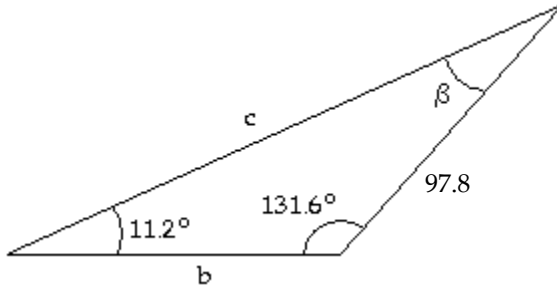


Name \_\_\_\_\_

Solve the triangle with the given parts.

1)



A)  $\beta = 37.2^\circ, b = 304.5, c = 376.5$

B)  $\beta = 37.2^\circ, b = 376.5, c = 304.5$

C)  $\beta = 36.8^\circ, b = 301.6, c = 376.5$

D)  $\beta = 37.2^\circ, b = 31.4, c = 25.5$

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

2)  $\beta = 16.6^\circ$

$b = 9.52$

$a = 18.9$

A)  $\alpha = 7.3^\circ, \gamma = 155.1^\circ, c = 30.4$

B)  $\alpha = 9.3^\circ, \gamma = 155.1^\circ, c = 31.4$

C)  $\alpha = 34.6^\circ, \gamma = 128.8^\circ, c = 26.0$

D)  $\alpha = 8.3^\circ, \gamma = 155.1^\circ, c = 28.4$

$\alpha' = 145.4^\circ, \gamma' = 18.0^\circ, c' = 10.3$

3)  $\beta = 37.3^\circ$

$b = 10.51$

$a = 22.2$

A)  $\alpha = 17.65^\circ, \gamma = 124.05^\circ, c = 34.71$

B) No solution

C)  $\alpha = 19.65^\circ, \gamma = 124.05^\circ, c = 36.71$

D)  $\alpha = 18.65^\circ, \gamma = 124.05^\circ, c = 32.71$

Approximate the area of the triangle to the nearest tenth.

4)  $\beta = 95.5^\circ, \gamma = 33.2^\circ, a = 23.2$

A) 375.9

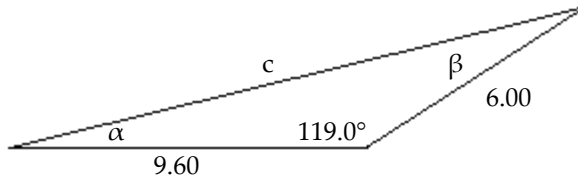
B) 187.9

C) 147.4

D) 222.2

Solve the triangle. Approximate values to the nearest tenth when appropriate.

5)



A)  $c = 19.4$ ,  $\alpha = 20.7^\circ$ ,  $\beta = 40.3^\circ$

B)  $c = 16.5$ ,  $\alpha = 24.7^\circ$ ,  $\beta = 36.3^\circ$

C)  $c = 13.6$ ,  $\alpha = 22.7^\circ$ ,  $\beta = 38.3^\circ$

D) No solution

Approximate the area of the triangle to the nearest tenth.

6)  $a = 40$ ,  $b = 52$ ,  $c = 61$

A) 1544.6

B) 1287.1

C) 117.7

D) 1029.7

Solve.

7) Two ships leave a harbor together traveling on courses that have an angle of  $126^\circ$  between them. If they each travel 521 miles, how far apart are they (to the nearest mile)?

A) 41 mi

B) 1856 mi

C) 928 mi

D) 473 mi

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

8)  $\langle -6\sqrt{3}, 6 \rangle$

A) 24;  $30^\circ$

B) 24;  $150^\circ$

C) 12;  $330^\circ$

D) 12;  $150^\circ$

Find the component form for the vector with the given magnitude and direction angle  $\theta$ . Round values to the nearest tenth.

9)  $|\mathbf{v}| = 116.9$ ,  $\theta = 105.2^\circ$

A)  $\langle 30.7, 112.8 \rangle$

B)  $\langle -30.7, 112.8 \rangle$

C)  $\langle 112.8, -30.7 \rangle$

D)  $\langle 112.8, 30.7 \rangle$

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

10)  $\mathbf{v} = \langle 9, -9 \rangle$ ,  $\mathbf{u} = \langle 4, 2 \rangle$ ; Find  $7\mathbf{v} - 4\mathbf{u}$ .

