UNIT 24 EXERCISES 6-10

TRIG

2017B 7. **Answer (B):** Because $\cos(\sin(x+\pi)) = \cos(-\sin(x)) = \cos(\sin(x))$, the function is periodic with period π. Furthermore, $\cos(\sin(x)) = 1$ if and only if $\sin(x) = 0$, which occurs if and only if x is a multiple of π, so the period cannot be less than π. Therefore the function $\cos(\sin(x))$ has least period π.

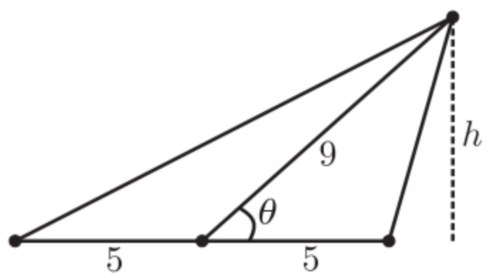
2018A 9. **Answer (E):** If $0 \le x \le \pi$ and $0 \le y \le \pi$, then $\sin(x) \ge 0$, $\sin(y) \ge 0$, $\cos(x) \le 1$, and $\cos(y) \le 1$. Therefore

$$\sin(x+y) = \sin(x) \cdot \cos(y) + \cos(x) \cdot \sin(y) \le \sin(x) + \sin(y).$$

The given inequality holds for all y such that $0 \le y \le \pi$.

2012A 10. **Answer (D):**

The area of a triangle equals one half the product of two sides and the sine of the included angle. Because the median divides the base in half, it partitions the triangle in two triangles with equal areas. Thus $\frac{1}{2} \cdot 5 \cdot 9 \sin\theta = 15$, and $\sin\theta = \frac{2 \cdot 15}{5 \cdot 9} = \frac{2}{3}$.



OR

The altitude h to the base forms a right triangle with the median as its hypotenuse, and thus $h = 9\sin\theta$. Hence the area of the original triangle is $\frac{1}{2} \cdot 10h = \frac{1}{2} \cdot 10 \cdot 9 \sin\theta = 30$, so $\sin\theta = \frac{2 \cdot 30}{10 \cdot 9} = \frac{2}{3}$.