

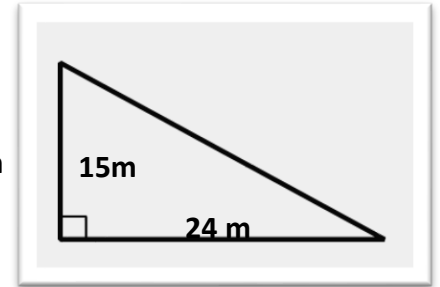
**Physics CP 2 D Pre-Test**

Copy # \_\_\_\_\_

**Unit 2: Vectors**

Directions: DO NOT WRITE on this pre-test!! Choose only the best answer to each question.

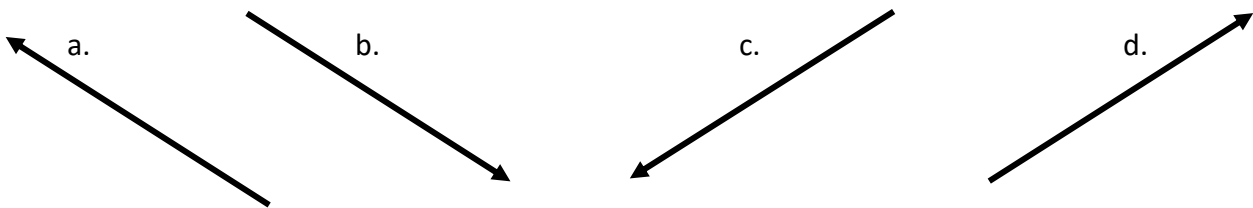
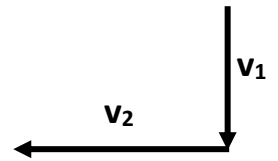
1. What is the length of the third side of the triangle pictured?  
 a. 39 m      b. 28.3 m      c. 18.7 m      d. 9 m



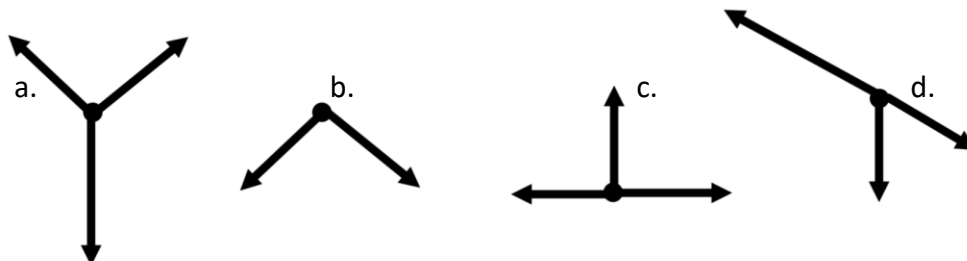
2. What is the direction (from East) of the resultant of two velocity vectors A and B, if A is 30 m/s east and B is 52 m/s south?  
 a. 60° south of east                      c. 41° south of east  
 b. 30° south of east                      d. 60° east of south

3. An airplane is flying at 120 m/s in a direction 37° east of north. What is the east component of the plane's velocity?  
 a. 37 m/s      b. 96 m/s      c. 90 m/s      d. 72 m/s

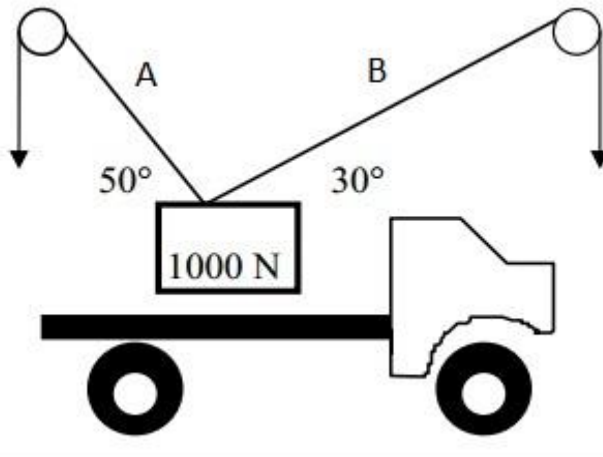
4. An object changes its velocity from  $V_1$  to  $V_2$  during a time interval  $t$ . Which of the following is the correct direction for the object's acceleration?



5. Which one of these sets of forces will keep the object in equilibrium?



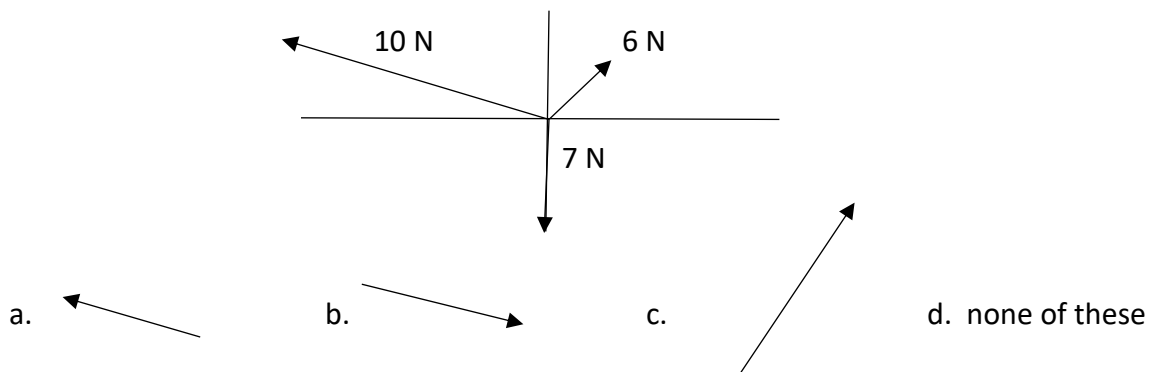
6. In the diagram below, which rope has more tension, or are they the same?
- Rope A
  - Rope B
  - Same
  - Cannot be determined



