

TMUA Practice - Trigonometry

1. What is the largest solution for  $x$  in the range  $0 \leq x < 2\pi$  for the following equation:

$$2\sin\left(2x - \frac{\pi}{3}\right) + 1 = 0$$

- A  $\frac{\pi}{12}$       B  $\frac{3\pi}{4}$       C  $\frac{13\pi}{12}$       D  $\frac{7\pi}{4}$       E  $\frac{23\pi}{12}$

2. What is the sum of the solutions for  $x$  in the range  $0 \leq x < \pi$  for the following equation:

$$\tan(2x - \pi) = 1$$

- A  $\frac{\pi}{8}$       B  $\frac{5\pi}{8}$       C  $\frac{3\pi}{4}$       D  $\frac{5\pi}{4}$       E  $\frac{7\pi}{4}$

3. How many solutions does the following equation have in the range  $0 \leq x < 2\pi$

$$2\sin(\cos x) = \sqrt{2}$$

- A 0  
B 1  
C 2  
D 3  
E infinitely many

4.  $x$  satisfies the simultaneous equations

$$2\sqrt{2}\sin 3x - \tan 3x = 3$$

$$\sqrt{2}\tan 3x + 4\sin 3x = \sqrt{2}$$

where  $0 \leq x \leq 180$ .

Find the sum of the possible values of  $x$

- A 150
- B 210
- C 315
- D 360
- E 540

5. Consider the inequality

$$\sin\left(x + \frac{\pi}{3}\right) \geq \frac{1}{2}$$

The fraction of the interval  $0 \leq x \leq 2\pi$  for which this is true, is:

- A  $\frac{1}{6}$
- B  $\frac{1}{4}$
- C  $\frac{1}{3}$
- D  $\frac{5}{12}$
- E  $\frac{1}{2}$

6. Find the greatest value of the function  $f(x) = (3\sin^2(2x - 5) - 7)^2$

- A 16
- B 25
- C 36
- D 49
- E 100

7. Find the maximum value of  $3(4^{\sin x}) - 10(2^{\sin x}) + 9$

- A  $\frac{2}{3}$       B 1      C 2      D  $\frac{19}{4}$       E 9

8. Which of the following is the largest?

- A  $\tan\left(\frac{5\pi}{4}\right)$       B  $\sin^2\left(\frac{3\pi}{4}\right)$       C  $\log_{10}\left(\frac{5\pi}{4}\right)$       D  $\log_2\left(\frac{3\pi}{4}\right)$

9. A triangle ABC is drawn with  $AC = 5\text{cm}$  and  $BC = 11\text{cm}$  and the angle at  $B$  equal to a specified angle  $\theta$ .

Of the two possible triangles that could be drawn, the larger triangle has double the area of the smaller one.

What is the value of  $\cos\theta$ ?

- A  $\frac{10}{11}$       B  $\frac{3\sqrt{12}}{11}$       C  $\frac{\sqrt{13}}{11}$       D  $\frac{\sqrt{6}}{5}$       E  $\frac{3\sqrt{6}}{25}$

10. A triangle ABC is to be drawn with the following measurements.

$AB = 10\text{cm}$  and angle  $BAC = 60^\circ$ .

Which of the following statements is/are true ?

I No such triangle can be drawn if  $BC = 7\text{cm}$

II Exactly one distinct triangle can be drawn if  $BC = 5\sqrt{3}\text{cm}$

III Exactly two distinct triangles can be drawn if  $BC = 12\text{cm}$

A none of them

B I only

C II only

D III only

E I and II only

F II and III only

G I and III only

H I, II and III