

وزارة التربية والتعليم و التعليم الفنى
الإدارة المركزية للتعليم العام
إدارة تنمية مادة الرياضيات

برعاية معالي وزير التربية والتعليم و التعليم الفنى

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وتوجيهات رئيس الإدارة المركزية للتعليم العام

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إشراف علمي

مستشار الرياضيات

أ/ منال عزقول

أداءات وتقييمات لمنهج تطبيقات الرياضيات لغات

للصف الثانى الثانوي "علمى"

الفصل الدراسى الأول

للعام الدراسي 2026 / 2027

الأسبوع السابع

لجنة الإعداد

أ/ محمد عبد العاطى أ/ محمود السيد محمد أ/ عفاف جاد

ترجمة

أ/ محمود سليمان نظيم

مراجعة الترجمة

أ/ شريف البرهامى أ/ عمرو فاروق

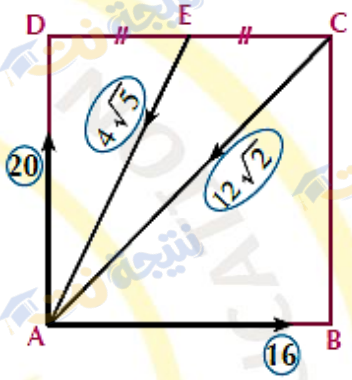
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Classroom Performance (Week Seven) - Mathematics Applications

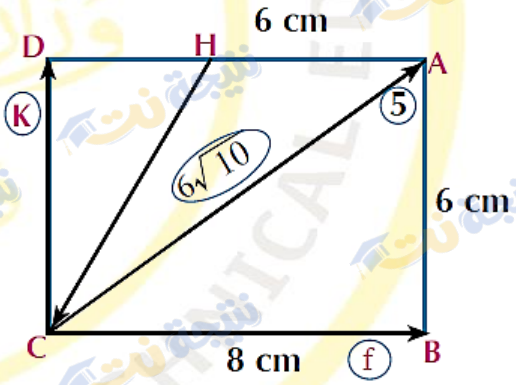
1) If $\overrightarrow{F_1} = 5\vec{i} + \vec{j}$, $\overrightarrow{F_2} = -7\vec{i} + 2\vec{j}$, $\overrightarrow{F_3} = 2\vec{i} - 3\vec{j}$. Prove that the forces $\overrightarrow{F_1}$, $\overrightarrow{F_2}$, $\overrightarrow{F_3}$ are in equilibrium.

2) If the forces $\overrightarrow{F_1} = 4\vec{i} - 3\vec{j}$, $\overrightarrow{F_2} = a\vec{i} - 2\vec{j}$, $\overrightarrow{F_3} = 6\vec{i} + b\vec{j}$. are meeting at a point and they are in equilibrium, find the values of a , b.

3) In the opposite figure: ABCD is a square, The forces of magnitudes: 16 , 20 , 12 $\sqrt{2}$, 4 $\sqrt{5}$ Newton act, in the directions $\overrightarrow{AB}$, $\overrightarrow{AD}$, $\overrightarrow{CA}$, $\overrightarrow{EA}$ respectively. where E is the midpoint of $\overline{CD}$.
Prove that these forces are in equilibrium.



4) In the opposite figure: The forces of magnitudes F , 5 , K , and 6 $\sqrt{10}$ N are in equilibrium and they act in the rectangle ABCD in the directions $\overrightarrow{CB}$, $\overrightarrow{CA}$, $\overrightarrow{CD}$, $\overrightarrow{HC}$ Such that: AB = 6 cm , BC = 8 cm , AH = 6 cm. Find the values of F , K.



5) If $\overrightarrow{F_1} = 4\vec{i} + b\vec{j}$, $\overrightarrow{F_2} = -7\vec{i} - 2\vec{j}$, $\overrightarrow{F_3} = a\vec{i} - 3\vec{j}$. are in equilibrium, Then find the value of a + b

6) A uniform rod $\overline{AB}$, 80 cm long and its weight is 50 gm.wt., is suspended from its ends A and B by two light strings, the ends of which are fixed at a point C on the ceiling. The two strings are perpendicular and AC = 40 cm long. The rod is in equilibrium. Find the magnitude of the tension in each string.

