

Homework Section 2.4

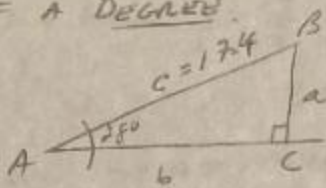
pg 1ne

⇒ NOTICE GIVE ANSWERS TO ANGLES
ROUNDED TO THE NEAREST TENTH
OF A DEGREE

25. Given #1

$$\angle A = 28.0^\circ$$

$$c = 17.4 \text{ ft}$$



Find:

$$\angle B = 62^\circ$$

$$\angle C = 90^\circ$$

$$a = 8.2 \text{ ft}$$

$$b = 15.4 \text{ ft}$$

$$\angle B = 90^\circ - 28^\circ = 62^\circ$$

$$a = \sin(28^\circ) = \frac{a}{17.4}$$

cross-multiply

$$\Rightarrow a = (17.4)(\sin(28^\circ))$$

$$\approx 8.2688 \dots$$

$$b = \cos(28^\circ) = \frac{b}{17.4}$$

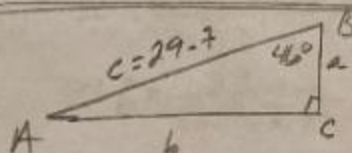
$$\Rightarrow b = (17.4)(\cos(28^\circ))$$

$$\approx 15.363 \dots$$

26. Given:

$$\angle B = 46^\circ$$

$$c = 29.7 \text{ m}$$



Find:

$$\angle A = 44^\circ$$

$$\angle C = 90^\circ$$

$$a = 42.0 \text{ m}$$

$$b = 21.4 \text{ m}$$

$$\angle A = 90^\circ - 46^\circ = 44^\circ$$

$$a = \cos(46^\circ) = \frac{a}{29.7}$$

$$\Rightarrow a = (29.7)(\cos(46^\circ))$$

$$= 42.0021 \dots$$

$$b = \sin(46^\circ) = \frac{b}{29.7}$$

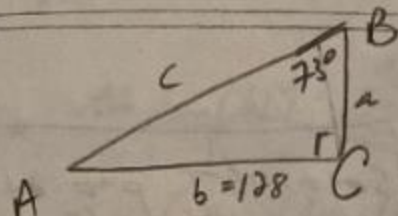
$$\Rightarrow b = (29.7)(\sin(46^\circ))$$

$$\approx 21.3643 \dots$$

27. Given

$$\angle B = 73^\circ$$

$$b = 128 \text{ in}$$



Find

$$\angle A = 17^\circ$$

$$\angle C = 90^\circ$$

$$a = 39.1 \text{ in}$$

$$c = 133.8 \text{ in}$$

$$\angle A = 90^\circ - 73^\circ = 17^\circ$$

$$a = \tan(73^\circ) = \frac{128}{a}$$

$$\Rightarrow a = \frac{128}{\tan(73^\circ)} = 39.1335 \dots$$

$$c = \sin(73^\circ) = \frac{128}{c}$$

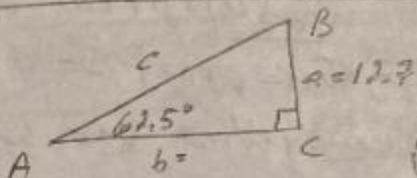
$$\Rightarrow c = \frac{128}{\sin(73^\circ)}$$

$$= 133.8485 \dots$$

* Note if two fractions are equal pg 210
you may "swap along the diagonal"

That is: If we have $\frac{x}{1} = \frac{y}{z}$ then we may write $\frac{z}{1} = \frac{y}{x}$ or, simply $z = \frac{y}{x}$. This was used in #27, and will be used frequently.

