Exam #1

ⓘ This is a preview of the published version of the quiz

Started: Dec 5 at 8:21pm

Quiz Instructions

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The following is Exam #1. You will have until 3:15 PM to complete this exam. The due time for the exam may be extended, so please do not stress if you are not finished and 3:15 PM approaches.

Please complete this exam on separate paper or on a tablet. Clearly indicate the question number for each question. Please show all work and clearly indicate your answers. Remember, this exam is an opportunity for you to demonstrate what you know. Please work on this exam on your own. You are not allowed to use your textbook, collaborate, nor allowed to use any external websites for assistance. You may use a calculator on this exam. Once you complete this exam, please submit a pdf of your exam to Canvas.

Once you complete the exam, please click on "Submit". You will not submit the exam to this assignment. You will submit your exam through the "**Exam #1 Submission Assignment**" in Canvas under **Assignments**. You can use a device to scan your exam. Please note that once your click Submit on this part of the exam and use your phone, you may not continue to work on your exam. If using paper, scan in your exam using Adobe Scan or any other scanning app.

You may only submit your exam once through the submission assignment. Submission times may be checked with when you log off Zoom and/or when you submit this part of the exam.

For this exam, you must keep your camera on for proctoring purposes. You will be placed into an individual breakout room. If you have any questions during the exam, you can click on the "Ask for Help" button and I will be with you as soon as possible.

(3 points) 1. Determine the distance between the points $P(4, 5, -2)$ and $Q(2, -3, 1)$.

(3 points) 2. Find the parametric form of the equation of the line passing $P(7, 3, 5)$ and $Q(5, -4, 2)$.

3. Given the following vectors:
$\vec{a} =< 4, -3, 6 >$, $\vec{b} =< 7, 5, -2 >$, $\vec{c} =< -2, 3, -4 >$. Determine the following:

(2 points) a. $6\vec{a} - 4\vec{c}$

(2 points) b. $|\vec{a}|$

(3 points) c. $\vec{b} \cdot \vec{c}$

(2 points) d. The unit vector in the direction of $\vec{b}$.

(4 points) e. $\vec{a} \times \vec{b}$

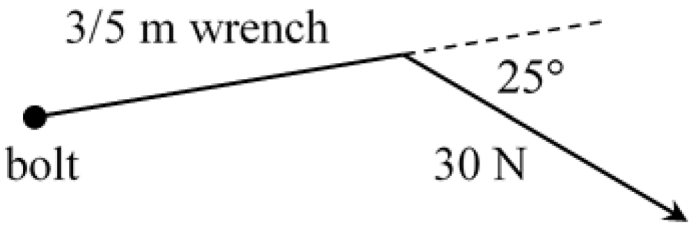
(3 points) f. $proj_{\vec{a}}\vec{c}$

(3 points) g. Find the area of the parallelogram determined by $\vec{a}$ and $\vec{b}$.

(4 points) 4. Find the equation of the plane that passes through the points $P(5, 2, -4)$, $Q(3, 6, 2)$, and $R(6, 4, -2)$.

(4 points) 5. A wagon is pulled along a straight path. The handle of the wagon makes an angle of 35° with the ground. It is pulled with a force of 60 lb. How much work is done in pulling the wagon 85 ft? Round your answer to the nearest tenth.

(4 points) 6. A bolt is tightened by applying a 30 N force to a $\frac{3}{5}$ m wrench at an angle of 25° as shown. Find the magnitude of the torque about the center of the bolt. Round your answer to the nearest tenth.



(4 points) 7. Find the distance from the point $P(5, 2, -3)$ to the plane $4x - 3y + 2z = 12$.

(4 points) 8. Find the volume of the parallelepiped determined by the vectors $\vec{a} =< 3, 2, 5 >$, $\vec{b} =< 5, -3, 1 >$, and $\vec{c} =< 6, 4, 3 >$.

(3 points) 9. Evaluate the following limit: $\lim_{t \to 0} \vec{r}(t)$ where $\vec{r}(t) = \left\langle 2t^2 - 4t + 3, \sqrt{t^2 + 5}, 4\cos t \right\rangle$.

(5 points) 10. Find the parametric form of the equation of the tangent line to the curve traced by the vector function $\vec{r}(t) = (t^2 + 3t)\hat{i} + (4e^{3t})\hat{j} + (\sin 4t)\hat{k}$ at $t = 0$.

(5 points) 11. Evaluate the following integral:

$$\int \left[\left(t^2 + 4\right) \hat{i} + \left(3e^{5t}\right) \hat{j} + (\cot t)\, \hat{k} \right] \, dt$$

(5 points) 12. Evaluate the following integral:

$$\int_0^1 \left[\left(\tfrac{1}{1+t}\right) \hat{i} + \left(t^2\right) \hat{j} + \left(4e^{2t}\right) \hat{k} \right] \, dt$$

(6 points) 13. Find the length of the curve traced by $\vec{r}(t) = \left\langle 2t, t^2, \tfrac{1}{3}t^3 \right\rangle$ on $0 \leq t \leq 1$.

(5 points) 14. Given $\vec{r}(t) = \left\langle t^2 - 2t, 1 + 3t, \tfrac{1}{3}t^3 + \tfrac{1}{2}t^2 \right\rangle$. Determine $\hat{T}(2)$.

(3 points) 15. Sketch the following equation: $\frac{x^2}{25} + \frac{y^2}{9} + \frac{z^2}{36} = 1$

(3 points) 16. Sketch the following equation: $\frac{z}{5} = \frac{x^2}{16} + \frac{y^2}{9}$

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