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7) A uniform rod of weight 20 gm.wt. is placed on two smooth, opposite planes inclined to the horizontal at two angles of measures 30° and 60° , such that the rod and the line of greatest slope of the two planes lie in the same vertical plane. Find the magnitude of the pressure on each of the two planes in a state of equilibrium

8) A uniform rod $\overline{AB}$, 16 cm. long and of weight 400 gm.wt., has one end A connected to a joint fixed in a vertical wall and the other end B tied to a light string, 20 cm long, fixed at a point C on the vertical wall located vertically above A . The rod is in equilibrium in a horizontal position. Find the magnitude of tension in the string and the magnitude of joint reaction.

9) A uniform rod $\overline{AB}$, 50 cm long and of weight 240 gm.wt, has one end A connected to a hinge fixed in a vertical wall and the other end B is tied to a light string of length 20 cm , whose end is fixed at a point C on the vertical wall located vertically above A and at a distance of 120 cm from A the equilibrium of the rod in a horizontal position. Find the magnitude of the tension in the string and the magnitude and direction of the hinge reaction in stste of equilibrium.

10) A uniform rod $\overline{AB}$, 80 cm long and of weight 50 gm.wt, has its end A connected to a hinge fixed in a vertical wall and a horizontal force has affected its end B. The rod is in equilibrium in a position that is inclined to the horizontal at an angle of measure 45° . Find the magnitude of the horizontal force and the magnitude of the hinge reaction.

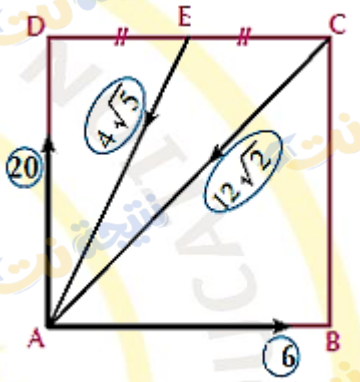
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Homework (Week Seven) - Mathematics Applications

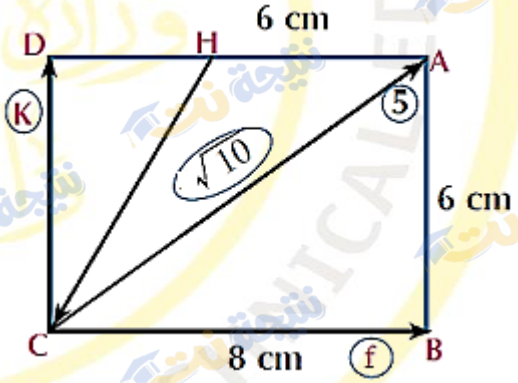
1) If $\overrightarrow{F_1} = 5\vec{i} - 3\vec{j}$, $\overrightarrow{F_2} = -7\vec{i} + 2\vec{j}$, $\overrightarrow{F_3} = 2\vec{i} + \vec{j}$. Prove that the forces $\overrightarrow{F_1}$, $\overrightarrow{F_2}$, $\overrightarrow{F_3}$ are in equilibrium.

2) If the forces $\overrightarrow{F_1} = 4\vec{i} - 3\vec{j}$, $\overrightarrow{F_2} = a\vec{i} - \vec{j}$, $\overrightarrow{F_3} = 6\vec{i} + b\vec{j}$. are meeting at a point and they are in equilibrium, find the values of a , b.

3) In the opposite figure: ABCD is a square, The forces of magnitudes: 6 , 20 , $12\sqrt{2}$, $4\sqrt{5}$ Newton act, in the directions $\overrightarrow{AB}$, $\overrightarrow{AD}$, $\overrightarrow{CA}$, $\overrightarrow{EA}$ respectively. where E is the midpoint of $\overline{CD}$.
Are these forces in equilibrium.



