

9.1 Homework #19-32 all

$$19. \quad \frac{16}{12} = \frac{12}{x} \quad 16x = 144 \\ x = 9$$

$$20. \quad \frac{20}{x} = \frac{25}{20} \quad 25x = 400 \\ x = 16$$

$$21. \quad \frac{32}{15} = \frac{x}{32} \quad 15x = 1024 \\ x = 68.3$$

$$22. \quad \frac{40}{32} = \frac{x}{40} \quad 32x = 1600 \\ x = 50$$

$$23. \quad \frac{4}{x} = \frac{x}{4} \quad x^2 = 16 \\ x = 4$$

$$24. \quad \frac{7}{x} = \frac{x}{18} \quad x^2 = 126 \quad x = 3\sqrt{14} \\ x = 11.2$$

$$25. \quad \frac{3}{x} = \frac{x}{9} \quad x^2 = 27 \quad x = 5.2 \\ x = 3\sqrt{3}$$

$$26. \quad \frac{12}{y} = \frac{20}{12} \quad 20y = 144 \quad \frac{7.2}{x} = \frac{x}{12.8} \quad x^2 = 92.16 \\ y = 7.2 \quad x = 9.6$$

$$27. \quad \frac{7}{5} = \frac{5}{m-7} \quad 25 = 7(m-7) \quad 7m = 74 \\ 25 = 7m - 49 \quad m = 10.6$$

$$28. \quad \frac{14}{c} = \frac{16}{14} \quad 16c = 196 \quad d = 16 - 12.25 \quad \frac{12.25}{e} = \frac{e}{3.75} \\ c = 12.25 \quad d = 3.75 \quad e^2 = 49.9375$$

$$29. \quad \frac{x}{32} = \frac{32}{24} \quad 24x = 1024 \quad \frac{z}{42.7} = \frac{66.8}{z} \quad z^2 = 2844.4$$

$$x = 42.7 \quad z = 53.3$$

$$\frac{y}{24} = \frac{66.8}{y} \quad y^2 = 1600$$

$$y = 40$$

$$30. \quad \frac{8}{x+9} = \frac{x+9}{18} \quad (x+9)(x+9) = 144$$

$$x^2 + 18x + 81 = 144$$

$$x^2 + 18x - 63 = 0$$

$$(x+21)(x-3) = 0$$

$$x = -21 \quad x = 3$$

$$x = 3$$

$$31. \quad \frac{44.8}{x} = \frac{72}{84.8} \quad 72x = 3799.04 \quad BD = 123.3$$

$$x = 61.63$$

$$32. \quad \frac{5.5}{18} = \frac{18}{h-5.5} \quad 5.5(h-5.5) = 324$$

$$5.5h - 30.25 = 324$$

$$5.5h = 354.25$$

$$h = 64.4 \text{ ft}$$

$$\frac{5.5}{18} = \frac{18}{x}$$

$$5.5x = 324$$

$$x = 58.9$$

$$\begin{array}{r} 58.9 \\ + 5.5 \\ \hline 64.4 \text{ ft} \end{array}$$

9.2 #7-31 odd

7. $65^2 + 72^2 = X^2$
 $X^2 = 9409$
 $X = 97$

9. $X^2 + 39^2 = 89^2$
 $X^2 = 6400$
 $X = 80$

11. $X^2 + 7^2 = 9^2$
 $X^2 = 32$
 $X = 4\sqrt{2}$

13. $X^2 + 8^2 = 16^2$
 $X^2 = 192$
 $X = 8\sqrt{3}$

15. $X = 14\sqrt{2}$

17. $X^2 + 10^2 = 12^2$
 $X^2 = 44$
 $X = 2\sqrt{11}$



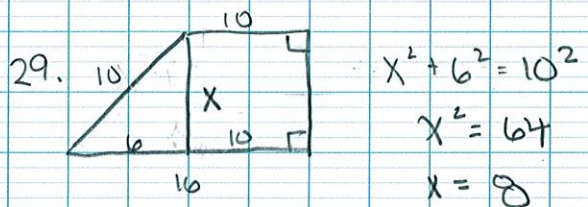
19. $12^2 + 16^2 = t^2$
 $t^2 = 400$
 $t = 20$

