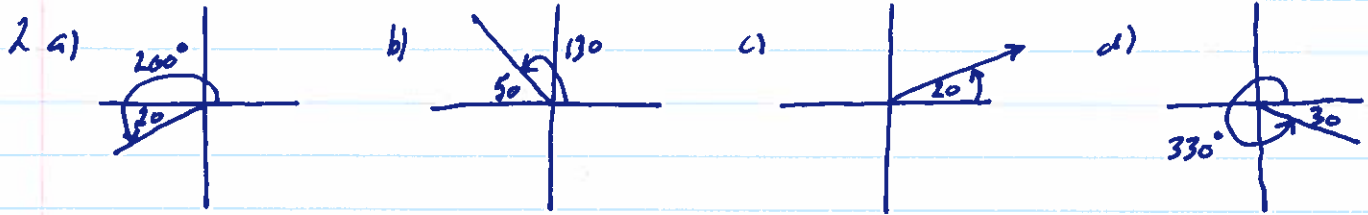


Chapter 2
Review

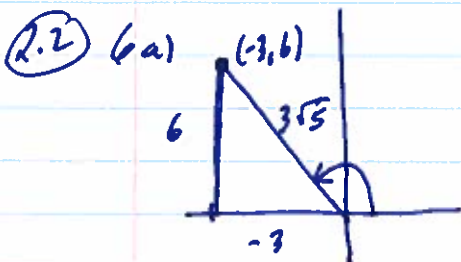
1. a) E b) D c) B d) A e) F f) C g) G



3. No. the arm becomes the "x-axis" so reference angle 60°

4. add/subtract from 180° add/subtract from $0^\circ, 360^\circ$
 $145^\circ, 215^\circ$ $35^\circ, 325^\circ$

5 a) $\sin 225 = -\frac{\sqrt{2}}{2}$ $\cos 225 = -\frac{\sqrt{2}}{2}$ $\tan 225 = 1$
 b) $\sin 120 = \frac{\sqrt{3}}{2}$ $\cos 120 = -\frac{1}{2}$ $\tan 120 = -\sqrt{3}$
 c) $\sin 330 = -\frac{1}{2}$ $\cos 330 = \frac{\sqrt{3}}{2}$ $\tan 330 = -\frac{1}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$
 d) $\sin 135 = \frac{\sqrt{2}}{2}$ $\cos 135 = -\frac{\sqrt{2}}{2}$ $\tan 135 = -1$



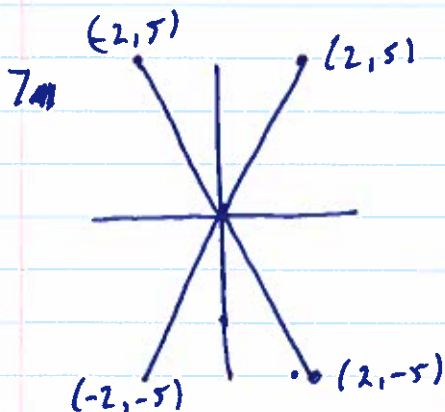
b) $(-3)^2 + 6^2 = d^2$
 $45 = d^2$
 $d = \sqrt{45} = \sqrt{9 \cdot 5} = 3\sqrt{5}$

c) $\sin \theta = \frac{6}{3\sqrt{5}} = \frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$

$\cos \theta = \frac{-3}{3\sqrt{5}} = -\frac{1}{\sqrt{5}} = -\frac{\sqrt{5}}{5}$

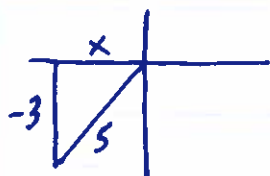
$\tan \theta = \frac{6}{-3} = -2$

d) $\cos^{-1}(-\frac{\sqrt{5}}{5}) = 117^\circ$



8 a) $\sin \theta = 1$ $\tan \theta$ undefined b) $\sin \theta = 0$ $\tan \theta = 0$
 $\cos \theta = 0$ $\cos \theta = -1$