4) In the opposite figure: The forces of magnitudes F , 5 , K , and $\sqrt{10}$ N are in equilibrium and they act in the rectangle ABCD in the directions $\overrightarrow{CB}$, $\overrightarrow{CA}$, $\overrightarrow{CD}$, $\overrightarrow{HC}$
Such that: AB = 6 cm , BC = 8 cm , AH = 6 cm. Find the values of F , K.



5) If $\overrightarrow{F_1} = 4\vec{i} + b\vec{j}$, $\overrightarrow{F_2} = -7\vec{i} - 2\vec{j}$, $\overrightarrow{F_3} = a\vec{i} - 3\vec{j}$. are in equilibrium, Then find the value of $2a - 3b$

6) A uniform rod $\overline{AB}$, 100 cm long and its weight is 300 gm.wt., is suspended from its two ends A and B by two light strings, the ends of which are fixed at a point C on the ceiling. The strings are perpendicular and AC = 50 cm long. The rod is in equilibrium. Find the magnitude of the tension in each string.

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7) A uniform rod, 100 gm.wt , is resting on one end of a smooth vertical wall and the other end on a smooth inclined plane inclined to the horizontal at an angle of measure 30° . Find the magnitude of each of the wall and plane reaction.

8) A uniform rod $\overline{AB}$, 12 cm long and of weight 180 gm.wt, has one end connected to a hinge fixed in a vertical wall and the other end tied to a light string, 15 cm long, fixed at point C on the vertical wall located vertically above point A. The rod is in equilibrium in a horizontal position. Find the magnitude of tension in the string and the magnitude of hinge reaction.

9) A uniform rod $\overline{AB}$, 60 cm long and of weight 32 gm.wt, has one end a connected to a hinge fixed in a vertical wall and the other end B is tied to a light string whose end is fixed at a point C on the vertical wall located vertically above A and at a distance of 80 cm from A the equilibrium of the rod in a horizontal position. Find the magnitude of the tension in the string and the magnitude and direction of the hinge reaction in case of equilibrium.

10) A uniform rod $\overline{AB}$, 20 cm long and of weight 60 Newton, has its end A connected to a joint fixed in a vertical wall and a horizontal force has affected its end B. The rod is balanced in a position that is inclined to the horizontal at an angle of measure 30° . Find the magnitude of the horizontal force and the magnitude of the joint reaction.

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Weekly Assessment (Week Seven) - Mathematics Applications

First Group

1) If $\overrightarrow{F_1} = 4\,\vec{i} + b\,\vec{j}$, $\overrightarrow{F_2} = -7\,\vec{i} - 2\,\vec{j}$, $\overrightarrow{F_3} = a\,\vec{i} - 3\,\vec{j}$. are in equilibrium, Then find the value of $a + 2b$

2) If $\overrightarrow{F_1} = 5\,\vec{i} + \vec{j}$, $\overrightarrow{F_2} = -7\,\vec{i} + 2\,\vec{j}$, $\overrightarrow{F_3} = 2\,\vec{i} - 3\,\vec{j}$. Prove that the forces $\overrightarrow{F_1}$, $\overrightarrow{F_2}$, $\overrightarrow{F_3}$ are in equilibrium.

3) If the forces $\overrightarrow{F_1} = 4\,\vec{i} - 3\,\vec{j}$, $\overrightarrow{F_2} = a\,\vec{i} - 2\,\vec{j}$, $\overrightarrow{F_3} = 6\,\vec{i} + b\,\vec{j}$. are meeting at a point and they are in equilibrium, find the values of a , b.

4) A body of weight (W) Newton placed on a smooth plane inclined to the horizontal at an angle of measure 60° is kept in equilibrium by the effect of a horizontal force of magnitude $60\sqrt{3}$ Newton. Find the magnitude of the body's weight and the magnitude of the plane's reaction on the body.