21. $S^2 + 18^2 = 30^2$
 $S^2 = 576$
 $S = 24$

23. $S^2 + 35^2 = 37^2$
 $S^2 = 144$
 $S = 12$

25. $a^2 + 9^2 = 12^2$ $A = \frac{(7.9)(9)}{2}$
 $a^2 = 63$
 $a = 7.9$ $A = 35.6 \text{ cm}^2$

27. $X^2 + 3.5^2 = 8^2$ $A = \frac{(7.2)(7)}{2}$
 $X^2 = 51.75$
 $X = 7.2$ $A = 25.2 \text{ cm}^2$



$X^2 + 6^2 = 10^2$
 $X^2 = 64$
 $X = 8$
 $A = \frac{8(16+10)}{2} = \frac{8(26)}{2}$

$A = 104 \text{ cm}^2$

31. $65\sqrt{2}$ ft
91.9 ft

9.3 #9-27 odd

9. 89^2 $39^2 + 80^2$
 7921 = 7921 yes

11. $\sqrt{26}^2$ $1^2 + 5^2$
 26 = 26 yes

13. $(4\sqrt{35})^2$ $20^2 + 13^2$
 560 ≠ 569 NO

15. 35^2 $21^2 + 28^2$
 1225 = 1225
Right Δ

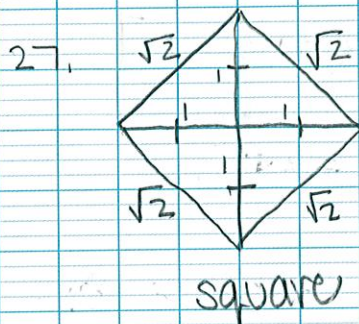
17. 12^2 $10^2 + 2^2$
 144 > 104
obtuse Δ

19. 7^2 $6^2 + \sqrt{13}^2$
 49 = 49
Right Δ

21. 14^2 $10^2 + 11^2$
 196 < 221
Acute Δ

23. 145^2 $144^2 + 17^2$
 21025 = 21025
Right Δ

25. 5.5^2 $5^2 + \sqrt{5}^2$
 30.25 > 30
Obtuse Δ



9.4 #12-20

12. $x = 5$
 $y = 5\sqrt{2}$

13. $a = 12\sqrt{3}$
 $b = 24$

14. $e = 2\sqrt{2}$

15. $8 = x\sqrt{2}$ $x = \frac{8\sqrt{2}}{2}$
 $\frac{8}{\sqrt{2}} = x$
 $c = d = 4\sqrt{2}$

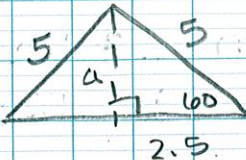
16. $c = 5$
 $d = 5\sqrt{3}$

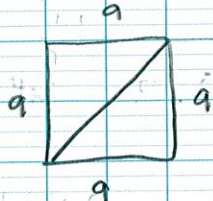
17. $r = 110$
 $q = 110\sqrt{2}$

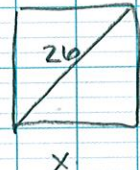
18. $m = 12$
 $q = 6\sqrt{3}$
 $p = 6\sqrt{3}$

19. $8 = f\sqrt{3}$ $f = \frac{8}{\sqrt{3}} \frac{\sqrt{3}}{\sqrt{3}}$
 $f = \frac{8\sqrt{3}}{3}$
 $h = \frac{16\sqrt{3}}{3}$

20. $n = 6$

21.  $a = 2.5\sqrt{3}$
 $a = \frac{5\sqrt{3}}{2}$

22.  $x = a\sqrt{2}$

23.  $26 = x\sqrt{2}$
 $x = \frac{26\sqrt{2}}{2} = 13\sqrt{2}$

24. $h = 4\sqrt{3}$
 $A = \frac{8(4\sqrt{3})}{2} = 16\sqrt{3} \text{ ft}^2$

25. $A = \frac{6(6\sqrt{3})}{2} = \frac{36\sqrt{3}}{2}$
 $A = 18\sqrt{3} \text{ ft}^2$

