7.1 7.2 7.6
#1,11 all all

Unit 3 Exam Review Key

Sec. 5.1 pg. 352-353: 43, 55 pg. 427: 17, 18

43. $\frac{18^\circ}{1} = \frac{18\pi}{180} = \frac{\pi}{10}$

55. $\frac{5\pi}{12} \cdot \frac{180^\circ}{\pi} = \frac{900}{12} \approx 75^\circ$

17. 3; 8 −, +

θ deg	0	30	45	60	90	120	135	150	180
θ rad	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π
sin θ	0	$\frac{1}{2}$	$\sqrt{2}/2$	$\sqrt{3}/2$	1	$\sqrt{3}/2$	$\sqrt{2}/2$	$1/2$	0
cos θ	1	$\sqrt{3}/2$	$\sqrt{2}/2$	$1/2$	0	$-1/2$	$-\sqrt{2}/2$	$-\sqrt{3}/2$	−1
tan θ	0	$1/\sqrt{3}$	1	$\sqrt{3}$	und.	$-\sqrt{3}$	−1	$-1/\sqrt{3}$	0

Sec. 5.2 pg. 427 19-37 odd

19. $\sin(-\frac{\pi}{3}) = -\sqrt{2}/2$

21. $\tan(\pi/3) = \sqrt{3}$

23. $\csc(-120^\circ)$

$\csc(240^\circ) = \frac{1}{\sin(240^\circ)}$

$= \frac{1}{-\sqrt{3}/2} = -2/\sqrt{3}$

25. $\sin(180^\circ) = 0$

27. $\cos(\frac{3\pi}{2}) = 0$

29. $\sec(-\pi) = \frac{1}{\cos(-\pi)}$

$= \frac{1}{-1} = -1$

31. $\cot(420^\circ) = \cot(60^\circ) = \frac{\cos(60^\circ)}{\sin(60^\circ)} = \frac{1/2}{\sqrt{3}/2} = \frac{1}{\sqrt{3}}$

33. $\cos(-135^\circ) = \cos(225^\circ) = -\frac{\sqrt{2}}{2}$

35. $\sec(\frac{2\pi}{3}) = \frac{1}{\cos(2\pi/3)} = \frac{1}{-1/2} = -2$

37. $\tan(\frac{5\pi}{6}) = -1/\sqrt{3}$

Sec 5.5 pg. 408: 35-80 m5

35. $\sec^{-1}(2) = 60^\circ$ or $\pi/3$

40. $\operatorname{arccot} -\sqrt{3} = 150^\circ$ or $5\pi/6$

45. $\cot^{-1}(-1) = 135^\circ$ or $3\pi/4$

50. $\sin^{-1}(-.4138) = -24.44$

55. $\sec^{-1}(-3.44) =$

60. $\operatorname{arccot}(-\sqrt{5}) = -0.015$

65. $\tan(\arccos(1/2)) = \tan(60^\circ) = \sqrt{3}$

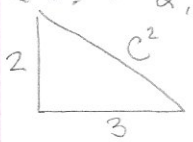
70. $\sec^{-1}(\sec(\frac{\pi}{3})) = 60^\circ$ or $\pi/3$

75. $\cos^{-1}(\cos(\frac{3\pi}{2})) = 270^\circ$ or $3\pi/2$

80. $\cos^{-1}(.5\tan(\frac{\pi}{4})) = \cos^{-1}(\frac{1}{2} \cdot \frac{\sqrt{2}}{2}) = \cos^{-1}(\frac{\sqrt{2}}{4}) \approx 69.29^\circ$

