

1. (7.3) Find all solutions to the triangle $\triangle ABC$ if $A = 124.3^\circ$, $a = 27.3$ cm, $b = 50.2$ cm.
2. (7.3) Find all solutions to the triangle $\triangle ABC$ if $A = 43^\circ$, $a = 31$ ft, $b = 37$ ft.
3. (7.4) Find the area of $\triangle ABC$. Round your answer to the nearest hundredth.
 - (a) $A = 37^\circ$, $c = 2.4$ in, $b = 3.6$ in
 - (b) $A = 14^\circ 20'$, $C = 75^\circ 40'$, $b = 10.2$ cm
4. (7.4) Find the exact area of the triangle with dimensions 1 ft \times 14 in \times 5 in.
5. (7.5) Find the exact magnitude of the vector $\langle 6, 9 \rangle$.
6. (7.5) Find $2\mathbf{U} - 3\mathbf{V}$ for $\mathbf{U} = 7\mathbf{i} + \mathbf{j}$ and $\mathbf{V} = 2\mathbf{i} - 6\mathbf{j}$.
7. (7.6) Find the exact angle between the vectors $\mathbf{U} = 4\mathbf{i} + 3\mathbf{j}$ and $\mathbf{V} = \mathbf{i} - 2\mathbf{j}$.
8. (8.1) Evaluate the following for $z_1 = 1 - 8i$ and $z_2 = 2 + 5i$
 - (a) $4z_1 + 10z_2$
 - (b) $z_1 z_2$
 - (c) $\frac{z_1}{z_2}$
9. (8.1) Simplify: i^{83}
10. (8.2) Write in standard form.

$$6 \left(\cos \frac{2\pi}{3} + i \sin \frac{2\pi}{3} \right)$$
11. (8.2) Write each complex number in trigonometric form.
 - (a) $-13i$
 - (b) $-7 + 7i$
 - (c) 18
12. (8.3) Use de Moivre's Theorem to find

$$(\sqrt{3} - i)^6$$
13. (8.3) For $z_1 = 4\sqrt{2} - 4i\sqrt{2}$, and $z_2 = -\sqrt{3} + i$, convert each into trigonometric form and evaluate each of the following. Leave your answers in trigonometric form.
 - (a) $z_1 z_2$
 - (b) $\frac{z_1}{z_2}$
14. (8.4) Find the three cube roots of $-8i$. Write your answers in standard form.
15. (8.4) Find all solutions to the following equation. Write your answers in trigonometric form.

$$x^5 + 243 = 0$$
16. (8.5) Find two sets of polar coordinates with $0 \leq \theta < 2\pi$, that represent the same point as the rectangular coordinate, $(-1, \sqrt{3})$.
17. (8.5) Convert the rectangular equations to polar. In each equation, isolate r .
 - (a) $y = 5$
 - (b) $x^2 + (y - 4)^2 = 16$
18. (8.5) Convert the polar equations to rectangular.
 - (a) $r = 4 \sec \theta$
 - (b) $r = 7$
 - (c) $r = \frac{2}{3 \cos \theta - 4 \sin \theta}$
19. (8.6) Without using a graphing utility, sketch the graph of the polar curve $r = 4 \sin 3\theta$.

MATH 142 EXAM 4 REVIEW – ANSWERS

1. No triangle is possible
2. $B \approx 54^\circ$, $C \approx 83^\circ$, $c \approx 45$ ft; $B' \approx 126^\circ$,
 $C' \approx 11^\circ$, $c' \approx 9$ ft;
3. (a) 2.60 in^2 ; (b) 12.48 cm^2
4. $\frac{21\sqrt{31}}{4} \text{ in}^2$
5. $3\sqrt{13}$
6. $8\mathbf{i} + 20\mathbf{j}$
7. $\arccos\left(-\frac{2\sqrt{5}}{25}\right)$
8. (a) $24 + 18i$; (b) $42 - 11i$; (c) $-\frac{38}{29} - \frac{21}{29}i$
9. $-i$
10. $-3 + 3i\sqrt{3}$
11. (a) $13 \text{ cis } \frac{3\pi}{2}$; (b) $7\sqrt{2} \text{ cis } \frac{3\pi}{4}$; (c) $18 \text{ cis } 0$
12. -64
13. (a) $16 \text{ cis } 105^\circ$; (b) $4 \text{ cis } 165^\circ$
14. $2i$, $-\sqrt{3} - i$, $\sqrt{3} - i$
15. $3 \text{ cis } 36^\circ$, $3 \text{ cis } 108^\circ$, $3 \text{ cis } 180^\circ$, $3 \text{ cis } 252^\circ$, $3 \text{ cis } 324^\circ$
16. $(2, \frac{2\pi}{3})$, $(-2, \frac{5\pi}{3})$
17. (a) $r = 5 \csc \theta$; (b) $r = 8 \sin \theta$
18. (a) $x = 4$, (b) $x^2 + y^2 = 49$; (c) $3x - 4y = 2$
19. graph:

