

**CHAPTER 7, FORM E  
TRIGONOMETRY**

NAME \_\_\_\_\_  
DATE \_\_\_\_\_

Choose the best answer.

1. Given that  $b = 21$  and  $c = 39$  in a triangle  $ABC$ , which of the following is impossible?
- a.  $a = 57$                       b.  $a = 20$   
c.  $a = 25$                       d.  $a = 12$

1. \_\_\_\_\_

Find the indicated part of each triangle  $ABC$ .

2.  $B = 35^\circ$ ,  $C = 82^\circ 15'$ ,  $b = 17.2$  cm; find  $c$ .
- a. 12.3 cm                      b. 24.5 cm  
c. 29.7 cm                      d. 33.8 cm

2. \_\_\_\_\_

3.  $C = 42^\circ 10'$ ,  $a = 15.3$  ft,  $c = 23.4$  ft; find  $A$ .
- a.  $13^\circ 08'$                       b.  $26^\circ 02'$   
c.  $40^\circ 32'$                       d.  $59^\circ 43'$

3. \_\_\_\_\_

4.  $a = 13$  in.,  $b = 31$  in.,  $C = 42^\circ$ ; find the area of the triangle  $ABC$ .
- a.  $78$  in.<sup>2</sup>                      b.  $109$  in.<sup>2</sup>  
c.  $118$  in.<sup>2</sup>                      d.  $135$  in.<sup>2</sup>

4. \_\_\_\_\_

Solve each triangle  $ABC$  having the given information.

5.  $a = 32$  m,  $b = 47$  m,  $c = 68$  m
- a.  $A: 22^\circ$ ,  $B: 45^\circ$ ,  $C: 113^\circ$   
b.  $A: 65^\circ$ ,  $B: 52^\circ$ ,  $C: 63^\circ$   
c.  $A: 25^\circ$ ,  $B: 38^\circ$ ,  $C: 117^\circ$   
d.  $A: 19^\circ$ ,  $B: 72^\circ$ ,  $C: 89^\circ$

5. \_\_\_\_\_

6.  $C = 113^\circ 25'$ ,  $a = 16.9$  ft,  $b = 42.3$  ft
- a.  $c: 51.4$  ft,  $A: 17^\circ 33'$ ,  $B: 49^\circ 02'$   
b.  $c: 62.7$  ft,  $A: 19^\circ 42'$ ,  $B: 46^\circ 53'$   
c.  $c: 42.3$  ft,  $A: 12^\circ 25'$ ,  $B: 54^\circ 10'$   
d.  $c: 38.8$  ft,  $A: 23^\circ 33'$ ,  $B: 43^\circ 02'$

6. \_\_\_\_\_

7.  $a = 13$  in.,  $b = 17$  in.,  $c = 28$  in.; find the area of the triangle using Heron's formula.
- a.  $75$  in.<sup>2</sup>                      b.  $88$  in.<sup>2</sup>  
c.  $92$  in.<sup>2</sup>                      d.  $103$  in.<sup>2</sup>

7. \_\_\_\_\_

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Solve each problem.

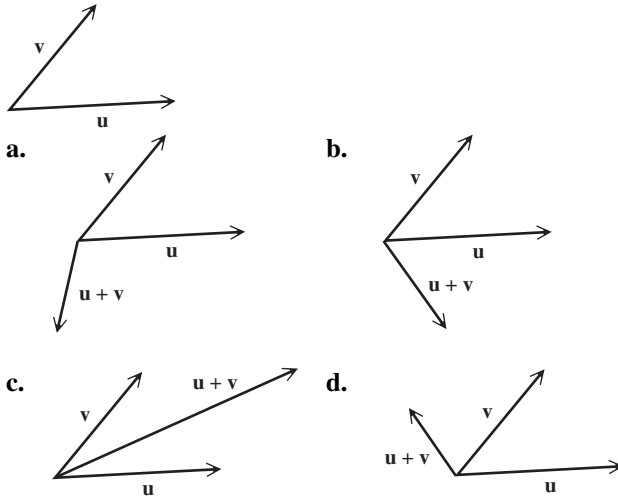
8. The sides of a triangular lot measure 120 m, 155 m, and 242 m. Find the area of the lot. 8. \_\_\_\_\_
- a.  $4501 \text{ m}^2$                       b.  $5498 \text{ m}^2$   
 c.  $7819 \text{ m}^2$                       d.  $8017 \text{ m}^2$

