

FINAL EXAM REVIEW

TRIGONOMETRY

Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the exact value of the expression without using a calculator or table.

1) $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$ 1) _____
 A) $\frac{7\pi}{4}$ B) $\frac{\pi}{6}$ C) $\frac{\pi}{4}$ D) $\frac{11\pi}{6}$

2) $\operatorname{arcsec}(\sqrt{2})$ 2) _____
 A) $\frac{7\pi}{4}$ B) $\frac{\pi}{4} \pm 2\pi n, \frac{7\pi}{4} \pm 2\pi n$
 C) $\frac{3\pi}{4}$ D) $\frac{\pi}{4}$

Find the exact value of the expression in degrees without using a calculator or table.

3) $\csc^{-1}(2)$ 3) _____
 A) 60° B) -30° C) 420° D) 30°

Find an equivalent algebraic expression for the composition.

4) $\cot(\arctan(x))$ 4) _____
 A) \sqrt{x} B) $\frac{1}{x}$ C) $\frac{1}{x^2}$ D) x

Find all real numbers that satisfy the equation.

5) $\cos x = 1$ 5) _____
 A) $\left\{x \mid x = \frac{\pi}{2} + 2k\pi\right\}$ B) $\{x \mid x = \pi + 2k\pi\}$
 C) $\left\{x \mid x = \frac{3\pi}{2} + 2k\pi\right\}$ D) $\{x \mid x = 0 + 2k\pi\}$

6) $\cos 2x = \frac{\sqrt{3}}{2}$ 6) _____
 A) $\left\{x \mid x = \frac{\pi}{6} + k\pi \text{ or } x = \frac{5\pi}{6} + k\pi\right\}$ B) $\left\{x \mid x = \frac{\pi}{12} + k\pi\right\}$
 C) $\left\{x \mid x = \frac{\pi}{12} + 2k\pi \text{ or } x = \frac{11\pi}{12} + 2k\pi\right\}$ D) $\left\{x \mid x = \frac{\pi}{12} + k\pi \text{ or } x = \frac{11\pi}{12} + k\pi\right\}$

Find all values of θ in $[0^\circ, 360^\circ)$ that satisfy the equation.

7) $\sin \theta = -\frac{1}{2}$ 7) _____
 A) $\{60^\circ, 300^\circ\}$ B) $\{150^\circ, 210^\circ\}$ C) $\{210^\circ, 330^\circ\}$ D) $\{60^\circ, 120^\circ\}$

Find all real numbers in $[0, 2\pi]$ that satisfy the equation.

8) $\sin 4x = \frac{\sqrt{3}}{2}$

8) _____

A) $0, \frac{\pi}{4}, \pi$

B) $\frac{\pi}{12}, \frac{\pi}{6}, \frac{2\pi}{3}, \frac{7\pi}{12}, \frac{7\pi}{6}, \frac{13\pi}{12}, \frac{5\pi}{3}, \frac{19\pi}{12}$

C) $\frac{\pi}{4}, \frac{5\pi}{4}$

D) 0

9) $\cos 2x = \frac{\sqrt{2}}{2}$

9) _____

A) $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

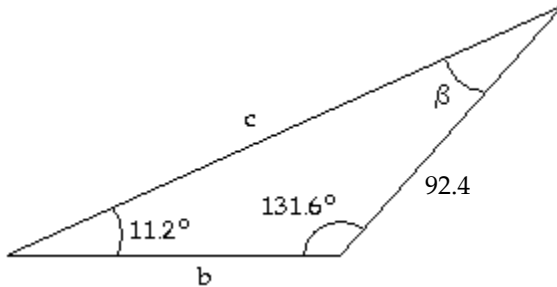
B) $\frac{\pi}{8}, \frac{7\pi}{8}, \frac{9\pi}{8}, \frac{15\pi}{8}$

C) $0, \frac{2\pi}{3}, \pi, \frac{4\pi}{3}$

D) no solution

Solve the triangle with the given parts.

10)



10) _____

A) $\beta = 37.2^\circ, b = 355.7, c = 287.6$

B) $\beta = 36.8^\circ, b = 285, c = 355.7$

C) $\beta = 37.2^\circ, b = 29.7, c = 24.1$

D) $\beta = 37.2^\circ, b = 287.6, c = 355.7$

Solve the triangle. If there is more than one triangle with the given parts, give both solutions.

