

Pltw poe 2.1.4 answer key

Statics is the basis for the study of engineering mechanics and specifically rigid-body mechanics. Statics is concerned with the equilibrium of bodies that are at rest or that move at a constant velocity. In this section you will learn how to identify and calculate forces acting on a body when it is in static equilibrium. Then calculate internal and external forces of a truss and use this knowledge to design, build, and test truss designs. Key Terms Famous Engineer Research Activity Intro to Statics Notes Bill Nye - Balance Video Beam Deflection Notes Free Body Diagrams Notes 2.1.3 Free Body Diagrams HW Key 1981 , then site settings, then Allow Flash] PBS Video: Bridges Calculating Truss Forces Notes Truss Kansas City Hyatt Regency Disaster Video (Part 1) (Part 2) Calculating Force Vectors Notes 2.1.4 Calculating Force Vectors HW Key Calculating Moments Notes Forces Lab - Check out how forces affect structures like bridges [Click Calculations Learning Video Truss Practice Problem Key 2.1.6 Step-By-Step Calculating Truss System Key Tacoma Bridge Collapse - March, 2018 Taiwan Bridge Collapse - October, 2019 Bridge Safety Report Top 10 Structurally Deficient Bridges by State Kane County, IL Bridge Inspection Report 2.1.7 Calculating Truss Forces Key Truss Testing Instructions 2.1.8 - Truss #1 Test Video, Truss #2 Video, & Trus (px) 344 x 292429 x 357514 x 422599 x 487Activity 2.1.4 Calculating Force Vectors Answer KeyActivity 2.1.4 Calculating Force Vectors Answer KeyIntroductionIf guy wires are used to stabilize a tower, what is the minimum number of wires necessary? Imagine what would happen if you only used one or two wires. The guy wires work together so that the tower does not fall in any direction. As long as there are no external forces, each of the wires should be expressed as a vector force. It is important that values are given for each force so that engineers can make informed decisions about the necessary strength of guy wires and their support mechanisms. EquipmentCalculatorProcedureIn this activity you will calculate force vectors. What is the magnitude of vector A?5.0NWhat is the magnitude of vector A?5.0NWhat is the sense of vector A?Down and to the rightSketch vector A with itsx and y components. (Solve for component forces with a precision of 0.0) What is the magnitude of vector B?5.0NWhat is the direction of vector B?5.0NWhat is the sense of vector B?5.0NWhat is A = 5.0N and B = 5.0N. Draw a free body diagram of the nail, illustrating the x and y components of vector A and B. (Solve for components of vector A and B. (Solve for component forces with a precision of 0.0) Calculate the x and y components of the resultant force (R) by summing the x and y components of vectors A and B. Fx = FAx + FBxFy = FAy + FByFx = -2.5N + 2.5N = 0Fy = -4.3N + 1.5N = 0Fy = -4.3 -4.3N = -8.6 NAn eve screw is experiencing two tension forces G 100N and H 50N.Sketch vector G with itsx and y components. (Solve for components. (Solve for component forces with a precision of 0.0)Sketch vector G with itsx and y components. 0.0Fx= FGx + FHx46.98 N + 25.88 N = 72.86 N = 72.9 NFy = FGy+ FHy17.1 N + 96.59 N = 113.7 NIf you know the components of a vector, what mathematical relationshipcan be used to find the magnitude of the vector?Pythagorean Theorem, Since the vector?Pythagorean Theorem, Since the vector?Pythagorean Theorem are at right angles to each other, they are the legs of a right angle of the vector?Pythagorean Theorem are at right angles to each other, they are the legs of a right angle of the vector?Pythagorean Theorem are at right angles to each other, they are the legs of a right angle of the vector?Pythagorean Theorem are at right angles to each other, they are the legs of a right angle of the vector?Pythagorean Theorem are at right angles to each other are at right angles to each other. triangle, lengths and b in the Pythagorean Theorem, and the hypotenuse is the resultant. c in the Pythagorean theorem is the magnitude of that resultant. Sketch the resultant force (R) and calculate the magnitude and angle of the vector. (R) (Ry=114N) () (Rx=73N)Conclusion1. You and someone else are pulling with forces of equal magnitude. You each pulling at an angle of 25 from the X axis (see top view below). How could you reduce the amount of force each of you must exert?You could both pull in a direction with a smaller angle from the x-axis. When pulling at an angle, each of the two forces has a component perpendicular to the direction of motion, and these y components are acting against each other, cancelling, giving no contribution to the net force. 