9. Two towers are 5.1 mi apart. An observer on tower A spots a fire at a bearing of  $53.8^\circ$ . An observer at tower B spots the same fire at a bearing of  $319.6^\circ$ . How far is the fire from each observer? 9. \_\_\_\_\_
- a. 2.1, 3.9 mi                      b. 3.0, 3.9 mi  
 c. 2.9, 3.2 mi                      d. 2.7, 4.3 mi

10. The magnitudes of vector  $\mathbf{u}$  and vector  $\mathbf{v}$  both equal 5. Which of the following is *always* true? 10. \_\_\_\_\_
- a.  $|\mathbf{u} + \mathbf{v}| = 5$                       b.  $|\mathbf{u} + \mathbf{v}| = 0$   
 c.  $\theta = 0^\circ$                               d. None of these

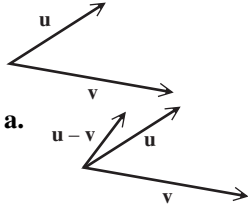
Determine which sketch best represents the indicated vector.

11.  $\mathbf{u} + \mathbf{v}$  11. \_\_\_\_\_



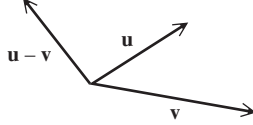
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12.  $u - v$

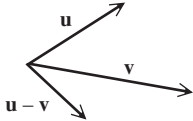


a.

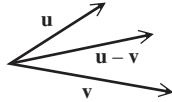
b.



c.



d.



12. \_\_\_\_\_

13. Forces of 32.4 and 54.6 pounds are combined at an angle of  $65^\circ$ . Find the magnitude of the resultant force.

- a. 74.3 lb  
c. 65.2 lb

- b. 53.7 lb  
d. 87.0 lb

13. \_\_\_\_\_

14. Find the magnitude and direction angle for  $\mathbf{u} = \langle -3, -4 \rangle$ , rounded to the nearest tenth.

- a. 5.0,  $53.1^\circ$   
c. 5.0,  $233.1^\circ$

- b. 7,  $112.3^\circ$   
d. 65,  $67.4^\circ$

14. \_\_\_\_\_

15. Write  $\mathbf{u}$  in the form  $\langle a, b \rangle$  if  $|\mathbf{u}| = 5$  and the direction angle of  $\mathbf{u} = 120^\circ$ .

a.  $\left\langle -\frac{5}{2}, \frac{5\sqrt{3}}{2} \right\rangle$

b.  $\left\langle \frac{5}{2}, \frac{5\sqrt{3}}{2} \right\rangle$

c.  $\left\langle \frac{\sqrt{3}}{2}, \frac{1}{2} \right\rangle$

d.  $\left\langle -\frac{5\sqrt{3}}{2}, \frac{5}{2} \right\rangle$

15. \_\_\_\_\_

Find the *vertical* component of each vector, where  $\alpha$  is the inclination of the vector from the horizontal.

16.  $\alpha = 71^\circ$ ; magnitude 59.1

- a. 21.6  
c. 42.5

- b. 55.9  
d. 42.7

16. \_\_\_\_\_

17.  $\alpha = 72^\circ$ , magnitude 125.4

- a. -14.8  
c. 102.5

- b. 57.9  
d. 119.3

17. \_\_\_\_\_

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Solve each problem.

- 18.** A force of 745 pounds just keeps a 4100-pound vehicle from rolling down a hill. To the nearest tenth of a degree, what angle does the hill make with the horizontal?  
**a.**  $5.6^\circ$                       **b.**  $7.6^\circ$   
**c.**  $9.8^\circ$                       **d.**  $10.5^\circ$                       **18.** \_\_\_\_\_
- 19.** A force of 63.5 pounds makes an angle of  $47^\circ 10'$  with a force of 18.7 pounds. Find the angle made by the equilibrant with the 63.5-lb force.  
**a.**  $118.7^\circ$                       **b.**  $132.4^\circ$   
**c.**  $147.3^\circ$                       **d.**  $169.8^\circ$                       **19.** \_\_\_\_\_
- 20.** A plane is heading due east with a ground speed of 398 mph. A 50-mph wind is blowing at a bearing of  $48^\circ$ . Find the planes resulting speed.  
**a.** 412 mph                      **b.** 436 mph  
**c.** 444 mph                      **d.** 458 mph                      **20.** \_\_\_\_\_

**CHAPTER 7, FORM F  
TRIGONOMETRY**

NAME \_\_\_\_\_  
DATE \_\_\_\_\_

Choose the best answer.

1. Given that  $a = 19$  and  $c = 42$  in a triangle  $ABC$ , which of the following is impossible? 1. \_\_\_\_\_
- a.  $b = 59$                       b.  $b = 35$   
c.  $b = 28$                       d.  $b = 22$

Find the indicated part of each triangle  $ABC$ .

