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Continuing Education Course #203
What Every Engineer Should Know About Structures
Part A - Statics Fundamentals

1. Which of the following statements is NOT true?

- a. Statics is the study of bodies that are stationary.
- b. Statics is concerned with forces acting on a body.
- c. Statics is used to calculate the acceleration of a falling apple.
- d. Strength of Materials is concerned with forces acting within a body.

2. Loads are classified as –

- a. concentrated
- b. distributed
- c. dead
- d. All of the above

3. Coplanar forces are forces that.

- a. always intersect at a point
- b. never intersect at a point
- c. are 2-dimensional
- d. are 3-dimensional

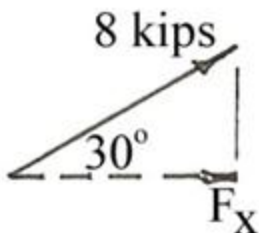
4. The resultant of a group of forces is a single force that has the same effect on the body on which it acts as the group of forces.

- a. True
- b. False

5. Two orthogonal forces are two forces at 90° .

- a. True
- b. False

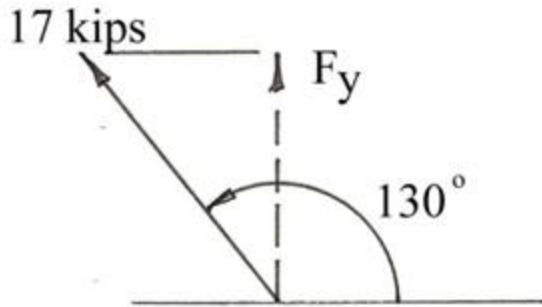
6. What is the horizontal component (F_x) of the 8 kip force?



- a. 1.2 kips
- b. 4.0 kips

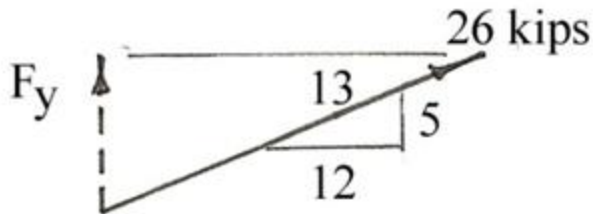
- c. 4.62 kips
- d. 6.93 kips

7. What is the vertical component (F_y) of the 17 kip force?



- a. 10.9 kips
- b. 13.0 kips
- c. 20.3 kips
- d. 22.2 kips

8. What is the vertical component (F_y) of the 26 kip force?

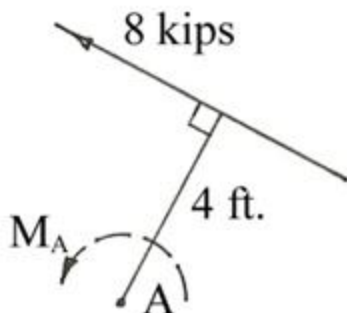


- a. 5 kips
- b. 10 kips
- c. 12 kips
- d. 24 kips

9. A moment is an action that tends to rotate the body on which it acts.

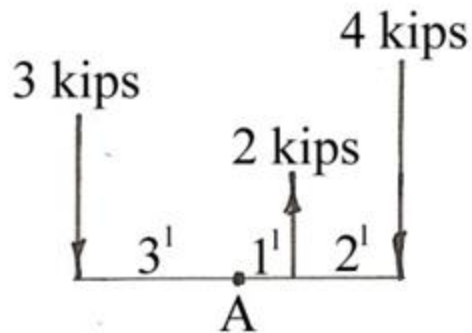
- a. True
- b. False

10. What is the moment of the 8 kip force about Point A.?



- a. 2 kip-ft.
- b. 4 kip-ft.
- c. 8 kip-ft.
- d. 32 kip-ft.

