Practice Exam 1

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(1) $153^\circ 31' 18''$

$$= 153^\circ + \left(\frac{31}{60}\right)^\circ + \left(\frac{18}{3600}\right)^\circ$$

$$= 153^\circ + 0.517^\circ + 0.005^\circ$$

$$= 153.52^\circ.$$

B

(2) $3z - 10 + 2z = 180$

$$5z - 10 = 180$$

$$5z = 190$$

$$z = 38$$

So, $(3z - 10)^\circ = 104^\circ$

$(2z)^\circ = 76^\circ$

C

(3) $-210^\circ + 360^\circ = 150^\circ$. C

(4) Sum of 3 angles in a triangle is 180°.

The measure of the third angle is:

$$180^\circ - (\underbrace{40^\circ 20' + 20^\circ 35'})$$

$$= 180^\circ - 60^\circ 55'$$

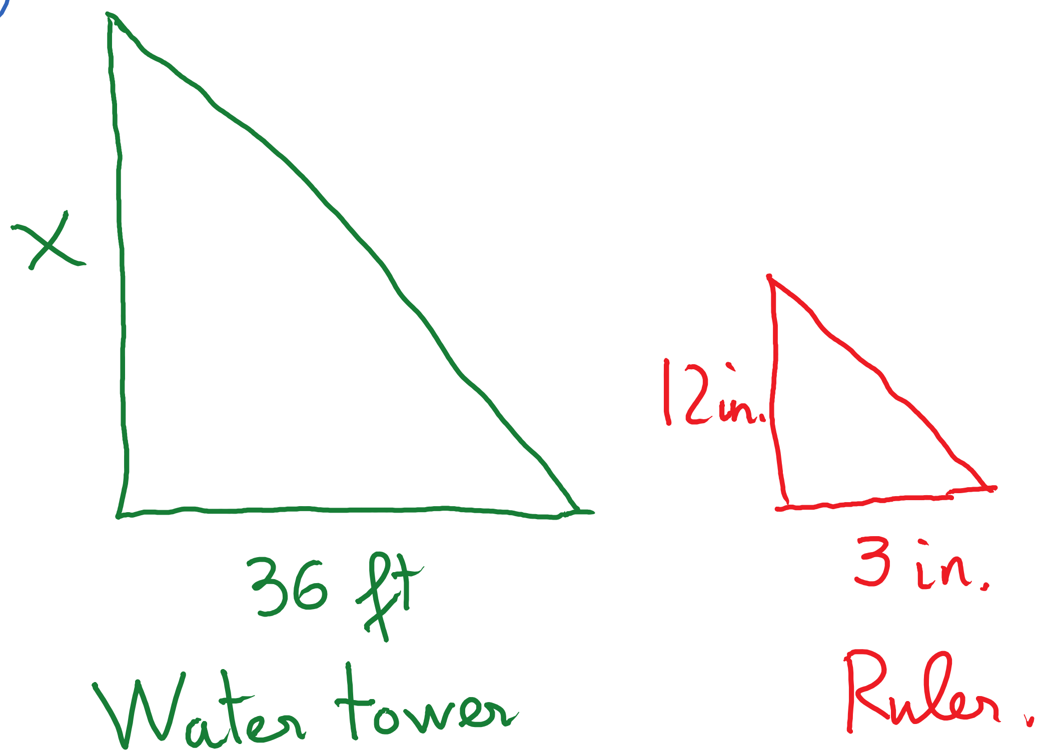
$$\begin{array}{r} 179^\circ 60' \\ - \quad 60^\circ 55' \\ \hline 119^\circ 05' \end{array}$$

B.

(5) $\frac{n}{15} = \frac{m}{9} = \frac{8}{12}$.