A)  $\langle 0, -24 \rangle$

B)  $\langle 0, -168 \rangle$

C)  $\langle 47, -71 \rangle$

D)  $\langle 91, 28 \rangle$

11)  $\mathbf{u} = \langle -9, -11 \rangle$  and  $\mathbf{v} = \langle 11, -6 \rangle$ ; Find  $\mathbf{u} \cdot \mathbf{v}$ .

A) -99

B) -165

C) 66

D) -33

Find the angle between the given vectors to the nearest tenth of a degree.

12)  $\langle -5, 8 \rangle$ ,  $\langle -7, -1 \rangle$

A)  $23.1^\circ$

B)  $76.1^\circ$

C)  $33.1^\circ$

D)  $66.1^\circ$

State if the vectors  $\mathbf{a}$  and  $\mathbf{b}$  are perpendicular, parallel, or neither. If  $\mathbf{a}$  and  $\mathbf{b}$  are parallel, state whether they point in the same direction or in opposite directions.

13)  $\mathbf{a} = \langle 8, 0 \rangle$ ,  $\mathbf{b} = \langle 0, -7 \rangle$

- A) Parallel, opposite directions  
C) Perpendicular

- B) Parallel, same direction  
D) Neither

14)  $\mathbf{a} = \langle 7, 6 \rangle$ ,  $\mathbf{b} = \langle -5, 1 \rangle$

- A) Perpendicular  
C) Parallel, same direction

- B) Parallel, opposite directions  
D) Neither

Express the given vector as a linear combination of the unit vectors  $\mathbf{i}$  and  $\mathbf{j}$ .

15)  $\langle \sqrt{5}, -5 \rangle$

A)  $-5\mathbf{i} + \sqrt{5}\mathbf{j}$

B)  $5\mathbf{i} + 25\mathbf{j}$

C)  $\sqrt{5}\mathbf{i} - 5\mathbf{j}$

D)  $\sqrt{5}\mathbf{i} + 5\mathbf{j}$

Perform the operation on the given vectors and find the magnitude and direction angle for the new vector.

16) Given  $\mathbf{A} = \langle 7, 2 \rangle$  and  $\mathbf{B} = \langle 5, 9 \rangle$

$\mathbf{A} - \mathbf{B}$

A)  $\sqrt{53}$ ,  $-73.1^\circ$

B) 14,  $74.1^\circ$

C)  $\sqrt{45}$ ,  $105.9^\circ$

D)  $\sqrt{53}$ ,  $285.9^\circ$

Find the absolute value of the complex number.

17)  $-3 + 2i$

A) 13

B) 5

C)  $\sqrt{13}$

D)  $\sqrt{5}$

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

18)  $-4\sqrt{2} + 4i\sqrt{2}$

A)  $8(\cos(-135^\circ) + i \sin(-135^\circ))$

B)  $8(\cos 135^\circ + i \sin 135^\circ)$

C)  $8(\cos 45^\circ + i \sin 45^\circ)$

D)  $8(\cos(-45^\circ) + i \sin(-45^\circ))$

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

19)  $\sqrt{3} \left[ \cos \frac{\pi}{3} + i \sin \frac{\pi}{3} \right]$

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

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

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

D)  $\frac{\sqrt{3}}{2} + \frac{3}{2}i$

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

20)  $[\sqrt{5}(\cos(5\pi/12) + i \sin(5\pi/12))]^2$

A)  $-\frac{15}{2} - \frac{1}{2}i$

B)  $\frac{5\sqrt{3}}{2} + \frac{5}{2}i$

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

D)  $-\frac{5\sqrt{3}}{2} + \frac{5}{2}i$

$$21) \frac{6(\cos \frac{3\pi}{2} + i \sin \frac{3\pi}{2})}{12(\cos \frac{5\pi}{2} + i \sin \frac{5\pi}{2})}$$

A)  $-\frac{1}{2}$

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

C)  $1 + \sqrt{3}i$

D)  $\frac{1}{4} + \frac{\sqrt{3}}{4}i$

Use De Moivre's theorem to simplify the expression. Write the answer in a + bi form.

22)  $(1 + i)^{20}$

Find all the complex roots. Write the answer in the indicated form.

23) The complex cube roots of  $216(\cos 135^\circ + i \sin 135^\circ)$  (polar form)

24) The complex fourth roots of  $-16$  (rectangular form)