac{3x^{-28}y^{35}}{2^{-2}x^{-16}y^8} = \frac{3 \cdot 4 x^{16} y^{35}}{x^{28} y^8} = \frac{12y^{27}}{x^{12}}$$

$$3) \textcircled{a} \sqrt{144} = 12$$

$$\textcircled{c} -16^{\frac{3}{2}} = -4^3 = -64$$

$$\textcircled{b} 8^{-2/3} = 2^{-2} = \frac{1}{4}$$

$$1b) \sqrt{90y^9z^5} = 3y^4z^2\sqrt{10yz}$$

$$1a) \sqrt[3]{81a^8b^9} = 3a^2b^3\sqrt[3]{3a^2}$$

$$3a) \sqrt{27} + \sqrt{45} - \sqrt{75}$$

$$\frac{9 \cdot 3}{9 \cdot 5} \quad \frac{9 \cdot 5}{25 \cdot 3}$$

$$3\sqrt{3} + 3\sqrt{5} - 5\sqrt{3}$$

$$-2\sqrt{3} + 3\sqrt{5}$$

$$5b) (\sqrt{5} + \sqrt{3})(\sqrt{5} - \sqrt{3})$$

$$\sqrt{75} - \sqrt{25} + \sqrt{45} - \sqrt{15}$$

$$5\sqrt{3} - 5 + 3\sqrt{5} - \sqrt{15}$$

$$5c) (3 + \sqrt{2})^2$$

$$(3 + \sqrt{2})(3 + \sqrt{2})$$

$$9 + 6\sqrt{2} + \underbrace{2}_a = 11 + 6\sqrt{2}$$

$$5d) \frac{3}{\sqrt[3]{2a^3}} \cdot \frac{\sqrt[3]{4a}}{\sqrt[3]{4a}}$$

$$= \frac{3\sqrt[3]{4a}}{\sqrt[3]{8a^3}} = \frac{3\sqrt[3]{4a}}{2a}$$

$$5e) \frac{\sqrt{5x^5}}{\sqrt{8}} = \frac{x^2\sqrt{5x}}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{x^2\sqrt{10x}}{4}$$

Bonus \*

$$\textcircled{1} 1 + \sqrt{x+7} = \sqrt{2x+7}$$

$$(1 + \sqrt{x+7})^2 = (\sqrt{2x+7})^2$$

$$1 + 2\sqrt{x+7} + x+7 = 2x+7$$

$$2\sqrt{x+7} = x-1$$

$$(2\sqrt{x+7})^2 = (x-1)^2$$

$$4(x+7) = x^2 - 2x + 1$$

$$4x + 28 = x^2 - 2x + 1$$

$$0 = x^2 - 6x - 27$$

$$0 = (x-9)(x+3)$$

$$\boxed{x = -3}$$

$$\boxed{x = 9}$$

$\textcircled{2}$

$$\frac{4 \sqrt[4]{3x^2y^5}}{6x \sqrt[4]{64x^6y^{11}z^7}} = \frac{4y \sqrt[4]{3x^2y}}{6x(2)y^2z \sqrt[4]{4x^2y^3z^3}}$$

$64 = 2^6$   
 $16 \cdot 4$

$$= \frac{4y \sqrt[4]{3x^2y}}{12x^2y^2z \sqrt[4]{4x^2y^3z^3}} \cdot \frac{\sqrt[4]{4x^2yz}}{\sqrt[4]{4x^2yz}}$$

$$= \frac{4y \sqrt[4]{12x^4y^2z}}{12x^2y^2z \sqrt[4]{16x^4y^4z^4}} = \frac{\cancel{4}y \sqrt[4]{12y^2z}}{\cancel{12}x^2y^2z \cancel{(2xyz)}}_3$$

$$= \boxed{\frac{\sqrt[4]{12y^2z}}{6x^2y^2z^2}}$$