26. $h = 2\sqrt{3}$
 $A = 5(2\sqrt{3}) = 10\sqrt{3} \text{ m}^2$

9.5 #10-15

$$10. \sin \theta R = \frac{45}{53} = 0.8491$$

$$\cos \theta R = \frac{28}{53} = 0.5283$$

$$\tan \theta R = \frac{45}{28} = 1.6071$$

$$m \theta R = 58.1^\circ$$

$$14. \sin \theta G = \frac{2}{\sqrt{5}} = 0.8944$$

$$\cos \theta G = \frac{1}{\sqrt{5}} = 0.4472$$

$$\tan \theta G = \frac{2}{1} = 2$$

$$m \theta G = 63.4^\circ$$

$$11. \sin \theta A = \frac{8}{10} = 0.8$$

$$\cos \theta A = \frac{6}{10} = 0.6$$

$$\tan \theta A = \frac{8}{6} = 1.3333$$

$$m \theta A = 53.1^\circ$$

$$15. \sin \theta K = \frac{3}{\sqrt{34}} = 0.5145$$

$$\cos \theta K = \frac{5}{\sqrt{34}} = 0.8575$$

$$\tan \theta K = \frac{3}{5} = 0.6$$

$$m \theta K = 30.96^\circ$$

$$12. \sin \theta Y = \frac{2}{\sqrt{13}} = 0.5547$$

$$\cos \theta Y = \frac{3}{\sqrt{13}} = 0.8320$$

$$\tan \theta Y = \frac{2}{3} = 0.6667$$

$$m \theta Y = 33.7^\circ$$

$$13. \sin \theta D = \frac{7}{25} = 0.28$$

$$\cos \theta D = \frac{24}{25} = 0.96$$

$$\tan \theta D = \frac{7}{24} = 0.2917$$

9.9 # 28-30

28. $\tan 37 = \frac{6}{y}$

$y = \frac{6}{\tan 37}$

$y = 8$

$\sin 37 = \frac{6}{x}$

$x = \frac{6}{\sin 37}$

$x = 10$

29. $\sin 23 = \frac{t}{34}$

$t = 34 \sin 23$

$t = 13.3$

$\cos 23 = \frac{s}{34}$

$s = 34 \cos 23$

$s = 31.3$

30. $\tan 36 = \frac{s}{4}$

$s = 4 \tan 36$

$s = 2.9$

$\cos 36 = \frac{4}{t}$

$t = 4 / \cos 36$

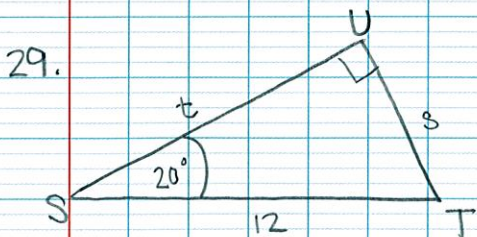
$t = 4.9$

9.10 # 23, 29, 30

23. $DE = 7\sqrt{2}$

$\angle D = 45^\circ$

$\angle E = 45^\circ$



$\angle S = 20^\circ$

$\angle U = 90^\circ$

$\angle T = 70^\circ$

$\overline{ST} = 12$

$\overline{UT} = 4.1$

$\overline{US} = 11.3$

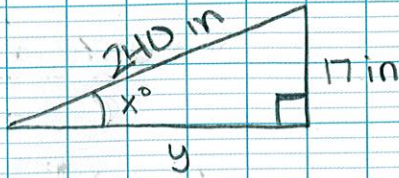
$\sin 20 = \frac{s}{12}$

$s = 12 \sin 20$

$\cos 20 = \frac{t}{12}$

$t = 12 \cos 20$

39.



$$\begin{aligned}17^2 + y^2 &= 240^2 \\y^2 &= 57311 \\y &= 239.4\end{aligned}$$

Horizontal Distance = 239.4 in
Ramp Angle = 58.2°

$$\begin{aligned}\sin x &= \frac{17}{240} \\x &= 4.1^\circ\end{aligned}$$

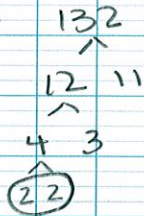
4.5 Homework

1. $x^2 + 8^2 = 14^2$

$x^2 = 132$

$x = 11.5$

$x = 2\sqrt{33}$



$A = \frac{(2\sqrt{33})(8)}{2}$

$A = 8\sqrt{33}$ or 46

2. $x^2 + 6^2 = 10^2$

$x^2 = 64$

$x = 8$

$A = \frac{(8)(6)}{2}$

$A = 24$

3. $A = \frac{1}{2}bc \sin A$

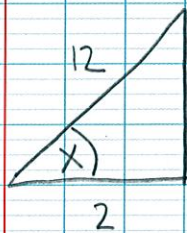
$A = \frac{1}{2}(12)(4) \sin 34$

$A = 13.4$ units²

4. $A = \frac{1}{2}(8)(12) \sin 28$

$A = 22.5$ units²

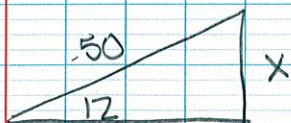
5.