11) $\beta = 65.7^\circ$

11) _____

$b = 4.42$

$a = 17.5$

A) $\alpha = 33.85^\circ, \gamma = 81.45^\circ, c = 25.92$

B) No solution

C) $\alpha = 32.85^\circ, \gamma = 81.45^\circ, c = 21.92$

D) $\alpha = 31.85^\circ, \gamma = 81.45^\circ, c = 23.92$

12) $\alpha = 30.0^\circ$

12) _____

$a = 12.79$

$b = 25.58$

A) No solution

B) $\beta = 60.0^\circ, \gamma = 60.0^\circ, c = 22.1$

C) $\beta = 90.0^\circ, \gamma = 60.0^\circ, c = 22.1$

D) $\beta = 60.0^\circ, \gamma = 90.0^\circ, c = 22.1$

Solve the triangle with the given information.

13) $\gamma = 123.5^\circ$

13) _____

$a = 4.80$

$b = 9.41$

A) $c = 18.5, \alpha = 16.4^\circ, \beta = 40.1^\circ$

B) $c = 12.7, \alpha = 18.4^\circ, \beta = 38.1^\circ$

C) $c = 15.6, \alpha = 20.4^\circ, \beta = 36.1^\circ$

D) No solution

14) $a = 8.9$
 $b = 13.2$
 $c = 16.1$

- A) $\alpha = 31.5^\circ, \beta = 55.0^\circ, \gamma = 93.4^\circ$
 C) $\alpha = 33.5^\circ, \beta = 55.0^\circ, \gamma = 91.4^\circ$

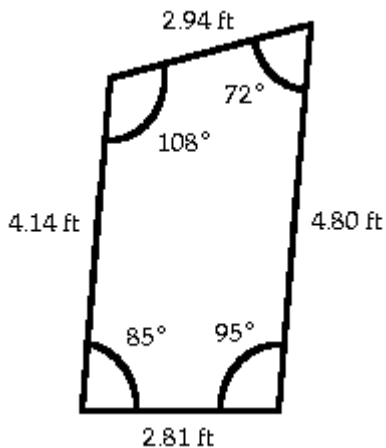
- B) $\alpha = 35.5^\circ, \beta = 53.0^\circ, \gamma = 91.4^\circ$
 D) No solution

14) _____

Solve the problem.

15) Find the area of the region.

15) _____



- A) 25.02 ft^2 B) 6.26 ft^2 C) 12.51 ft^2 D) 14.69 ft^2

Find the area of the triangle using Heron's formula. Round to the nearest unit.

16) $a = 64.6$
 $b = 65.4$
 $c = 67.2$

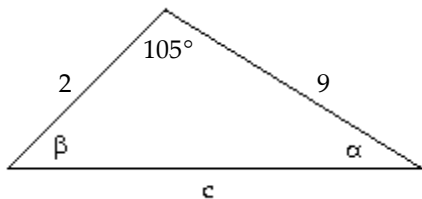
- A) 1869 B) 1947 C) 1961 D) 1941

16) _____

Find the area of the triangle. If necessary, round the answer to two decimal places.

17)

17) _____

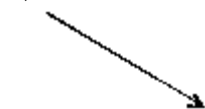


- A) 2.33 B) 8.69 C) 101.42 D) 34.77

The vectors $u, v,$ and w are drawn below. Sketch the specified vector.



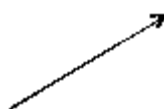
18) $u + v$
 A)



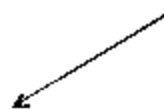
B)



C)



D)



18) _____

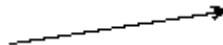
19) $\mathbf{v} + \mathbf{w}$

A)

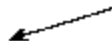


C)

B)



D)



19) _____

Find the magnitudes of the horizontal and vertical components for the vector \mathbf{v} with the given magnitude and given direction angle. Round to an appropriate number of significant digits.

20) $|\mathbf{v}| = 178.6$, $\theta = 112^\circ$

A) $|\mathbf{v}_x| = 165.6$, $|\mathbf{v}_y| = 66.9$

B) $|\mathbf{v}_x| = -66.9$, $|\mathbf{v}_y| = 165.6$

C) $|\mathbf{v}_x| = 165.6$, $|\mathbf{v}_y| = -66.9$

D) $|\mathbf{v}_x| = 66.9$, $|\mathbf{v}_y| = 165.6$

20) _____

Find the magnitude and direction angle (to the nearest tenth) of the vector. Give the measure of the direction angle as an angle in $[0^\circ, 360^\circ)$.