11. Find the moment about Point A of the several forces.

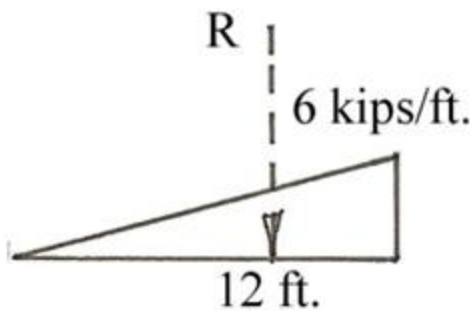


- a. 1 kip-ft. ~
- b. 1 kip-ft. ~
- c. 5 kip-ft. ~
- d. 8 kip-ft. ~

12. Which of the following statements is NOT true?

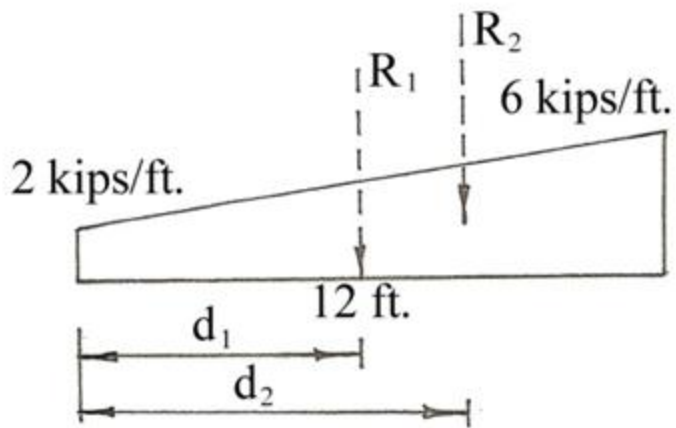
- a. A couple is a pair of parallel forces that have the same magnitude
- b. The moment produced by a couple is equal to the force times the distance between them
- c. The moment generated by a couple is the same regardless of the point of reference
- d. A couple is only a theoretical concept and not useful

13. What is the magnitude of the resultant of the uniformly varying distributed load?



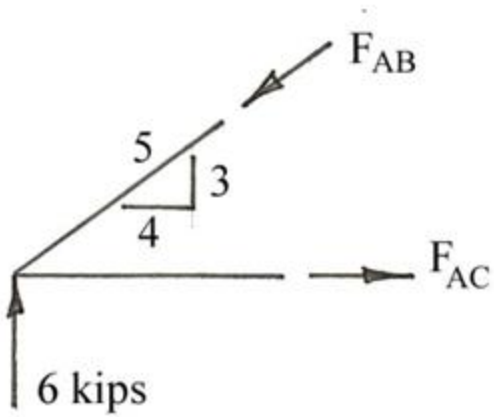
- a. 2 kip-ft.
- b. 6 kips
- c. 36 kips
- d. 48 kips
- e. 72 kips

14. Where do the two resultants act for the distributed load shown? (What are the distances d_1 and d_2)?



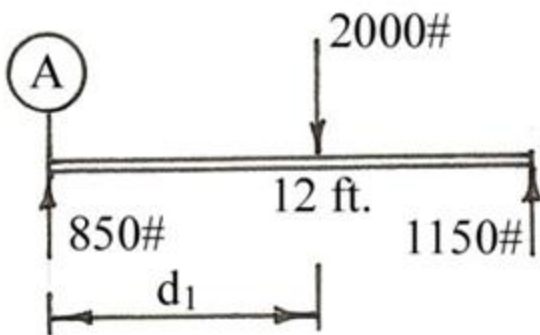
- a. $d_1 = 4$ ft.; $d_2 = 6$ ft.
 - b. $d_1 = 6$ ft.; $d_2 = 8$ ft.
 - c. $d_1 = 6$ ft.; $d_2 = 9$ ft.
 - d. $d_1 = 8$ ft.; $d_2 = 9$ ft.
15. For use in Statics, Newton's First Law can be revised to state that a body at rest will remain at rest if the forces acting on it are in equilibrium.
- a. True
 - b. False
16. Newton's Third Law means that forces come in pairs.
- a. True
 - b. False
17. If a body is in equilibrium, all of the forces and all of the moments must be in balance.
- a. True
 - b. False
18. In a coplanar force problem, there are a maximum of three equilibrium equations available for the solution – two force equations and one moment equation.
- a. True
 - b. False
19. When using the "tally" method in a solution to an equilibrium problem, "up equals down", and "left equals right".
- a. True
 - b. False