9. a) $\sin \theta \ominus$ $\cos \theta \ominus$ \therefore quad III



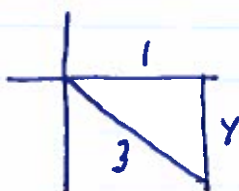
$$x^2 + (-3)^2 = 5^2$$

$$x^2 = 16$$

$$x = \pm 4$$

quad III $\therefore x = -4$ $\cos \theta = -\frac{4}{5}$
 $\tan \theta = \frac{3}{4}$

b) $\cos \theta \oplus$ $\tan \theta \ominus$ \therefore quad IV



$$y^2 + 1^2 = 3^2$$

$$y^2 = 8$$

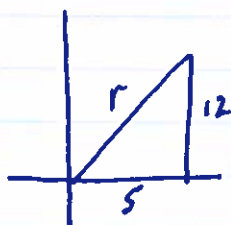
$$y = \pm \sqrt{8}$$

quad IV $\therefore y = -\sqrt{8}$ or $-2\sqrt{2}$

$$\sin \theta = -\frac{2\sqrt{2}}{3}$$

$$\tan \theta = \frac{-2\sqrt{2}}{\frac{1}{3}} = -2\sqrt{2}$$

c) $\tan \theta \oplus$ $\sin \theta \oplus$ \therefore quad I



$$r^2 = 5^2 + 12^2$$

$$r^2 = 169$$

$$r = \pm 13$$

* * (r always \oplus) $\therefore r = 13$

$$\sin \theta = \frac{12}{13}$$

$$\cos \theta = \frac{5}{13}$$

10 a) $\tan^{-1}(-1.1918)$ gives -50° $\tan \theta = \tan(\theta + 180)$
 $\therefore 130^\circ$ and 310°

b) $\sin^{-1}(-0.342)$ gives -20° $-20^\circ = 340^\circ$
 $\sin \theta = \sin(180 - \theta)$
 $\sin -20^\circ = \sin(180 - (-20)) \therefore 200^\circ$
 $200^\circ, 340^\circ$

c) $\cos \theta = 0.342$ gives 70° $\cos \theta = \cos(360 - \theta)$
 70° and 290°

Chapter 5 Review 1-21

1 a) $\sqrt{64}\sqrt{5} = \sqrt{320}$ b) $\sqrt[5]{-32}\sqrt[5]{3} = \sqrt[5]{-96}$
 c) $\sqrt{9y^2}\sqrt{7} = \sqrt{63y^2}$ d) $\sqrt[3]{-27z^3}\sqrt[3]{4z} = \sqrt[3]{-108z^4}$

2 a) $\sqrt{36}\sqrt{2} = 6\sqrt{2}$ b) $3\sqrt{4}\sqrt{10} = 6\sqrt{10}$ c) $\sqrt{9}\sqrt{m^2}\sqrt{3} = 3m\sqrt{3}$
 d) $\sqrt[3]{8x^3y^6}\sqrt[3]{10x^2} = 2xy^2\sqrt[3]{10x^2}$

3. a) $\sqrt{13}$ b) $4\sqrt{7} - 2\sqrt{16}\sqrt{7}$
 $4\sqrt{7} - 8\sqrt{7}$
 $-4\sqrt{7}$ c) $-\sqrt[3]{3} + \sqrt[3]{8}\sqrt[3]{3}$
 $-\sqrt[3]{3} + 2\sqrt[3]{3}$
 $\sqrt[3]{3}$

4. a) $4\sqrt{9x^2}\sqrt{5x} - \sqrt{9}\sqrt{3x} + 17\sqrt{3x} - 9\sqrt{25}\sqrt{x^2}\sqrt{5x}$
 $4 \cdot 3x\sqrt{5x} - 3\sqrt{3x} + 17\sqrt{3x} - 45x\sqrt{5x}$
 $-33\sqrt{5x} + 14\sqrt{3x} \quad x \geq 0$


b) $\frac{2}{3}\sqrt{4}\sqrt{11a} + \sqrt{144a^2}\sqrt{a} - \frac{1}{2}\sqrt{11a}$
 $\frac{4}{3}\sqrt{11a} + 12a\sqrt{a} - \frac{1}{2}\sqrt{11a}$
 $\frac{7}{6}\sqrt{11a} + 12a\sqrt{a} \quad a \geq 0$

5. $\frac{2\sqrt{16}\sqrt{7}}{8\sqrt{7}} \quad \frac{\sqrt{64}\sqrt{7}}{8\sqrt{7}} \quad \frac{3\sqrt{6}\sqrt{7}}{8\sqrt{7}} \quad \frac{4\sqrt{4}\sqrt{7}}{8\sqrt{7}}$
 \uparrow
 $3\sqrt{42}$ is not equal (simplify)