21) $\langle 9, 9 \rangle$

A) 9; 225°

B) 18; 45°

C) $9\sqrt{2}$; 45°

D) $9\sqrt{2}$; 225°

21) _____

22) $\langle \sqrt{21}, -1 \rangle$

A) 22; 347.7°

B) 22; 102.3°

C) $\sqrt{22}$; 347.7°

D) $\sqrt{22}$; 282.3°

22) _____

23) $\langle 0, -18 \rangle$

A) 324; 270°

B) 18; 90°

C) 18; 180°

D) 18; 270°

23) _____

Find the component form for the vector \mathbf{v} with the given magnitude and direction angle θ .

24) $|\mathbf{v}| = 78.9$, $\theta = 79.3^\circ$

A) $\langle -77.5, -14.6 \rangle$

B) $\langle 14.6, 77.5 \rangle$

C) $\langle 77.5, 14.6 \rangle$

D) $\langle -14.6, -77.5 \rangle$

24) _____

25) $|\mathbf{v}| = 153.8$, $\theta = 121.6^\circ$

A) $\langle 131.0, 80.6 \rangle$

B) $\langle 80.6, 131.0 \rangle$

C) $\langle -80.6, 131.0 \rangle$

D) $\langle 131.0, -80.6 \rangle$

25) _____

Perform the indicated operation. Use the form $\langle a, b \rangle$ for vectors.

26) $\mathbf{u} = \langle 9, 2 \rangle$, $\mathbf{v} = \langle -12, -3 \rangle$; Find $\mathbf{u} - \mathbf{v}$.

A) $\langle 11, -15 \rangle$

B) $\langle 21, 5 \rangle$

C) $\langle -3, -1 \rangle$

D) $\langle 7, -9 \rangle$

26) _____

27) $\mathbf{v} = \langle 2, 10 \rangle$; Find $-1\mathbf{v}$.

A) $\langle -2, 10 \rangle$

B) $\langle 1, 10 \rangle$

C) $\langle 1, 9 \rangle$

D) $\langle -2, -10 \rangle$

27) _____

28) $\mathbf{v} = \langle 2, 7 \rangle$, $\mathbf{u} = \langle 2, 5 \rangle$; Find $8\mathbf{v} + 9\mathbf{u}$.

A) $\langle 648, 504 \rangle$

B) $\langle 32, 108 \rangle$

C) $\langle 72, 63 \rangle$

D) $\langle 34, 101 \rangle$

28) _____

Identify the complex number as real or imaginary.

- 29) $5i$ 29) _____
A) Real B) Imaginary
- 30) 2π 30) _____
A) Real B) Imaginary
- 31) $-8 - 7i$ 31) _____
A) Real B) Imaginary

Express in terms of i.

- 32) $\sqrt{-25}$ 32) _____
A) $5i$ B) $-5i$ C) $-i\sqrt{5}$ D) ± 5

Perform the indicated operation and write the answer in the form $a + bi$, where a and b are real numbers.

- 33) $(4 - 7i) + (7 + 3i)$ 33) _____
A) $11 + 4i$ B) $11 - 4i$ C) $-11 + 4i$ D) $-3 + 10i$
- 34) $5i + (-7 - i)$ 34) _____
A) $-7 + 6i$ B) $7 - 4i$ C) $7 - 6i$ D) $-7 + 4i$
- 35) $(3 + 5i) - (-5 + i)$ 35) _____
A) $-8 - 4i$ B) $8 + 4i$ C) $-2 + 6i$ D) $8 - 4i$
- 36) $9i(5 - 6i)$ 36) _____
A) $54 + 45i$ B) $45i - 54$ C) $45i + 54i^2$ D) $45i - 54i^2$
- 37) $(9 - 4i)(2 + 6i)$ 37) _____
A) $42 - 46i$ B) $42 + 46i$ C) $-6 - 62i$ D) $-24i^2 + 46i + 18$
- 38) $(6 - 4i)^2$ 38) _____
A) $36 + 16i$ B) $52 - 48i$ C) $20 - 48i$ D) $36 - 16i$

Evaluate the indicated power of i.

- 39) i^8 39) _____
A) -1 B) i C) $-i$ D) 1
- 40) i^{42} 40) _____
A) $-i$ B) 1 C) i D) -1

Write the quotient in the form $a + bi$.