So, $n = \frac{8 \cdot 15}{12} = 10$; $m = \frac{8 \cdot 9}{12} = 6$. B

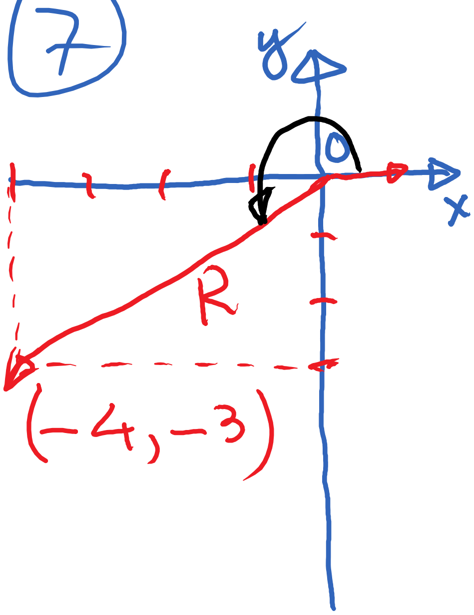
6



$$\frac{x}{36} = \frac{12}{3} = 4. \quad \text{So, } x = 144 \text{ ft.}$$

A.

7



$$R = \sqrt{(-4)^2 + (-3)^2}$$

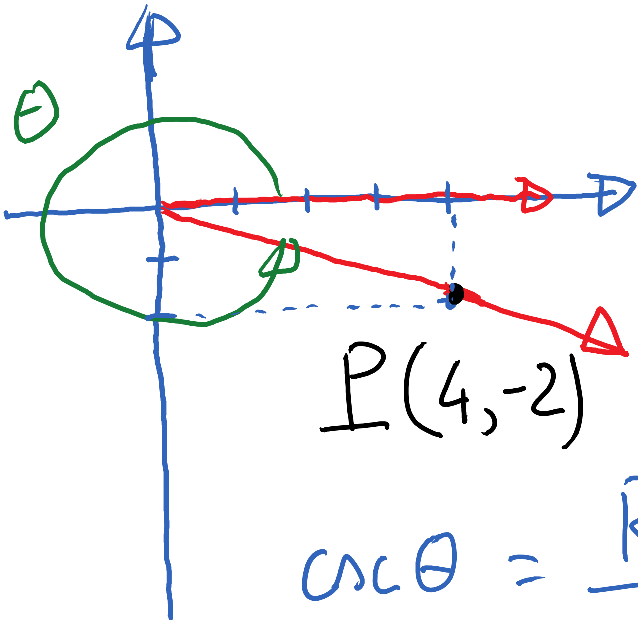
$$R = \sqrt{16 + 9} = 5$$

$$\sin\theta = \frac{y}{R} = -\frac{3}{5}; \quad \tan\theta = \frac{y}{x} = \frac{3}{4}$$

$$\cos\theta = \frac{x}{R} = -\frac{4}{5}$$

Answer: A.

(8)



$x = 4, \; y = -2$

$R = \sqrt{(4)^2 + (-2)^2}$

$R = \sqrt{20} = \sqrt{4 \cdot 5}$

$R = \sqrt{4} \cdot \sqrt{5} = 2\sqrt{5}$

$\csc\theta = \dfrac{R}{y} = \dfrac{2\sqrt{5}}{-2} = -\sqrt{5}$

$\sec\theta = \dfrac{R}{x} = \dfrac{2\sqrt{5}}{4} = \dfrac{\sqrt{5}}{2}$

$\cot\theta = \dfrac{x}{y} = \dfrac{4}{-2} = -2$

Ans: D

9) You can use a calculator to calculate

$\csc 90^\circ = \dfrac{1}{\sin 90^\circ} = 1$

$\sin 270^\circ = -1$; $\tan 180^\circ = 0$

and plug in: $(1)^2 + (-1)\cdot(0) = 1$.

Ans: C

10) $\sec\alpha < 0$. So $\dfrac{R}{x} < 0$, so $x < 0$

$\tan\alpha > 0$. So, $\dfrac{y}{x} > 0$, so $y < 0$

(bc x is already < 0)

So, α is in quadrant III and $\sin\alpha < 0$ and $\cos\alpha < 0$. The only choice with correct signs is A. Ans: A.