2. You and someone else are pulling on an object with forces of 50N and 75N respectively. If you are allowed to pull in any direction, what range of values is possible for the magnitude of the resultant force? The resultant force could have values ranging from 25N to 125N. The resultant would be 25N if the two forces were in opposite directions, 180 apart. The resultant would be 125N if the two forces were in the same direction, 0 apart. If the angle between 0 and 180, the resultant would be between 25N and 125 N. 2012 Project Lead The Way, Inc.Principles of Engineering Activity 2.1.4 Calculating Force Vectors Answer Key Page $45\sin^{30}$ right $2.5xANN = -5\cos^{30}$ down $4.3yANN = -5\cos^{30}$ down $4.3yANN = -5\cos^{30}$ down $4.334.3yBNN = -5\cos$ KeyIntroductionIf guy wires are used to stabilize a tower, what is the minimum number of wires necessary? Imagine what would happen if you only used one or two wires. The guy wires work together so that the tower does not fall in any direction. As long as there are no external forces, each of the wires should be experiencing an equal amount of tension. The tension in each guy wire can be expressed as a vector force. It is important that values are given for each force so that engineers can make informed decisions about the necessary strength of guy wires and their support mechanisms. Equipment CalculatorProcedureIn this activity you will calculate force vectors. 1. What is the magnitude of vector A?5N2. What is the direction of vector A relative to the negative Y axis?303. 4. What is the sense of vector A?Down and to the right5. 6. Draw a free body diagram illustrating the X and Y components of vector A?Down and to the right5. axis?309. What is the sense of vector B?Down and to the left10. Draw a free body diagram illustrating the X and Y components of vector A and B. (Solve for components of vector B. (Solve for components of vector B. and B = 5N.11. Draw a free body diagram illustrating the X and Y components of vector A and B. (Solve for components of vector B. and B = 5N.11. Draw a free body diagram illustrating the X and Y components of vector A and B. (Solve for components of vector B. and B = 5N.11. Draw a free body diagram illustrating the X and Y components of vector A and B. (Solve for components of vector B. and B = 5N.11. 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Draw a free body diagram illustrating the X and Y components of vector A. and B = 5N.11. Draw a free body diagram illustrating the X and Y components of vector A. and B = 5N.11. Draw a free body diagram illustrating the X and Y components of vector A. and B = 5N.11. Draw a free body diagram illustrating the X and Y components of vector A. and B = 5N.11. Draw a free body diagram illustrating the X and Y components of vector A. and B = 5N.11. Draw a free body diagram illustrating the X and Y components of vector component forces)12. Calculate the resultant force (FR) by summing the X and Y components of vector G. (Solve for component forces)14. Draw a free body diagram illustrating the X and Y components of vector H. (Solve for component forces)15. Calculate the resultant force (FR) by summing the X and Y components of vectors G and H. SFX = FGX + FHX 46.98 N + 25.88 N = 72.86 N = 70 N SFY = FGY + FHY17.1 N + 96.59 N = 113.69 N = 110 NConclusion1. Describe the relationship between force vectors and free body diagrams. 2. If you and someone else are pulling an object and both of you are 25 from the X axis (see top view below), how could you reduce the amount of force each of you must exert? Project Lead The Way, Inc. Copyright 2010POE Unit 2 Activity 2.1.4 Calculating Force Vectors Answer Key Page 3 1341902295.unknown 1341902401.unknown 1341902355.unknown number of wires necessary? Imagine what would happen if you only used one or two wires. The guy wires work together so that the tower does not fall in any direction. As long as there are no external forces and the wires are equally spaced, each of the wires are equally spaced. expressed as a vector force. It is important that values are given for each force so that engineers can make informed decisions about the necessary strength of guy wires and their support mechanisms.

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