2.  $A = 40^\circ$ ,  $C = 72^\circ 45'$ ,  $c = 23.2$  m; find  $a$ . 2. \_\_\_\_\_
- a. 11.8 m                      b. 12.3 m  
c. 13.4 m                      d. 15.6 m
3.  $B = 36^\circ 30'$ ,  $a = 42.7$  ft,  $b = 25.8$  ft; find  $A$ . 3. \_\_\_\_\_
- a.  $8^\circ 44'$                       b.  $53^\circ 30'$   
c.  $58^\circ 32'$                       d.  $79^\circ 53'$
4.  $b = 24$  in.,  $c = 17$  in.,  $A = 35^\circ$ ; find the area of the triangle  $ABC$ . 4. \_\_\_\_\_
- a.  $56 \text{ in.}^2$                       b.  $117 \text{ in.}^2$   
c.  $121 \text{ in.}^2$                       d.  $143 \text{ in.}^2$

Solve each triangle  $ABC$  having the given information.

5.  $a = 95$  ft,  $b = 140$  ft,  $c = 205$  ft 5. \_\_\_\_\_
- a.  $A: 66^\circ, B: 84^\circ, C: 30^\circ$     b.  $A: 32^\circ, B: 52^\circ, C: 96^\circ$   
c.  $A: 36^\circ, B: 50^\circ, C: 94^\circ$     d.  $A: 24^\circ, B: 36^\circ, C: 120^\circ$
6.  $B = 128^\circ 40'$ ,  $a = 25.3$  m,  $c = 42.3$  m 6. \_\_\_\_\_
- a.  $b: 35.3$  m,  $A: 29^\circ 21'$ ,  $C: 22^\circ 59'$   
b.  $b: 33.0$  m,  $A: 36^\circ 43'$ ,  $C: 14^\circ 37'$   
c.  $b: 61.4$  m,  $A: 18^\circ 47'$ ,  $C: 32^\circ 33'$   
d.  $b: 42.9$  m,  $A: 12^\circ 42'$ ,  $C: 39^\circ 38'$
7.  $a = 22$  in.,  $b = 26$  in.,  $c = 38$  in.; find the area of the triangle using Heron's formula. 7. \_\_\_\_\_
- a.  $109 \text{ in.}^2$                       b.  $158 \text{ in.}^2$   
c.  $206 \text{ in.}^2$                       d.  $277 \text{ in.}^2$

Solve each problem.

8. The sides of a triangular lot measure 85 ft, 105 ft, and 162 ft. Find the area of the lot. 8. \_\_\_\_\_
- a.  $3214 \text{ ft}^2$                       b.  $3990 \text{ ft}^2$   
c.  $4322 \text{ ft}^2$                       d.  $5323 \text{ ft}^2$

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9. A plane travels at a bearing of  $62.4^\circ$  from point A for 105.7 mi. The plane then travels for 93.6 miles at a bearing of  $125.2^\circ$ . How far is the plane from point A.

- a. 170.2 mi                      b. 178.6 mi  
c. 193.4 mi                      d. 205.8 mi

9. \_\_\_\_\_

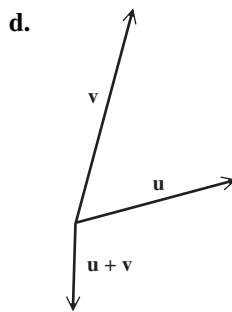
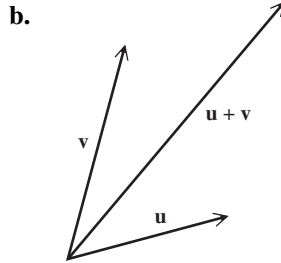
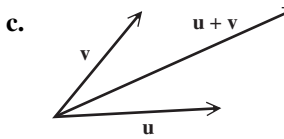
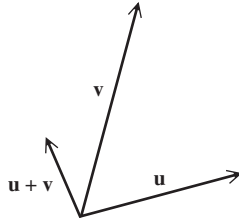
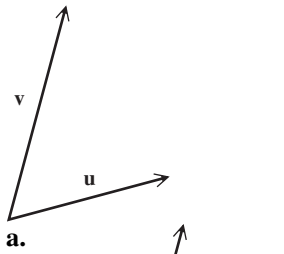
10. The angle between vector  $\mathbf{u}$  and vector  $\mathbf{v}$  measures  $30^\circ$ . What is the angle between vector  $\mathbf{u}$  and vector  $\mathbf{u} + \mathbf{v}$ ?