11) $\cos(90°) = 0$

$$\tan(90°) = \frac{\sin(90°)}{\cos(90°)} = \frac{1}{0} = \text{undefined}$$

Ans: C

12) θ could be $0°, 90°, 180°, 270°, 360°$

(quadrantal angle)

$\sin 0° = 0$, $\sin 90° = 1$, $\sin 180° = 0$

$\sin 270° = -1$, $\sin 360° = 0$

Ans: D.

13) $\cos 31°19' = \sin(90° - 31°19')$

$= \sin 58°41'$

$$\begin{array}{r} 89°60' \\ -\ 31°19' \\ \hline 58°41' \end{array}$$

Ans: C

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(14) $(\beta + 10^\circ) + (2\beta - 10^\circ) = 90^\circ$

$$3\beta = 90^\circ$$

$$\beta = 30^\circ$$

Ans: B

(15) $195^\circ 29' = \left(195 + \frac{29}{60}\right)^\circ \approx 195.483^\circ$

$95^\circ 29' = \left(95 + \frac{29}{60}\right)^\circ \approx 95.483^\circ$

$25^\circ 31' = \left(25 + \frac{31}{60}\right)^\circ \approx 25.52^\circ$

$85^\circ 31' = \left(85 + \frac{31}{60}\right)^\circ \approx 85.517^\circ$

Use calculator to calculate sine of these angles.

Ans: D.

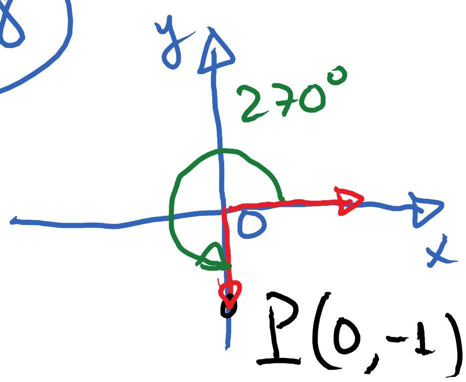
(16) $699^\circ - 360^\circ = 339^\circ$

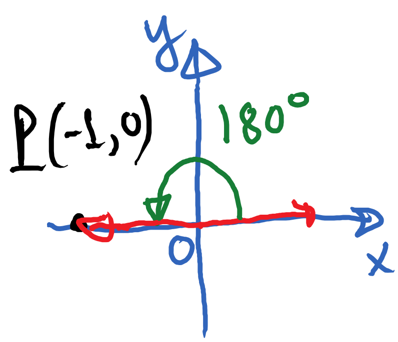
(17) $90^\circ - 49^\circ 39'$

$$\begin{array}{r} 89^\circ 60' \\ -\ 49^\circ 39' \\ \hline 40^\circ 21' \end{array}$$

So, the other acute angle is $40^\circ 21'$

(18)





$\sin 270^\circ = \frac{-1}{1} = -1$; $\tan 180^\circ = \frac{0}{-1} = 0$

$\cos 180^\circ = \frac{-1}{1} = -1$

$\sin^2 270^\circ + 3\tan 180^\circ - 5\cos 180^\circ$

$= (-1)^2 + 3 \cdot 0 - 5 \cdot (-1) = \boxed{6}$

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19 Since $\cos\alpha > 0$ and $\sin\alpha > 0$, $\tan\alpha = \frac{\sin\alpha}{\cos\alpha}$ must be positive.

$\cos\alpha = \frac{3}{5}$, so $\sec\alpha = \frac{5}{3}$.

$$\tan^2\alpha + 1 = \sec^2\alpha$$

$$\tan^2\alpha + 1 = \left(\frac{5}{3}\right)^2$$

$$\tan^2\alpha + 1 = \frac{25}{9}$$

$\tan^2\alpha = \frac{16}{9}$. So, $\tan\alpha = \pm\frac{4}{3}$.

Since $\tan\alpha > 0$, $\boxed{\tan\alpha = \frac{4}{3}}$

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$$\sin A = \frac{\text{opp.}}{\text{hyp.}} = \frac{s}{h}$$

$$\cos A = \frac{\text{adj.}}{\text{hyp.}} = \frac{135}{h}$$

$$\tan A = \frac{\text{opp.}}{\text{adj.}} = \frac{s}{135}$$