Sec. 5.6 pg. 427: 65, 67, 102

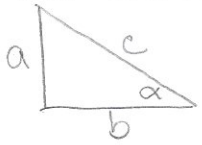
65. $a = 2$, $b = 3$



$2^2 + 3^2 = c^2$

$4 + 9 = c^2 \Rightarrow c = \sqrt{13}$

67. $a = 3.2$ $\alpha = 21.3°$



$\sin(21.3) = \frac{3.2}{c}$

$c = \frac{3.2}{\sin(21.3)} \approx 5.02$

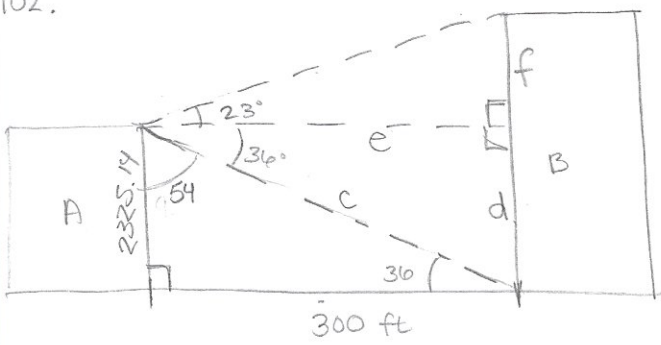
$(3.2)^2 + b^2 = (5.02)^2$

$b^2 = 25.2 - 10.24$

$b^2 = 14.9$ $b \approx 3.87$

$a = 3.2$, $b \approx 3.87$, $c = 5.02$

102.



Building A: $\tan(36°) = \frac{A}{300}$ $A = 300 \times \tan(36°)$

$A = 2,325.14$ ft

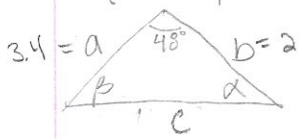
$\sqrt{(300)^2 + (2325.14)^2} = c$ $c = 2344.41$ $a = A$ $e = 300$

Building B: $\tan(23°) = \frac{f}{300}$ $f = 300 \cdot \tan(23°)$ $f \approx 476.44$

$f + d = 476.44 + 2,325.14 = 2801.58$ ft

Sec 7.1 pg. 571: 1, 3, 7, 9, 11 pg. 573: 97

1. $\gamma = 48°$, $a = 3.4$, $b = 2.6$



law of cosine

$c^2 = 3.4^2 + 2.6^2 - 2(3.4)(2.6)\cos(48°)$

$c^2 = 18.32 - 17.68\cos(48°)$

$c = 2.5475$

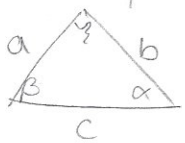
law of sine

$\frac{\sin 48}{2.5475} = \frac{\sin\beta}{2.6}$

$\beta = 49.34°$

$\alpha = 82.67°$

3. $\alpha = 13°$, $b = 8$, $c = 10$



law of cosine

$a^2 = 64 + 100 - 2(8)(10)\cos(13°)$

$a^2 = 164 - 160\cos(13°)$

$a^2 = 164 - 155.89$

$a^2 = 8.11 \quad a \approx 2.84$

law of sines

$\frac{\sin(13)}{2.84} = \frac{\sin(\beta)}{8}$

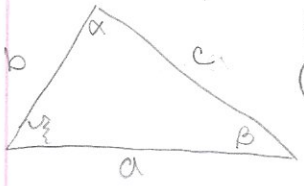
$\frac{8\sin(13)}{2.84} = \sin(\beta)$

$\sin(\beta) = .633$

$\beta = 39.32°$

$\gamma = 127.67$

7. $a = 30.6$, $b = 12.9$, $c = 24.1$



law of cosine

$(30.6)^2 = 12.9^2 + 24.1^2 - 2(12.9)(24.1)\cos(\alpha)$

$936.36 = 747.2 - 621.78\cos(\alpha)$

$189.16 = -621.78\cos(\alpha)$

$-.304 = \cos(\alpha)$

$\alpha = 107.71$

$\gamma = 48.612°$

$\beta = 23.677°$

$\alpha = 107.71°$

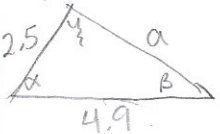
$(12.9)^2 = 30.6^2 + 24.1^2 - 2(30.6)(24.1)\cos(\beta)$