6. $\frac{3\sqrt{7}}{\sqrt{9}\sqrt{7}} \quad \sqrt{65} \quad \frac{2\sqrt{17}}{\sqrt{4}\sqrt{17}} \quad 8$
 $\frac{\sqrt{63}}{\sqrt{63}} \quad \sqrt{68}$ least to greatest:
 $3\sqrt{7}, 8, \sqrt{65}, 2\sqrt{17}$

7a) $v = 13\sqrt{6}$

b) $v = 13\sqrt{13.4} \quad 47.6 \quad 48 \text{ km/h}$

8.  $x^2 = 24 \quad x = \sqrt{24} \quad x = \sqrt{4}\sqrt{6} \quad x = 2\sqrt{6}$
 $\therefore \text{perimeter} = 8\sqrt{6} \text{ km}$

9 a) $-3^2 = -9$ b) True c) $\sqrt{9} = 3$

Ch 5 Review

10. a) $\sqrt{12} = \sqrt{4}\sqrt{3} = 2\sqrt{3}$
 b) $-6f^4\sqrt{75} = -6f^4\sqrt{25}\sqrt{3} = -30f^4\sqrt{3}$
 c) $3\sqrt[4]{144} = 3\sqrt[4]{16}\sqrt[4]{9} = 6\sqrt[4]{9}$

11. a) $4-5 = -1$ b) $25(3) - 10\sqrt{24} + 8$
 $75 - 10\sqrt{4}\sqrt{6} + 8 = 83 - 20\sqrt{6}$
 c) $a^2 + 7a\sqrt{4}\sqrt{a} + 3a\sqrt{a} + 21\sqrt{a^2}\sqrt{a}$
 $a^2 + 14a\sqrt{a} + 3a\sqrt{a} + 42a = a^2 + 17a\sqrt{a} + 42a \quad a \geq 0$

12. Yes. $5 \pm \frac{\sqrt{25-8}}{2}$ (quad formula)

13. a) $\frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$ b) $-\frac{1}{\sqrt[3]{25}} \frac{\sqrt[3]{25}}{\sqrt[3]{25}} \frac{\sqrt[3]{25}}{\sqrt[3]{25}} = -\frac{\sqrt[3]{625}}{25} = -\frac{\sqrt[3]{125}\sqrt[3]{5}}{25} = -\frac{5\sqrt[3]{5}}{25} = -\frac{\sqrt[3]{5}}{5}$

c) $-4\sqrt{\frac{a^2}{9}}\sqrt{2} = -4\left(\frac{a}{3}\right)\sqrt{2} = -\frac{4a}{3}\sqrt{2}$

14. a) $\frac{-2}{4-\sqrt{3}} \left(\frac{4+\sqrt{3}}{4+\sqrt{3}} \right) = \frac{-8-2\sqrt{3}}{16-3} = \frac{-8-2\sqrt{3}}{13}$

b) $\frac{\sqrt{7}}{2\sqrt{5}-\sqrt{7}} \left(\frac{2\sqrt{5}+\sqrt{7}}{2\sqrt{5}+\sqrt{7}} \right) = \frac{2\sqrt{35}+7}{4(5)-7} = \frac{2\sqrt{35}+7}{13}$

c) $\frac{18}{6+3\sqrt{3}m} \left(\frac{6-3\sqrt{3}m}{6-3\sqrt{3}m} \right) = \frac{108-54\sqrt{3}m}{36-9(3m)} = \frac{108-54\sqrt{3}m}{36-27m} = \frac{36-18\sqrt{3}m}{12-9m}$
 $= \frac{12-6\sqrt{3}m}{4-3m} \rightarrow m > 0 \rightarrow m \neq \frac{4}{3}$

d) $\frac{a+\sqrt{b}}{a-\sqrt{b}} \left(\frac{a+\sqrt{b}}{a+\sqrt{b}} \right) = \frac{a^2+2a\sqrt{b}+b}{a^2-b} \quad b \geq 0$
 $\rightarrow b \neq a^2$

15. $\sqrt{16}\sqrt{2} + 2\sqrt{16}\sqrt{5}$
 $4\sqrt{2} + 8\sqrt{5}$

16. a) $\frac{5\sqrt{21}}{3\sqrt{6}\sqrt{21}} = \frac{5}{3\sqrt{6}} = \frac{5\sqrt{6}}{18}$ b) $\frac{24a\sqrt{a^2}\sqrt{a}}{-9\sqrt{4}\sqrt{a}} = \frac{24a^2\sqrt{a}}{-18\sqrt{2}a}$