7. Marci, who weighs 375 N, stands on a scaffold which weighs 420 N. If the tension in the right rope is 450 N, what is the tension in the left rope?
- 1245 N
  - 405 N
  - 450 N
  - 345 N
8. A 15-N force and a 45-N force act on an object in opposite directions. What is the net force on the object?
- 15 N
  - 30 N
  - 45 N
  - 60 N
  - none of the above
9. What is the maximum resultant possible when adding a 2-N force to an 8-N force?
- 2 N
  - 6 N
  - 8 N
  - 10 N
  - 16 N
10. A 5-N force and a 30-N force act in the same direction on an object. What is the net force on the object?
- 5 N
  - 25 N
  - 30 N
  - 35 N
  - none of the above

11. What is the minimum resultant possible when adding a 5-N force to an 8-N force?
- 5 N
  - 3 N
  - 8 N
  - 13 N
  - 40 N
12. Equilibrium occurs when
- all the forces acting on an object are balanced.
  - the sum of the  $+x$  forces on an object equals the sum of the  $-x$  forces.
  - the net force on the object is zero.
  - the sum of the upward forces equals the sum of the downward forces.
  - all of the above
13. A girl whose weight is 500 N hangs from the middle of a bar supported by two vertical strands of rope. What is the tension in each strand?
- 0 N.
  - 250 N.
  - 500 N.
  - 750 N.
  - 1000 N.
14. The weight of a person can be represented by a vector that acts
- in a direction that depends on where the person is standing.
  - perpendicular to the ground underneath the person.
  - parallel to the ground.
  - straight down, even if the person is standing on a hill.
  - all of the above
15. What would be the safest way to put up a clothesline?
- It doesn't make any difference which way the line is strung.
  - With the line very tight
  - With some slack in the line
16. A barge is being pulled along a canal by two ropes that make equal angles with the direction in which the barge points. Assuming the two pulls on the barge are equal, in what direction does the barge move?
- It oscillates back and forth between the two banks.
  - It moves straight ahead.
  - It moves in the direction of the resultant force on it.
  - both A and B
  - both B and C

17. A clothesline is stretched between two trees. A tire hangs in the middle of the line and the two halves of the line make equal angles with the horizontal. The tension in the line is
- half the tire's weight.
  - is less than half the tire's weight.
  - is more than half the tire's weight.
18. What is needed to describe a vector quantity?
- only magnitude
  - only direction
  - both magnitude and direction
  - neither magnitude nor direction
19. A scalar quantity has
- only direction.
  - only magnitude.
  - both magnitude and direction.
  - neither magnitude nor direction.
20. In order to find the components of a vector, you should
- draw the vector with correct magnitude and orientation.
  - measure the sides of the rectangle.
  - draw a rectangle so that the vector is the diagonal.
  - all of the above
21. From the following diagram, determine the approximate direction of the EQUILIBRANT.



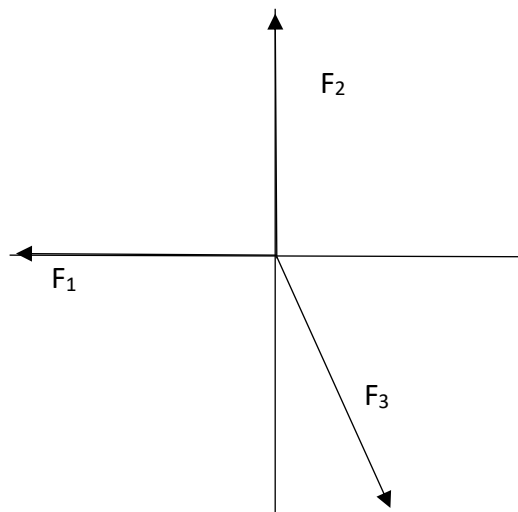
In questions #22 and #23, use the diagram below. The three forces are in equilibrium.  $F_1$  is horizontal and  $F_2$  is vertical. The vectors are not drawn to scale. Use your knowledge of equilibrium to draw conclusions about their relative size.

22. The magnitude of the vertical component of  $F_3$  is:

- a. greater than the magnitude of  $F_2$
- b. less than the magnitude of  $F_2$
- c. equal to the magnitude of  $F_2$
- d. zero

23. Which of the following is true?

- a.  $F_3$  is the vector with the greatest magnitude
- b.  $F_1 = F_2$
- c.  $F_1 + F_2 = F_3$
- d.  $F_2$  is the resultant of  $F_1 + F_3$ .



24. Two concurrent forces of 40 N and "X" N have a resultant of 100 N.

Force "X" could be:

- a. 20 N
- b. 40 N
- c. 80 N
- d. 150 N

25. The horizontal component of "F" in this diagram is:

- a.  $F \times \sin 55^\circ$
- b.  $F \times \cos 55^\circ$
- c.  $F / \sin 55^\circ$
- d.  $F / \cos 55^\circ$