#28 Given:
 $\angle A = 62.5^\circ$
 $a = 12.7$ m



Find:

$\angle B = 27.5^\circ$ $b = 6.6$ m
 $\angle C = 90^\circ$ $c = 14.3$ m

$\angle B$:

$$\angle B = 90^\circ - 62.5^\circ = 27.5^\circ$$

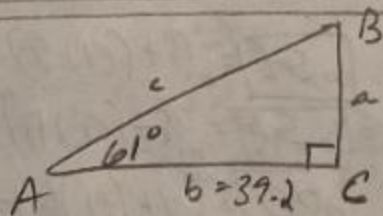
$$b = \frac{\tan(62.5)}{1} = \frac{12.7}{b}$$

$$\Rightarrow b = \frac{12.7}{\tan(62.5)} = 6.6112 \dots$$

$$c = \frac{\sin(62.5)}{1} = \frac{12.7}{c}$$

$$\Rightarrow c = \frac{12.7}{\sin(62.5)} = 14.3177 \dots$$

#29 Given:
 $\angle A = 61^\circ$
 $b = 39.2$ cm



Find

$\angle B = 29^\circ$ $a = 70.7$ cm
 $\angle C = 90^\circ$ $c = 80.9$ cm

$\angle B$:

$$\angle B = 90^\circ - 61^\circ = 29^\circ$$

$$a = \frac{\tan(61)}{1} = \frac{39.2}{a}$$

$$\Rightarrow a = (39.2)(\tan(61^\circ)) = 70.7186 \dots$$

$$c = \frac{\cos(61^\circ)}{1} = \frac{39.2}{c}$$

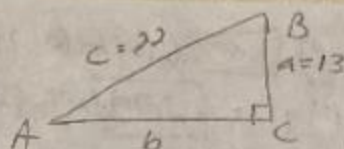
$$\Rightarrow c = \frac{39.2}{\cos(61^\circ)}$$

$$= 80.8564^\circ$$

31. Given

$$a = 13 \text{ m}$$

$$c = 22 \text{ m}$$



Find:

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$$b = 17.7 \text{ m} \quad \angle B = 53.8^\circ$$

$$\angle A = 36.2^\circ \quad \angle C = 90^\circ$$

$$b = \sqrt{c^2 - a^2} = \sqrt{22^2 - 13^2}$$

$$\Rightarrow b = \sqrt{(22)^2 - (13)^2}$$

$$= 17.7482 \dots$$

$$\angle A: \sin(A) = \frac{a}{c}$$

$$\Rightarrow \sin(A) = \frac{13}{22}$$

$$\Rightarrow A = \sin^{-1}\left(\frac{13}{22}\right) = 36.2215 \dots^\circ$$

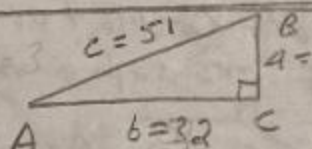
$$\angle B:$$

$$\angle B = 90^\circ - 36.2^\circ = 53.8^\circ$$

32. Given

$$b = 32 \text{ ft}$$

$$c = 51 \text{ ft}$$



Find:

$$a = 39.7 \text{ ft} \quad \angle B = 38.9^\circ$$

$$\angle A = 51.1^\circ \quad \angle C = 90^\circ$$

$$a = \sqrt{c^2 - b^2} = \sqrt{51^2 - 32^2}$$

$$\Rightarrow a = \sqrt{(51)^2 - (32)^2}$$

$$= 39.7114 \dots$$

$$\angle A: \cos(A) = \frac{b}{c}$$

$$\Rightarrow A = \cos^{-1}\left(\frac{32}{51}\right) = 51.1376 \dots^\circ$$

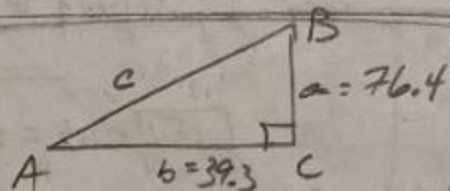
$$\angle B:$$

$$\angle B = 90^\circ - 51.1^\circ = 38.9^\circ$$

33. Given:

$$a = 76.4 \text{ yd}$$

$$b = 39.3 \text{ yd}$$



Find

$$c = 85.0 \text{ yd} \quad \angle B = 27.2^\circ$$

$$\angle A = 62.8^\circ \quad \angle C = 90^\circ$$

$$c = \sqrt{a^2 + b^2} = \sqrt{76.4^2 + 39.3^2}$$

$$= 85.0273 \dots$$

$$\angle A:$$

$$\tan(A) = \frac{a}{b}$$

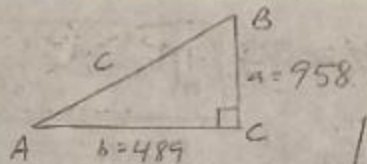
$$\Rightarrow A = \tan^{-1}\left(\frac{76.4}{39.3}\right)$$

$$= 62.7788 \dots^\circ$$

$$\angle B:$$

$$\angle B = 90^\circ - 62.8^\circ = 27.2^\circ$$

34) Given:
 $a = 958\text{m}$
 $b = 489\text{m}$



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Find

$c = 1075.6\text{m}$ $\angle B = 27.0^\circ$
 $\angle A = 63.0^\circ$ $\angle C = 90^\circ$