$\cos x = \frac{2}{12}$

$\rightarrow x = 80.4^\circ$

6.

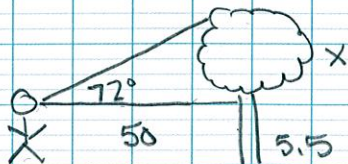


$\sin 12 = \frac{x}{50}$

$50 \sin 12 = x$

$x = 10.4$ ft

7.

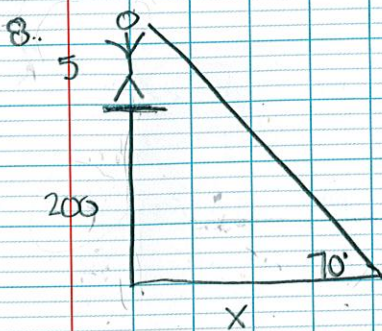


$\tan 72 = \frac{x}{50}$

$x = 50 \tan 72$

$x = 153.9$

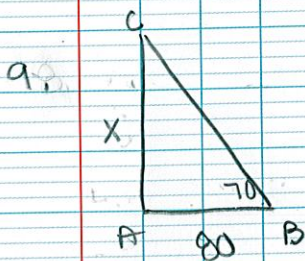
Tree height
159.4 ft



$$\tan 70 = \frac{205}{x}$$

$$x = 74.6 \text{ feet}$$

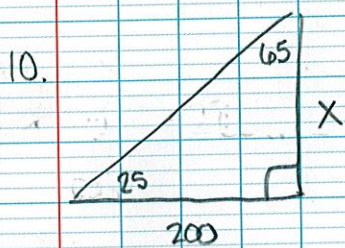
$$x = \frac{205}{\tan 70}$$



$$\tan 70 = \frac{x}{80}$$

$$x = 219.8 \text{ feet}$$

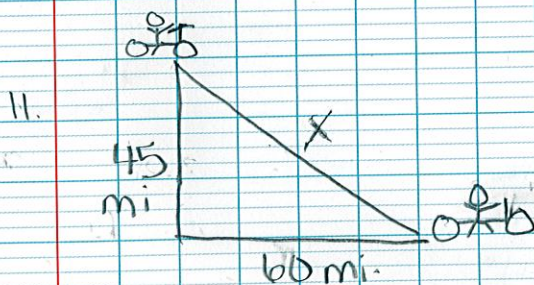
$$x = 80 \tan 70$$



$$\tan 65 = \frac{200}{x}$$

$$x = 93.3 \text{ m}$$

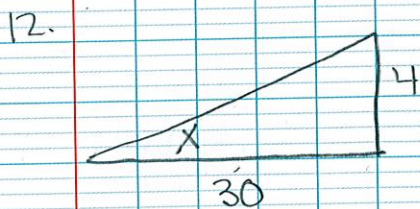
$$x = \frac{200}{\tan 65}$$



$$45^2 + 60^2 = x^2$$

$$x^2 = 5025$$

$$x = 75 \text{ miles}$$

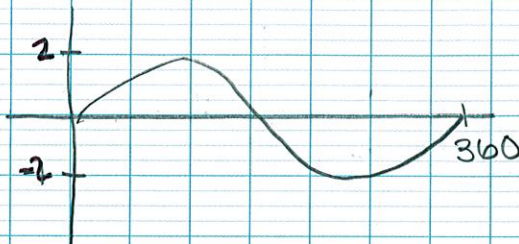


$$\tan X = \frac{4}{30}$$

$$X = 7.6^\circ$$

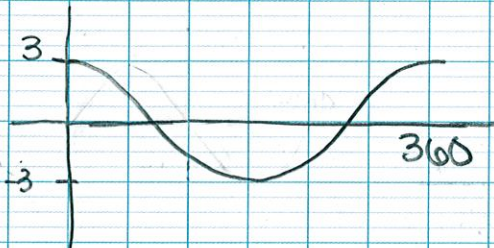
4.6 Homework

1. $y = 2\sin x$
amp: 2
of cyc: 1
period: 360



