## تم تحميل هذا الملف من موقع المناهج الإماراتية


## ملزمة الهيكل شاملة لجميع الاسئلة

موقع المناهج ⇦ المناهج الإماراتية ⇦ الصف الثاني عشر العام ⇦ رياضيات ⇦ الفصل الثاني ⇦ ملخصات وتقارير ⇦ الملف

تاريخ إضافة الملف على موقع المناهج: 2025-02-12 20:31:16

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|---|---|
| المزيد من مادة رياضيات: | ملفات ا كتب للمعلم ا كتب للطالب ا اختبارات الكترونية ا اختبارات ا حلول ا عروض بوربوينت ا أوراق عمل منهج انجليزي ا ملخصات وتقارير ا مذكرات وبنوك ا الامتحان النهائي ا للمدرس |

## التواصل الاجتماعي بحسب الصف الثاني عشر العام

| | | | | | |
|---|---|---|---|---|---|
| صفحة المناهج الإماراتية على فيسبوك |  |  |  |  |  |
| المواد على تلغرام | التربية الاسلامية | اللغة العربية | اللغة الانجليزية | الرياضيات | |

## المزيد من الملفات بحسب الصف الثاني عشر العام والمادة رياضيات في الفصل الثاني

| | |
|---|---|
| 1 | عرض بوربوينت درس القطع المكافئ |
| 2 | عرض بوربوينت حل درس الضرب النقطي والضرب المتجهي للمتجهات |
| 3 | عرض بوربوينت مراجعة الوحدة الرابعة differentiation of Application الجزء الثاني |
| 4 | عرض بوربوينت مراجعة الوحدة الرابعة differentiation of Application الجزء الأول |
| 5 | عرض بوربوينت مراجعة عامة مع الحل |

# ملزمة هيكل الصف الثاني عشر عام

## 2025-2024

# Mathematics

## الترم الثاني


إعداد

أ / كرم اسعد

للإستفسار: 0505308082


يمكنكم التواصل للحصول علي نموذج الاجابة

# Haykal

# Grade 12 General

## 2nd term (2024-2025)

Mr. Karam Asaad ( 0505308082 )

**First : multiple choices questions** اولا اسئلة الاختيار من متعدد

**Use an inverse matrix to solve the system of equations, if possible.**

$2x - 3y = -1$
$-3x + 5y = 3$

**Use an inverse matrix to solve the system of equations, if possible.**

**1A.** $6x + y = -8$
$-4x - 5y = -12$

**1B.** $-3x + 9y = 36$
$7x - 8y = -19$

**Use an inverse matrix to solve each system of equations, if possible.** (Examples 1 and 2)

**1.** $5x - 2y = 11$
$-4x + 7y = 2$

**2.** $2x + 3y = 2$
$x - 4y = -21$

**3.** $-3x + 5y = 33$
$2x - 4y = -26$

**4.** $-4x + y = 19$
$3x - 2y = -18$

**5.** $2x + y - z = -13$
$3x + 2y - 4z = -36$
$x + 6y - 3z = 12$

**6.** $3x - 2y + 8z = 38$
$6x + 3y - 9z = -12$
$4x + 4y + 20z = 0$

**7.** $x + 2y - z = 2$
$2x - y + 3z = 4$
$3x + y + 2z = 6$

**8.** $4x + 6y + z = -1$
$-x - y + 8z = 8$
$6x - 4y + 11z = 21$

Find the coordinates of $M$, the midpoint of $\overline{JK}$, for $J(-1, 2)$ and $K(6, 1)$.

Let $J$ be $(x_1, y_1)$ and $K$ be $(x_2, y_2)$.

**1A.** Find the coordinates of the midpoint of $\overline{AB}$ for $A(5, 12)$ and $B(-4, 8)$.

**1B.** Find the coordinates of the midpoint of $\overline{CD}$ for $C(4, 5)$ and $D(14, 13)$.

Find the midpoint of the line segment with endpoints at the given coordinates.

**10.** (20, 3), (15, 5)

**11.** $(-27, 4)$, $(19, -6)$

**12.** $(-0.4, 7)$, $(11, -1.6)$

**13.** (5.4, −8), (9.2, 10)

**14.** $(-5.3, -8.6)$, $(-18.7, 1)$

**15.** $(-6.4, -8.2)$, $(-9.1, -0.8)$

Find the distance between each pair of points with the given coordinates.