$= -\frac{4a^2}{3\sqrt{2}} = -\frac{4a^2\sqrt{2}}{6}$
 $= -\frac{2\sqrt{2}a^2}{3}$

Ch 5 Review

17. $A = LW$ $L = \frac{A}{W}$ $\frac{12}{4-\sqrt{2}} \left(\frac{4+\sqrt{2}}{4+\sqrt{2}} \right) = \frac{48+12\sqrt{2}}{16-2}$ $\frac{48+12\sqrt{2}}{14} = \frac{24+6\sqrt{2}}{7}$

18 a) $\sqrt{x} = 7$	$x = 49$	radical exists
b) $\sqrt{\quad} = -2$	no solution	$x \leq 4$
c) $-\sqrt{2x} = -6$		
	$\sqrt{2x} = 6$	$x \geq 0$
	$2x = 36$	
	$x = 18$	
d) $\sqrt{\frac{7x}{3}} = 7$		$\frac{7x}{3} \geq 0$
	$\frac{7x}{3} = 49$	$7x \geq 0$
	$7x = 147$	$x \geq 0$
	$x = 21$	

19 a) $5x - 3 = 2x - 12$ restriction $x \geq \frac{3}{5}$ $x \geq \frac{12}{7}$ $\therefore x \geq \frac{12}{7}$
 $9 = 2x$ $x = \frac{9}{2}$ check $\sqrt{\frac{45}{2} - 3} = \sqrt{\frac{62}{2} - 12}$
 $\sqrt{\frac{39}{2}} = \sqrt{\frac{39}{2}}$ ✓

b) $y - 3 = y^2 - 6y + 9$ restriction $y - 3 \geq 0$
 $0 = y^2 - 7y + 12$ $y \geq 3$
 $0 = (y - 4)(y - 3)$ $y = 4, y = 3$
 check $y = 3$ $y = 4$
 $0 = 0$ ✓ $\sqrt{1} = 1$ ✓

c) $\sqrt{7n+25} = 1+n$ restriction $7n+25 \geq 0$ $7n \geq -25$
 $7n+25 = n^2+2n+1$ $n \geq -25/7$
 $0 = n^2 - 5n - 24$
 $0 = (n-8)(n+3)$
 $n = 8$ $n = -3$
 check $n = 8$ check $n = 3$
 $\sqrt{56+25} - 8 = 1$ $\sqrt{-21+25} + 3 = 1$
 $\sqrt{81} - 8 = 1$ $\sqrt{4} = -2$
 $9 - 8 = 1$ ✓ no.
 $\therefore n = 8$

d) $8 - \frac{m}{3} = 3m - 8\sqrt{3m} + 16$
 $8\sqrt{3m} = \frac{10}{3}m + 8$
 $64(3m) = \frac{100}{9}m^2 + \frac{160}{3}m + 64$
 $0 = \frac{100}{9}m^2 - \frac{416}{3}m + 64$
 $0 = 100m^2 - 1248m + 576$
 $25m^2 - 312m + 144 = 0$
 $x = \frac{+312 \pm \sqrt{82944}}{50}$
 $= \frac{+312 \pm 288}{50}$ $\frac{+12}{25}, \frac{+12}{5}$

Chapter 5 Review

check $\frac{12}{25}$

$$2.8 = -2.8$$

no.

check 12

$$\sqrt{8-4} = \sqrt{36-4}$$

$$\sqrt{4} = 6-4$$

yes.

$$x=12$$

restriction

$$8 - \frac{m}{3} \geq 0 \quad | \quad m \geq 0$$
$$8 \geq \frac{m}{3}$$
$$24 \geq m$$

$$\therefore 0 \leq m \leq 24$$

e) $\sqrt[3]{3x-1} = -4$

$$3x-1 = -64$$

$$3x = -63$$

$$x = -21$$

(no restrictions)

check

$$\sqrt[3]{-63-1} + 7 = 3$$

$$\sqrt[3]{-64} = -4$$

$$-4 = -4 \checkmark$$

20. squaring both sides created an extraneous root.

21. $7.1 = \sqrt{\frac{3h}{2}}$

$$50.41 = \frac{3h}{2}$$

$$100.82 = 3h$$

$$h = 33.6 \text{ m}$$