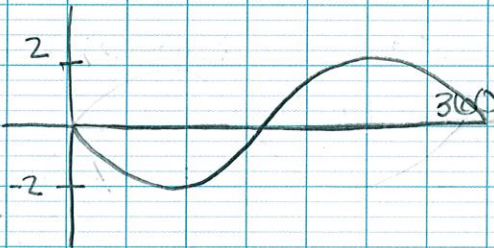
Domain: $(-\infty, \infty)$
Range: $[-2, 2]$

2. $y = 3\cos x$
amp: 3
of cyc: 1
period: 360



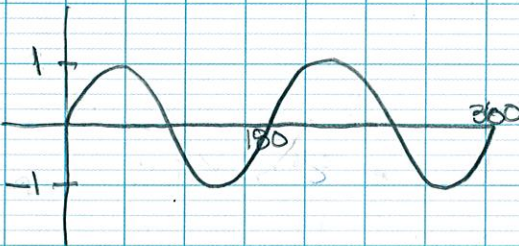
Domain: $(-\infty, \infty)$
Range: $[-3, 3]$

3. $y = -2\sin x$
amp: 2
of cyc: 1
period: 360



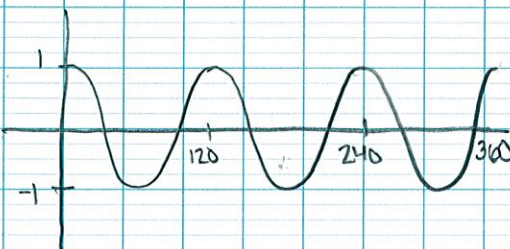
Domain: $(-\infty, \infty)$
Range: $[-2, 2]$

4. $y = \sin 2x$
amp: 1
of cyc: 2
period: 180



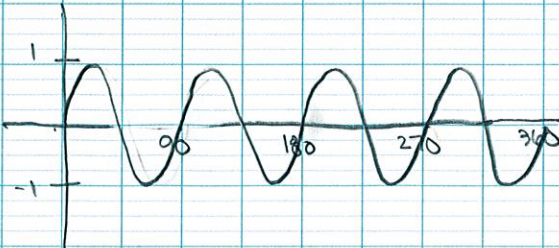
Domain: $(-\infty, \infty)$
Range: $[-1, 1]$

5. $y = \cos 3x$
amp: 1
of cyc: 3
period: 120



Domain: $(-\infty, \infty)$
Range: $[-1, 1]$

6. $y = \sin 4x$
amp: 1
of cyc: 4
period: 90



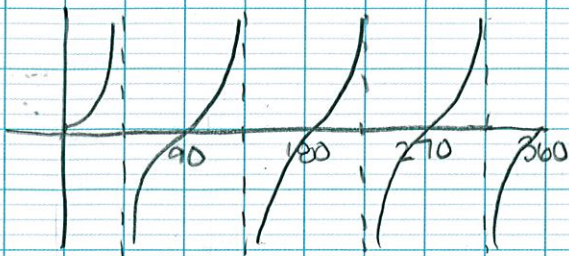
Domain: $(-\infty, \infty)$
Range: $[-1, 1]$

7. $y = \tan(2x)$

amp: 1

of cycles: 4

period: 90



Domain:

\mathbb{R} except

$90n - 45$

Range:

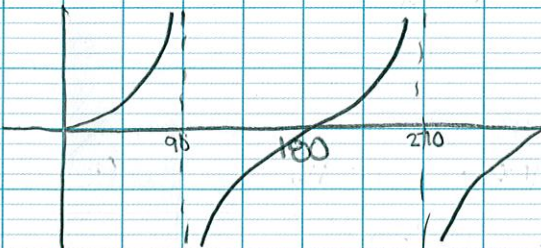
$(-\infty, \infty)$

8. $y = -\tan(x)$

amp: 1

of cycles: 2

period: 180



Domain:

\mathbb{R} except

$180n - 90$

Range:

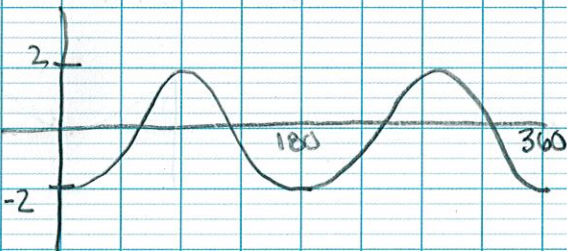
$(-\infty, \infty)$

9. $y = -2\cos(2x)$

amp: 2

of cycles: 2

period: 180



Domain:

$(-\infty, \infty)$

Range:

$[-2, 2]$

10. $y = a \sin bx$

a effects the height of the graph

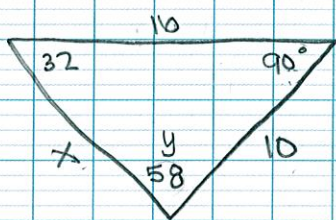
b effects the # of times the wave repeats

4.7 Homework

1. $\frac{x}{\sin 46} = \frac{14}{\sin 35}$ $\frac{x \sin 35}{\sin 35} = \frac{14 \sin 46}{\sin 35}$ $x = 15.7$

2. $x^2 = 14^2 + 10^2 - 2(14)(10) \cos 35$
 $x^2 = 66.6$
 $x = 8.2$

3. $\frac{10}{\sin 32} = \frac{16}{\sin y}$ $\frac{10 \sin y}{10} = \frac{16 \sin 32}{10}$ $\sin y = 0.847$
 $\angle y = 58^\circ$



$$\begin{array}{r} 180 \\ - 58 \\ \hline 122 \\ - 32 \\ \hline 90 \end{array}$$

$\frac{x}{\sin 90} = \frac{10}{\sin 32}$ $x \sin 32 = 10 \sin 90$
 $x = 18.9$

4. $\frac{40}{\sin 117} = \frac{x}{\sin 28}$ $x \sin 117 = 40 \sin 28$
 $x = 21.1$

5. $\frac{14}{\sin x} = \frac{8}{\sin 32}$ $\frac{8 \sin x}{8} = \frac{14 \sin 32}{8}$ $\sin x = 0.9274$
 $\angle x = 68^\circ$

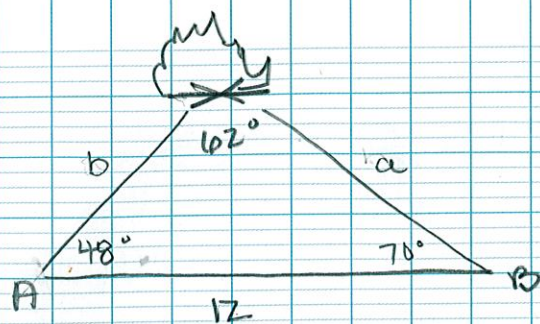
6. $8^2 = 10^2 + 14^2 - 2(10)(14) \cos x$ $\cos x = 0.8286$
 $64 = 296 - 280 \cos x$ $\angle x = 34^\circ$
 $-232 = -280 \cos x$

7. $\frac{5}{\sin 35} = \frac{8}{\sin x}$ $\frac{5 \sin x}{5} = \frac{8 \sin 35}{5}$ $x = 66.6^\circ$
 or
 $x = 113.4^\circ$

a) $\frac{5}{\sin 35} = \frac{x}{\sin 78.4}$ $x \sin 35 = 5 \sin 78.4$
 $x = 8.5 \text{ mi}$ $y = 78.4^\circ$ or

b) $\frac{5}{\sin 35} = \frac{x}{\sin 31.6}$ $x \sin 35 = 5 \sin 31.6$ $y = 31.6^\circ$

8.



$$\frac{\sin 62}{12} = \frac{\sin 48}{a} \quad a \sin 62 = 12 \sin 48$$

$$a = 10.1 \text{ mi}$$

$$\frac{\sin 62}{12} = \frac{\sin 70}{b} \quad b \sin 62 = 12 \sin 70$$

$$b = 12.8 \text{ miles}$$

$$9. \quad a^2 = 50^2 + 45^2 - 2(50)(45)\cos 130$$

$$a^2 = 7417.5$$

$$a = 86.1 \text{ miles}$$