

## Math 1060 Final Exam Answers

Each instructor should verify students steps and answers and assign points according to students' skills and accuracy of the work. These answers are not intended to list all possible ways to answer the questions accurately.

1. a)  $-\frac{1}{2}$   
 b)  $\frac{1}{\sqrt{2}}$  or  $\frac{\sqrt{2}}{2}$   
 c)  $\frac{1}{\sqrt{3}}$  or  $\frac{\sqrt{3}}{3}$

b)  $\frac{1+\sqrt{3}}{\sqrt{3}-1}$  or  $2+\sqrt{3}$

2. a)  $\frac{1}{\sqrt{3}}$  or  $\frac{\sqrt{3}}{3}$   
 b)  $\sqrt{2}$   
 c)  $-\frac{2}{\sqrt{3}}$  or  $-\frac{2\sqrt{3}}{3}$

6. a)  $-\frac{1}{4}$

b)  $\frac{\sqrt{15}}{4}$

c)  $-\sqrt{15}$

d)  $\frac{4}{\sqrt{15}}$

3.  $\frac{x}{\sqrt{1-x^2}}$

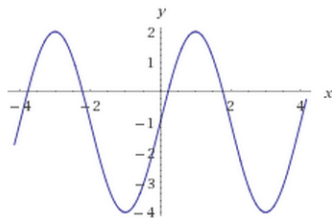
e)  $-\frac{1}{\sqrt{15}}$

4. a)  $-1$   
 b)  $4$   
 c)  $\frac{1}{4}$   
 d)  $3$   
 e)  $[-4, 2]$

7. a)  $\langle 14, -13 \rangle$

b)  $2\sqrt{5}$

c)  $\vec{u} \cdot \vec{v} = -40$ , no.



f)

8. a)  $115^\circ$

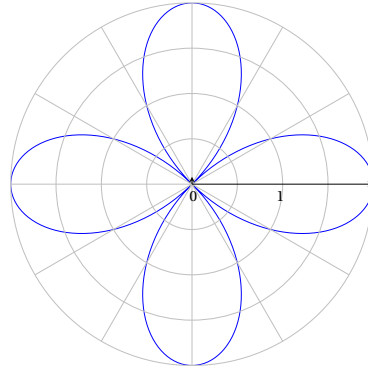
b)  $\frac{\sqrt{3}}{2}$

5. a)  $\tan(\alpha + \beta) = \frac{\tan(\alpha) + \tan(\beta)}{1 - \tan(\alpha)\tan(\beta)}$  or  
 $\frac{\sin(\alpha + \beta)}{\cos(\alpha + \beta)}$

9.  $x = \frac{\pi}{6} + \pi k$  or  $x = \frac{5\pi}{6} + \pi k$ ,  $k$  is any integer.

10.

$$\begin{aligned} \text{LHS} &= \cos(3\theta) \\ &= \cos(2\theta + \theta) \\ &= \cos(2\theta)\cos(\theta) - \sin(2\theta)\sin(\theta) \\ &= (2\cos^2(\theta) - 1)\cos(\theta) - \\ &\quad (2\sin(\theta)\cos(\theta))\sin(\theta) \\ &= 2\cos^3(\theta) - \cos(\theta) - 2\sin^2(\theta)\cos(\theta) \\ &= \text{RHS} \end{aligned}$$



15.

16.  $0.583 - 0.323i$

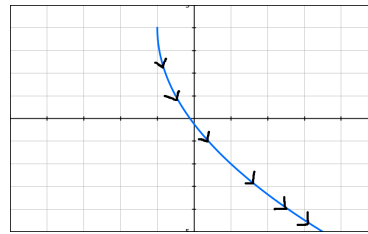
11.  $\alpha \sim 35.37^\circ, \beta \sim 43.07^\circ, \gamma \sim 101.56^\circ$

17. There are 2 triangles.

$$\begin{aligned} a_1 &\sim 1.4, \alpha_1 \sim 6.3^\circ, \beta_1 \sim 133.7^\circ; \\ a_2 &\sim 12.4, \alpha_2 \sim 93.7^\circ, \beta_2 \sim 46.3^\circ \end{aligned}$$

12.  $8.79 \text{ m}^2$

13.  $\sqrt[3]{2}(\cos(30^\circ) + i\sin(30^\circ)),$   
 $\sqrt[3]{2}(\cos(150^\circ) + i\sin(150^\circ)),$   
 $\sqrt[3]{2}(\cos(270^\circ) + i\sin(270^\circ))$



18.

14. 26.03 mph

19. 107 mph, S41°E

20. 363 feet