

SOLUTIONS
Practice EXAM I

Pg. 1ne

I

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|------------|------------|------------|
| ① <u>C</u> | ④ <u>B</u> | ⑦ <u>C</u> |
| ② <u>A</u> | ⑤ <u>B</u> | ⑧ <u>D</u> |
| ③ <u>E</u> | ⑥ <u>C</u> | ⑨ <u>D</u> |
| | | ⑩ <u>C</u> |

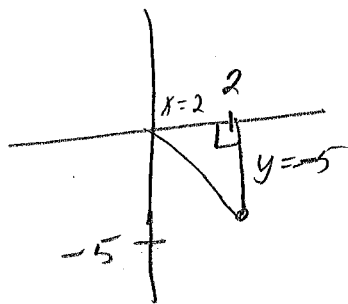
II ⑪ The angles are alternate exterior

$$\begin{aligned} \underline{\text{so}} \quad \alpha &= \beta & \underline{\text{so}} \quad \alpha &= 2(42) - 9 \\ & \Rightarrow 2x - 9 = x + 33 & &= 84 - 9 \\ & \Rightarrow \begin{array}{r} -x \quad -x \\ x - 9 = 33 \\ +9 \quad +9 \\ \hline \end{array} & &= \boxed{75^\circ} \\ & \Rightarrow x = 42 & \beta &= 42 + 33 \\ & & &= \boxed{75^\circ} \end{aligned}$$

⑫ an exterior angle equals the sum of the remote interior angles.

$$\begin{aligned} \underline{\text{so}} \quad \gamma &= \alpha + \beta & \underline{\text{so we have}} \\ \Rightarrow 5x + 20 &= (2x) + (4x) & \alpha &= 2(20) = \boxed{40^\circ} \\ \Rightarrow 5x + 20 &= 6x & \beta &= 4(20) = \boxed{80^\circ} \\ \Rightarrow \begin{array}{r} -5x \\ 5x + 20 = 6x \\ \hline \end{array} & & \gamma &= 5(20) + 20 \\ & & &= 100 + 20 \\ & & &= \boxed{120^\circ} \end{aligned}$$

III 13



$$\begin{aligned} r &= \sqrt{(x)^2 + (y)^2} \\ &= \sqrt{(2)^2 + (-5)^2} \\ &= \sqrt{4 + 25} \\ &= \sqrt{29} \end{aligned}$$

$$\begin{aligned} \text{so } x &= 2 \\ y &= -5 \\ r &= \sqrt{29} \end{aligned}$$

so we have:

$$\sin(\theta) = \frac{y}{r} = \frac{-5}{\sqrt{29}}$$

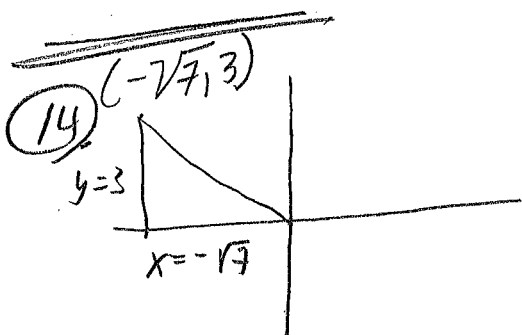
$$\csc(\theta) = \frac{r}{y} = \frac{\sqrt{29}}{-5}$$

$$\cos(\theta) = \frac{x}{r} = \frac{2}{\sqrt{29}}$$

$$\sec(\theta) = \frac{r}{x} = \frac{\sqrt{29}}{2}$$

$$\tan(\theta) = \frac{y}{x} = \frac{-5}{2}$$

$$\cot(\theta) = \frac{x}{y} = \frac{2}{-5}$$



$$\begin{aligned} r &= \sqrt{(x)^2 + (y)^2} \\ &= \sqrt{(-\sqrt{7})^2 + (3)^2} \\ &= \sqrt{7 + 9} \\ &= \sqrt{16} \\ &= 4 \end{aligned}$$

$$\begin{aligned} \text{so } x &= -\sqrt{7} \\ y &= 3 \\ r &= 4 \end{aligned}$$

so we have:

$$\sin(\theta) = \frac{y}{r} = \frac{3}{4}$$

$$\csc(\theta) = \frac{r}{y} = \frac{4}{3}$$

$$\cos(\theta) = \frac{x}{r} = \frac{-\sqrt{7}}{4}$$

$$\sec(\theta) = \frac{r}{x} = \frac{4}{-\sqrt{7}}$$

$$\tan(\theta) = \frac{y}{x} = \frac{4}{-\sqrt{7}}$$

$$\cot(\theta) = \frac{x}{y} = \frac{-\sqrt{7}}{4}$$

Pg 2 we



(15) Prove $\cos(\theta) = \frac{1}{\sec(\theta)}$

$$\begin{aligned} (*) \frac{1}{\sec(\theta)} &= \frac{1}{\frac{r}{x}} \\ &= 1 \cdot \frac{x}{r} \\ &= \frac{x}{r} \\ &= \cos(\theta) \checkmark \end{aligned}$$

(16) Prove $\tan(\theta) = \frac{\sec(\theta)}{\csc(\theta)}$

$$\begin{aligned} (*) \frac{\sec(\theta)}{\csc(\theta)} &= \frac{\frac{r}{x}}{\frac{r}{y}} \\ &= \frac{r}{x} \cdot \frac{y}{r} \\ &= \frac{y}{x} \\ &= \tan(\theta) \checkmark \end{aligned}$$

(17) Prove: $\sin(\theta) = \frac{\tan(\theta)}{\sec(\theta)}$

$$\begin{aligned} (*) \frac{\tan(\theta)}{\sec(\theta)} &= \frac{\frac{y}{x}}{\frac{r}{x}} \\ &= \frac{y}{x} \cdot \frac{x}{r} \\ &= \frac{y}{r} \\ &= \sin(\theta) \checkmark \end{aligned}$$

Alternate:

$$\begin{aligned} (*) \frac{\tan(\theta)}{\sec(\theta)} &= \frac{\frac{\sin(\theta)}{\cos(\theta)}}{\frac{1}{\cos(\theta)}} \\ &= \frac{\sin(\theta)}{\cos(\theta)} \cdot \frac{\cos(\theta)}{1} \\ &= \frac{\sin(\theta)}{1} \\ &= \sin(\theta) \checkmark \end{aligned}$$