- 41) $\frac{9 + 3i}{3 - 4i}$ 41) _____
A) $\frac{39}{5} + \frac{27}{5}i$ B) $-\frac{3}{7} + \frac{9}{7}i$ C) $\frac{3}{5} + \frac{9}{5}i$ D) $-\frac{39}{7} + \frac{9}{7}i$

42) $\frac{9}{i}$ 42) _____
 A) -9 B) -9i C) 9 D) 9i

43) $\frac{4}{7i}$ 43) _____
 A) $-\frac{4}{7}$ B) $\frac{4}{7}$ C) $\frac{4}{7}i$ D) $-\frac{4}{7}i$

Write the expression in the form $a + bi$, where a and b are real numbers.

44) $10 + \sqrt{-81}$ 44) _____
 A) 1 B) $10 - 9i$ C) $10 + 9i$ D) $10 + i$

45) $\frac{\sqrt{-16}}{\sqrt{-4}}$ 45) _____
 A) 2 B) $4i$ C) $-2i$ D) $2i$

Find the absolute value of the complex number. Round your answer to two decimal places, if necessary.

46) $6 + 3i$ 46) _____
 A) 6.71 B) 3.00 C) 4.18 D) 9

47) $3 - 3i$ 47) _____
 A) 9 B) 4.24 C) 3.46 D) 2.45

Write the complex number in trigonometric form, using degree measure for the argument.

48) -5 48) _____
 A) $5(\cos 270^\circ + i \sin 270^\circ)$ B) $5(\cos 0^\circ + i \sin 0^\circ)$
 C) $5(\cos 180^\circ + i \sin 180^\circ)$ D) $5(\cos 90^\circ + i \sin 90^\circ)$

49) $-15 + 20i$ 49) _____
 A) $25(\cos 126.9^\circ + i \sin 126.9^\circ)$ B) $25(\cos 306.9^\circ + i \sin 306.9^\circ)$
 C) $25(\cos 53.1^\circ + i \sin 53.1^\circ)$ D) $25(\cos 233.1^\circ + i \sin 233.1^\circ)$

Write the complex number in the form $a + bi$.

50) $8(\cos 30^\circ + i \sin 30^\circ)$ 50) _____
 A) $4 + 4\sqrt{3}i$ B) $\frac{1}{4} + \frac{\sqrt{3}}{4}i$ C) $\frac{\sqrt{3}}{4} + \frac{1}{4}i$ D) $4\sqrt{3} + 4i$

51) $\frac{5}{2}(\cos 150^\circ + i \sin 150^\circ)$ 51) _____
 A) $-\frac{\sqrt{3}}{4} + \frac{1}{4}i$ B) $-\frac{\sqrt{3}}{4} + \frac{1}{2}i$ C) $-\frac{5\sqrt{3}}{4} + \frac{5}{4}i$ D) $-\frac{5\sqrt{3}}{4} + \frac{5}{2}i$

Perform the indicated operation. Write the answer in the form $a + bi$.

52) $3(\cos 30^\circ + i \sin 30^\circ) \cdot 2(\cos 90^\circ + i \sin 90^\circ)$ 52) _____
 A) $2\sqrt{6} - \sqrt{2}i$ B) $-3 + 3\sqrt{3}i$ C) $-6 - 6\sqrt{3}i$ D) $3 - 12\sqrt{3}i$

53) $\frac{5(\cos 200^\circ + i \sin 200^\circ)}{4(\cos 50^\circ + i \sin 50^\circ)}$

53) _____

A) $-2 + 2\sqrt{3}i$

B) $-\frac{1}{2} + \frac{\sqrt{3}}{2}i$

C) $-10 + 10\sqrt{3}i$

D) $-\frac{5\sqrt{3}}{8} + \frac{5}{8}i$

Answer Key

Testname: FINALEXAM_REVIEW

- 1) B
- 2) D
- 3) D
- 4) B
- 5) D
- 6) D
- 7) C
- 8) B
- 9) B
- 10) D
- 11) B
- 12) C
- 13) B
- 14) C
- 15) C
- 16) A
- 17) B
- 18) C
- 19) C
- 20) B
- 21) C
- 22) C
- 23) D
- 24) B
- 25) C
- 26) B
- 27) D
- 28) D
- 29) B
- 30) A
- 31) B
- 32) A
- 33) B
- 34) D
- 35) B
- 36) A
- 37) B
- 38) C
- 39) D
- 40) D
- 41) C
- 42) B
- 43) D
- 44) C
- 45) A
- 46) A
- 47) B
- 48) C
- 49) A
- 50) D

Answer Key

Testname: FINALEXAM_REVIEW

51) C

52) B

53) D