**16.** (1, 2), (6, 3)

**17.** (3, −4), (0, 12)

**18.** $(-6, -7)$, $(11, -12)$

**19.** $(-10, 8)$, $(-8, -8)$

**20.** (4, 0), (5, −6)

**21.** (7, 9), $(-2, -10)$

**22.** $(-4, -5)$, (15, 17)

**23.** (14, −20), $(-18, 25)$

Write each equation in standard form. Identify the vertex, axis of symmetry, and direction of opening of the parabola.

**1.** $y = 2x^2 - 24x + 40$

**2.** $y = 3x^2 - 6x - 4$

**3.** $x = y^2 - 8y - 11$

**4.** $x + 3y^2 + 12y = 18$

Write each equation in standard form. Identify the vertex, axis of symmetry, and direction of opening of the parabola.

**14.** $y = x^2 - 8x + 13$

**15.** $y = 3x^2 + 42x + 149$

**16.** $y = -6x^2 - 36x - 8$

**17.** $y = -3x^2 - 9x - 6$

**18.** $x = \frac{1}{3}y^2 - 3y + 4$

**19.** $x = \frac{2}{3}y^2 - 4y + 12$

## Graph each equation.

**5.** $y = (x - 4)^2 - 6$

**6.** $y = 4(x + 5)^2 + 3$

**7.** $y = -3x^2 - 4x - 8$

**8.** $x = 3y^2 - 6y + 9$

## Graph each equation.

**20.** $y = \frac{1}{3}x^2$

**21.** $y = -2x^2$

**22.** $y = -2(x - 2)^2 + 3$

**23.** $y = 3(x - 3)^2 - 5$

**24.** $x = \frac{1}{2}y^2$

**25.** $4x - y^2 = 2y + 13$

## Write an equation for each parabola described below. Then graph the equation.

**9.** vertex (0, 2), focus (0, 4)

**10.** vertex (−2, 4), directrix $x = -1$

**11.** focus (3, 2), directrix $y = 8$

**12.** vertex (−1, −5), focus (−5, −5)

## Write an equation for each parabola described below. Then graph the equation.

**26.** vertex (0, 1), focus (0, 4)

**27.** vertex (1, 8), directrix $y = 3$

**28.** focus (−2, −4), directrix $x = -6$

**29** focus (2, 4), directrix $x = 10$

**30.** vertex (−6, 0), directrix $x = 2$

**31.** vertex (9, 6), focus (9, 5)

## Write an equation for each circle given the center and radius.

**2.** center: (−2, −6), $r = 4$ units

**3.** center: (1, −5), $r = 3$ units

## Write an equation for each circle given the center and radius.

**12.** center: (4, 9), $r = 6$

**13.** center: (−3, 1), $r = 4$

**14.** center: (−7, −3), $r = 13$

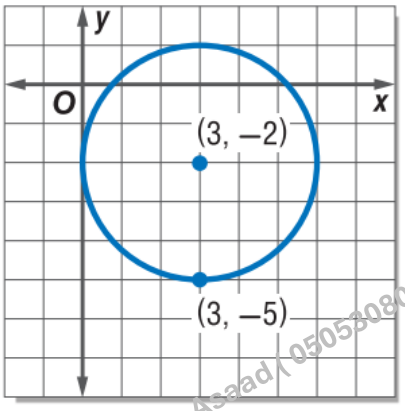
**15.** center: (−2, −1), $r = 9$

**16.** center: (1, 0), $r = \sqrt{15}$

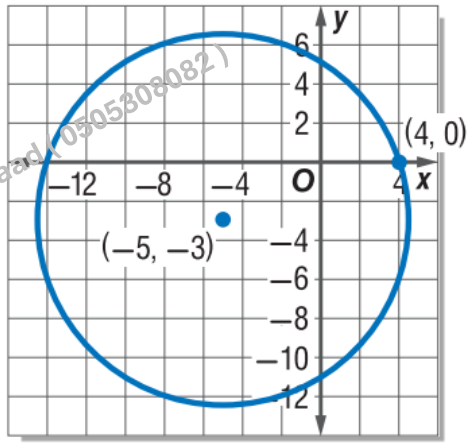
**17** center: (0, −6), $r = \sqrt{35}$

Write an equation for each graph.

**4.**



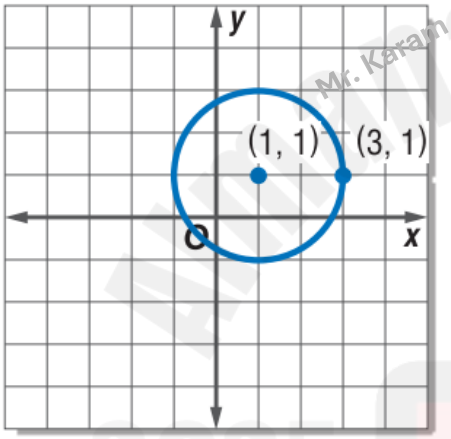

**5.**



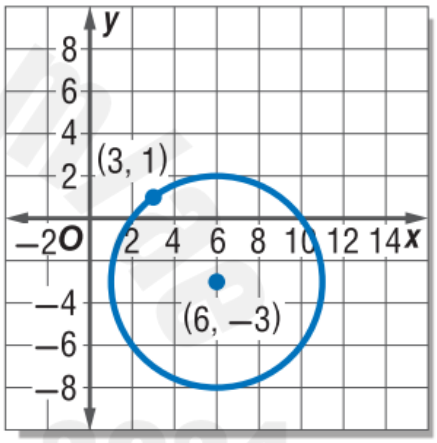



Write an equation for each graph.

**19.**

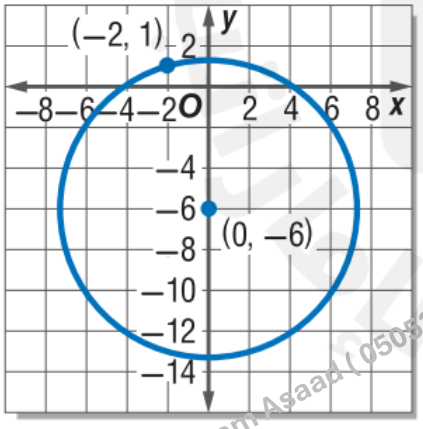



**20.**

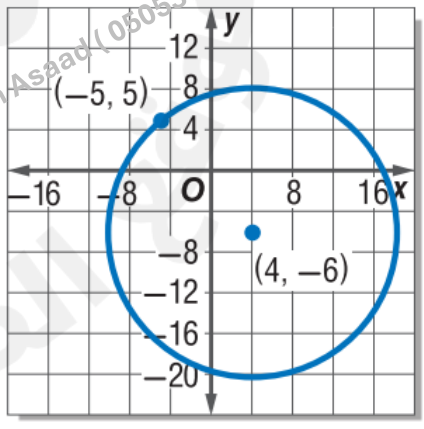





**21.**




**22.**



**State whether each quantity described is a *vector* quantity or a *scalar* quantity.**

**a. a boat traveling at 15 kilometers per hour**

This quantity has a magnitude of 15 kilometers per hour, but no direction is given. Speed is a scalar quantity.

**b. a hiker walking 25 paces due west**

This quantity has a magnitude of 25 paces and a direction of due west. This directed distance is a vector quantity.

**c. a person's weight on a bathroom scale**

Weight is a vector quantity that is calculated using a person's mass and the downward pull due to gravity. (Acceleration due to gravity is a vector.)