5) A body of weight 200 gm .wt. is placed on a smooth plane inclined to the horizontal at an angle of measure θ , where $\tan\theta = \frac{3}{4}$, where the body's equilibrium is maintained by a force of magnitude (F) gm.wt tending in the direction of the line of the greatest slope of the plane upwards at an angle of α , where $\tan\alpha = \frac{5}{12}$, Find the magnitude of this force and the reaction of the plane on the body.

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Second Group

1) If $\overrightarrow{F_1} = 4\,\vec{i} + b\,\vec{j}$, $\overrightarrow{F_2} = -7\,\vec{i} - 2\,\vec{j}$, $\overrightarrow{F_3} = a\,\vec{i} - 3\,\vec{j}$. are in equilibrium, Then find the value of $3a + b$

2) If $\overrightarrow{F_1} = 5\,\vec{i} - 3\,\vec{j}$, $\overrightarrow{F_2} = -7\,\vec{i} + 2\,\vec{j}$, $\overrightarrow{F_3} = 2\,\vec{i} + \vec{j}$. Prove that the forces $\overrightarrow{F_1}$, $\overrightarrow{F_2}$, $\overrightarrow{F_3}$ are in equilibrium.

3) If the forces $\overrightarrow{F_1} = 4\,\vec{i} - 3\,\vec{j}$, $\overrightarrow{F_2} = a\,\vec{i} - \vec{j}$, $\overrightarrow{F_3} = 6\,\vec{i} + b\,\vec{j}$. are meeting at a point and they are in equilibrium, find the values of a , b.

4) A body of weight (W) Newton placed on a smooth plane inclined to the horizontal at an angle of measure 45° is balanced by the effect of a horizontal force of magnitude $20\sqrt{2}$ Newton. Find the magnitude of the body's weight and the magnitude of the plane's reaction on the body.

5) A body of weight 260 gm.wt. is placed on a smooth plane inclined to the horizontal at an angle of measure θ where $\tan\theta = \frac{5}{12}$, where the body's equilibrium is maintained by a force of magnitude (F) gm.wt tending in the direction of the line of the greatest slope of the plane upwards at an angle of α where $\tan\alpha = \frac{3}{4}$, Find the magnitude of this force and the reaction of the plane on the body.

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Third Group

1) If $\overrightarrow{F_1} = 4\vec{i} + b\vec{j}$, $\overrightarrow{F_2} = -7\vec{i} - 2\vec{j}$, $\overrightarrow{F_3} = a\vec{i} - 3\vec{j}$. are in equilibrium, Then find the value of $a - 3b$

2) If $\overrightarrow{F_1} = 5\vec{i} + \vec{j}$, $\overrightarrow{F_2} = -7\vec{i} + 2\vec{j}$, $\overrightarrow{F_3} = 2\vec{i} - 3\vec{j}$. Prove that the forces $\overrightarrow{F_1}$, $\overrightarrow{F_2}$, $\overrightarrow{F_3}$ are in equilibrium.

3) If the forces $\overrightarrow{F_1} = 4\vec{i} - 3\vec{j}$, $\overrightarrow{F_2} = a\vec{i} - 2\vec{j}$, $\overrightarrow{F_3} = 6\vec{i} + b\vec{j}$. are meeting at a point and they are in equilibrium, find the values of a , b.

4) A body of weight 18 N is placed on a smooth plane inclined to the horizontal at an angle of measure 30° , where the body's equilibrium is maintained by a tension force of magnitude $6\sqrt{3}$ N, which is inclined in the direction of the line of greatest slope of the plane upwards at an angle of measure θ, Find the measure of the angle θ and the magnitude of the reaction of the plane on the body are found.

5) A smooth ball with a radius of 30 cm and a weight of 200 gm.wt. is resting on a smooth vertical wall suspended by a light string 20 cm long, one end of which is fixed to the surface of the ball and the other end is fixed to a point on the wall located vertically above the point of contact of the ball with the wall. Find the magnitude of the tension in the string and the magnitude of the reaction of the wall in a state of equilibrium.

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