$166.41 = 1517.17 - 1474.92\cos(\beta)$

$-1350.76 = -1474.92\cos(\beta)$

$\cos(\beta) = .9158 \quad \beta = 23.677$

9. $\beta = 22°$, $c = 4.9$, $b = 2.5$



law of sines

$\frac{\sin(22)°}{2.5} = \frac{\sin(\gamma)}{4.9}$

$\sin(\gamma) = \frac{4.9\sin(22°)}{2.5}$

$\sin(\gamma) = .734$

$\gamma = 42.24°$

$\frac{\sin(110.75°)}{a} = \frac{\sin(22°)}{2.5}$

$a = \frac{\sin(110.75°)2.5}{\sin(22)}$

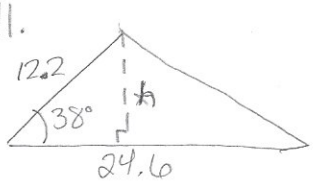
$a = 6.24$

$\gamma = 42.24°$

$\alpha = 110.75°$

$a = 6.24$

11.



$A = \frac{1}{2}(12.2)(24.6)\sin 38$

$A = 92.3866\ u^2$

pg. 573: 97

97. $431 + 562 = 993$ ft $993 \times 21.6 = \$21448.80$

law of cosine

$c^2 = 431^2 + 562^2 - 2(431)(562)\cos(122°)$

$c^2 = 758321.208$

$c = 870.81$

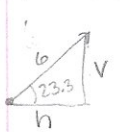
cost of $c = 870.81 \times 21.6 = \$18809.63$

Difference in cost:

$21448.80 - 18809.63 = \boxed{\$2639.17}$

Sec. 7.2 pg. 572: 15-35 odd

15. $|v| = 6$, $\theta = 23.3$

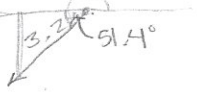


$\sin(23.3) = \frac{v}{6}$ $v = 2.37$

$\cos(23.3) = \frac{h}{6}$ $h = 5.51$

$\vec{v} = \langle 5.51, 2.37 \rangle$

17. $|v| = 3.2$, $\theta = 231.4$



$\sin(231.4) \cdot 3.2 = v = -2.5$

$\cos(231.4) \cdot 3.2 = h = -1.99$

$\vec{v} = \langle -1.999, -2.5 \rangle$

19. $\langle 2, 3 \rangle$

$|v| = \sqrt{4+9} = \sqrt{13} \approx 3.6$

$\sin^{-1}\left(\frac{3}{\sqrt{13}}\right) = 56.3° = \theta$

21. $\langle -3.2, -5.1 \rangle$

$|v| = \sqrt{10.24 + 26.01} = \sqrt{36.24} \approx 6.02$

$\theta = \sin^{-1}\left(\frac{-5.1}{6.02}\right) = -57.9$ or 302.09

23. $|v| = \sqrt{2}$, $\theta = 45°$

$\langle 1, 1 \rangle$ ~~or $\langle -1, -1 \rangle$~~

25. $|v| = 9.1$ $\theta = 109.3°$ $(-3.007, 8.59)$

$\sin(109.3) \cdot 9.1 = v = 8.59$

$\cos(109.3) \cdot 9.1 = h = -3.007$

27. $2\langle -3, 4 \rangle = \langle -6, 8 \rangle$

29. $\langle 2, -5 \rangle - 2\langle 1, 6 \rangle$

$\langle 2, -5 \rangle - \langle 2, 12 \rangle$

$= \langle 0, -17 \rangle$

31. $\langle -1,5 \rangle \cdot \langle 4,2 \rangle$ (x, y)

$-4+10$

6

33. In component form, $v = \langle -4,8 \rangle$

$-4i + 8j$

35 Direction $\measuredangle$ v $30°$

$|v| = 7.2$

$\sin(30°) \cdot 7.2 = v = 3.6$

$\cos(30°) \cdot 7.2 = h = 6.23$

$6.23i + 3.6j$

Sec. 7.6 pg. 573: 81-87 odd

81. $r = \frac{1}{\sin\theta + \cos\theta}$

$r\sin\theta + r\cos\theta = 1$

$y + x = 1$

$y = 1 - x$

83. $r = -5$

$x^2 + y^2 = 25$

85. $y = 3$

$r\sin\theta = 3$

$r = \frac{3}{\sin\theta}$

87. $x^2 + y^2 = 49$

$r = 7$