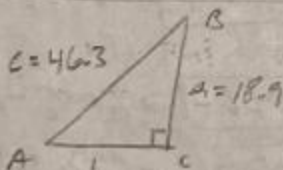
$c = \sqrt{(958)^2 + (489)^2}$
 $= 1075.5858\dots\text{m}$

$\angle A:$
 $\tan(A) = \frac{958}{489}$

$\Rightarrow A = \tan^{-1}\left(\frac{958}{489}\right) = 62.7584\dots$

$\angle B:$
 $\angle B = 90^\circ - 63.0^\circ$
 $= 27.0^\circ$

35) Given:
 $a = 18.9\text{cm}$
 $c = 46.3\text{cm}$



Find

$b = 42.3\text{cm}$ $\angle B = 65.9^\circ$
 $\angle A = 24.1^\circ$ $\angle C = 90^\circ$

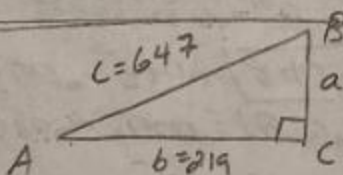
$b = \sqrt{(46.3)^2 - (18.9)^2}$
 $= 42.2667\dots\text{cm}$

$\angle A:$
 $\sin(A) = \frac{18.9}{46.3}$

$\Rightarrow A = \sin^{-1}\left(\frac{18.9}{46.3}\right) = 24.0922\dots$

$\angle B = \angle B = 90^\circ - 24.1^\circ$
 $= 65.9^\circ$

36) Given:
 $b = 219\text{m}$
 $c = 647\text{m}$



Find

$a = 608.8\text{m}$ $\angle B = 19.8^\circ$
 $\angle A = 70.2^\circ$ $\angle C = 90^\circ$

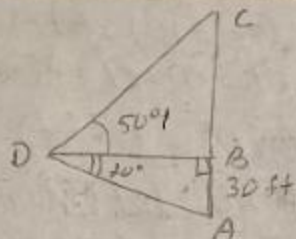
$a = \sqrt{(647)^2 - (219)^2}$
 $= 608.8086\dots\text{m}$

$\angle A:$
 $\cos(A) = \frac{219}{647}$

$\Rightarrow A = \cos^{-1}\left(\frac{219}{647}\right) = 70.2153\dots$

$\angle B:$
 $\angle B = 90^\circ - 70.2^\circ$
 $= 19.8^\circ$

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Given $AB = 30 \text{ ft}$

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$\angle ADB = 20^\circ$

$\angle BDC = 50^\circ$

Find $AC =$

Plan: In $\triangle ADB$, find length DB. Then in $\triangle BDC$ find length BC. Finally, add AB and BC to find AC

I In $\triangle ADB \Rightarrow \tan(20^\circ) = \frac{30}{DB} \Rightarrow DB = \frac{30}{\tan(20^\circ)} = 82.4243\dots$

II In $\triangle BDC \Rightarrow \tan(50^\circ) = \frac{BC}{82.4243\dots} \Rightarrow BC = \tan(50^\circ)(82.4243\dots)$

So $AC = 98.2294\dots + 30 = 128.2294\dots = 98.2294\dots$

$\rightarrow AC = \boxed{128.2 \text{ ft}}$

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AGAIN, ROUND TO THE NEAREST TENTH OF A DEGREE. DO

NOT CONCERN YOURSELF WITH MINUTES AND SECONDS.

NOTE THAT THIS ANGLE

EQUALS THE ANGLE OF DEPRESSION.

SO WE HAVE:

so $\tan(\theta) = \frac{39.82}{51.74}$

$\Rightarrow \theta = \tan^{-1}\left(\frac{39.82}{51.74}\right) = 37.5825\dots$

so $\theta = 37.6^\circ$