- a.  $10^\circ$                               b.  $15^\circ$   
c.  $20^\circ$                               d. Cannot be determined from given information.

10. \_\_\_\_\_

Determine which sketch best represents the indicated vector.

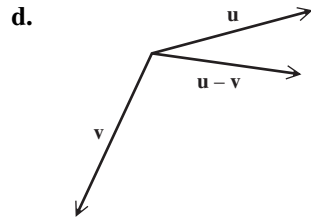
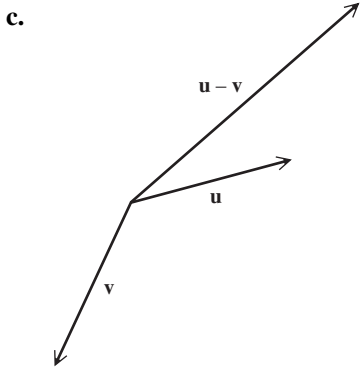
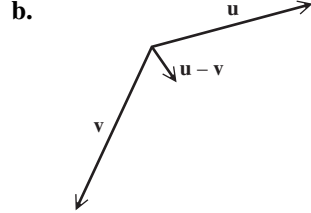
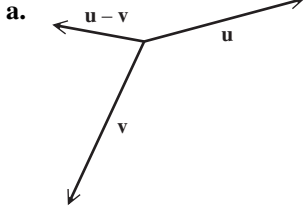
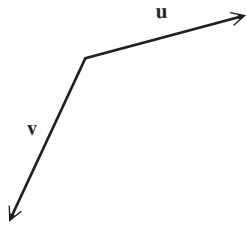
11.  $\mathbf{u} + \mathbf{v}$



11. \_\_\_\_\_

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12.  $u - v$



12. \_\_\_\_\_

13. Forces of 12.0 and 22.0 pounds are combined at an angle of  $58^\circ$ . Find the magnitude of the resultant force.

- a. 15 lb                      b. 30 lb  
c. 32 lb                      d. 35 lb

13. \_\_\_\_\_

14. Find the magnitude and direction angle for  $\mathbf{u} = \langle -3, 8 \rangle$ , rounded to the nearest tenth.

- a. 7.4,  $290.6^\circ$               b. 8.5,  $110.6^\circ$   
c. 5.0,  $75.8^\circ$                 d. 9.3,  $117.3^\circ$

14. \_\_\_\_\_

15. Write  $\mathbf{u}$  in the form  $\langle a, b \rangle$  if  $|\mathbf{u}| = 7$  and the direction angle of  $\mathbf{u} = 135^\circ$ .

- a.  $\left\langle -\frac{7\sqrt{2}}{2}, \frac{7\sqrt{2}}{2} \right\rangle$               b.  $\left\langle -\frac{7\sqrt{2}}{2}, -\frac{7\sqrt{2}}{2} \right\rangle$   
c.  $\left\langle -\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2} \right\rangle$                 d.  $\left\langle \frac{7\sqrt{2}}{2}, \frac{7\sqrt{2}}{2} \right\rangle$

15. \_\_\_\_\_

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Find the *horizontal* component of each vector, where  $\alpha$  is the inclination of the vector from the horizontal.

- 16.**  $\alpha = 58^\circ$ ; magnitude 89.5 **16.** \_\_\_\_\_  
**a.** -26.7 **b.** 41.6  
**c.** 47.4 **d.** 516.6
- 17.**  $\alpha = 49^\circ$ , magnitude 26.8 **17.** \_\_\_\_\_  
**a.** 9.9 **b.** 17.6  
**c.** 59.8 **d.** 142.6

Solve each problem.

- 18.** A force of 275 pounds just keeps a 3800-pound vehicle from rolling down a hill. To the nearest tenth of a degree, what angle does the hill make with the horizontal? **18.** \_\_\_\_\_  
**a.**  $2.3^\circ$  **b.**  $2.8^\circ$   
**c.**  $4.2^\circ$  **d.**  $5.1^\circ$
- 19.** A force of 42.5 pounds makes an angle of  $44^\circ 15'$  with a force of 23.8 pounds. Find the angle made by the equilibrant with the 42.5-pound force. **19.** \_\_\_\_\_  
**a.**  $15.6^\circ$  **b.**  $106.0^\circ$   
**c.**  $164.4^\circ$  **d.**  $173.2^\circ$
- 20.** A plane is heading due north with a ground speed of 450 mph. A 35-mph wind is blowing at a bearing of  $62^\circ$ . Find the planes resulting speed. **20.** \_\_\_\_\_  
**a.** 405 mph **b.** 467 mph  
**c.** 470 mph **d.** 503 mph