20. What is the magnitude of the tensile force F_{AC} ?



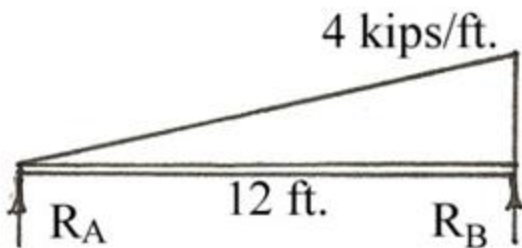
- a. 4 kips
- b. 6 kips
- c. 8 kips
- d. 10 kips

21. What distance d_1 is necessary to keep the beam below in equilibrium?



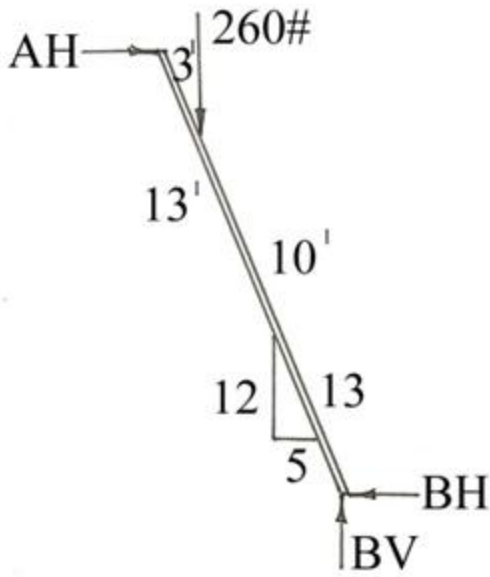
- a. 16.2 ft.
- b. 8.87 ft.
- c. 6.9 ft.
- d. 5.1 ft.

22. Determine the magnitude of reaction R_A in the problem below.



- a. 8 kips
- b. 12 kips
- c. 16 kips
- d. 32 kips

Refer to the diagram below for questions 23 and 24.



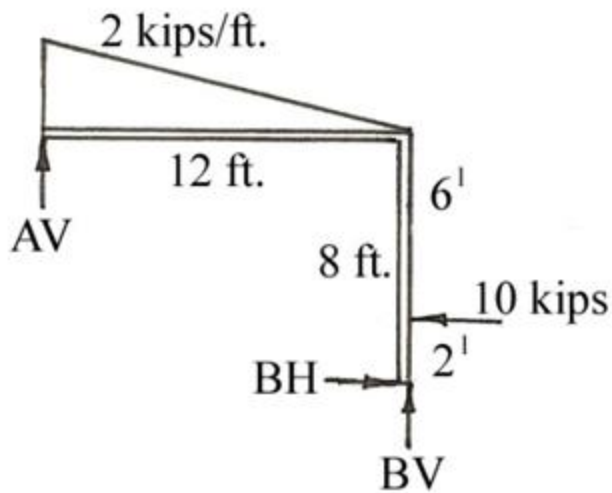
23. What is the magnitude of the vertical reaction BV in the diagram above?

- a. $78\#$
- b. $200\#$
- c. $260\#$
- d. $867\#$

24. What is the magnitude of the horizontal force AH in the drawing above?

- a. $83.4\#$
- b. $108\#$
- c. $260\#$
- d. $1000\#$

25. What is the magnitude of the vertical force AV in the drawing below?



- a. 6.3 kips
- b. 8.0 kips
- c. 9.7 kips
- d. 12 kips

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