**1A.** a car traveling 60 kilometers per hour 15° east of south

**1B.** a parachutist falling straight down at 12.5 miles per hour

**1C.** a child pulling a sled with a force of 40 newtons

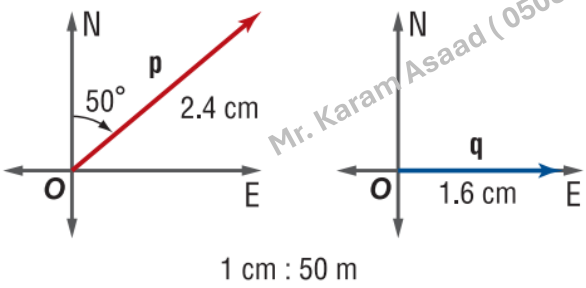
**State whether each quantity described is a *vector* quantity or a *scalar* quantity.** (Example 1)

1. a box being pushed with a force of 125 newtons
2. wind blowing at 20 km/h
3. a deer running 15 meters per second due west
4. a baseball thrown with a speed of 136 km/h
5. a 15-Newton tire hanging from a rope
6. a rock thrown straight up at a velocity of 15 meters per second

**ORIENTEERING** **In an orienteering competition, Noura walks N50°E for 120 meters and then walks 80 meters due east. How far and at what quadrant bearing is Noura from her starting position?**

Let **p** = walking 120 meters N50°E and **q** = walking 80 meters due east. Draw a diagram to represent **p** and **q** using a scale of 1 cm : 50 m.

Use a ruler and a protractor to draw a 120 ÷ 50 or 2.4-centimeter arrow 50° east of north to represent **p** and an 80 ÷ 50 or 1.6-centimeter arrow due east to represent **q**.



1 cm : 50 m

**Determine the magnitude and direction of the resultant of each vector sum.** (Example 3)

**22.** 18 **N** directly forward and then 20 **N** directly backward

**23.** 100 meters due north and then 350 meters due south

**24.** 10 **N** of force at a bearing of 025° and then 15 **N** of force at a bearing of 045°

**25** 17 kilometers east and then 16 kilometers south

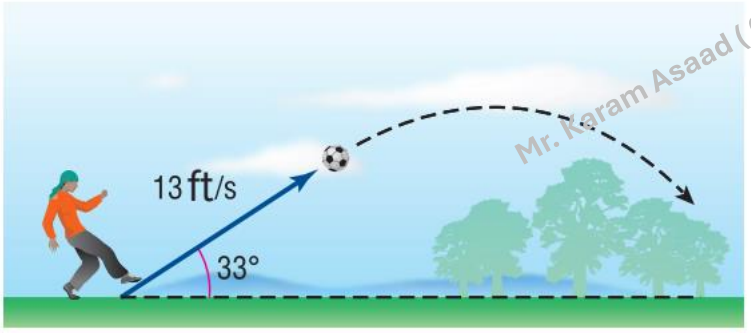
**26.** 15 meters per second squared at a 60° angle to the horizontal and then 9.8 meters per second squared downward

**LAWN CARE** **Eiman is pushing the handle of a lawn mower with a force of 450 newtons at an angle of 56° with the ground.**


**a. Draw a diagram that shows the resolution of the force that Eiman exerts into its rectangular components.**

**b. Find the magnitudes of the horizontal and vertical components of the force.**

**6. SOCCER** A player kicks a football so that it leaves the ground with a velocity of 44 feet per second at an angle of 33° with the ground.




**A.** Draw a diagram that shows the resolution of this force into its rectangular components.

**B.** Find the magnitude of the horizontal and vertical components of the velocity.

**Draw a diagram that shows the resolution of each vector into its rectangular components. Then find the magnitudes of the vector's horizontal and vertical components.** (Example 6)

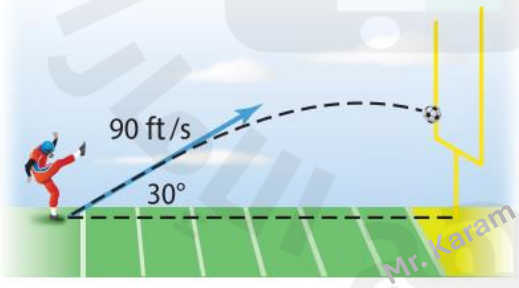
**38.** $2\frac{1}{8}$ centimeters at 310° to the horizontal

**39.** 1.5 centimeters at a bearing of N49°E

**40.** 3.2 centimeters per hour at a bearing of S78°W

**41.** $\frac{3}{4}$ centimeters per minute at a bearing of 255°

**42. SOCCER** For a field goal attempt, a ball is kicked with the velocity shown in the diagram below




**a.** Draw a diagram that shows the resolution of this force into its rectangular components.

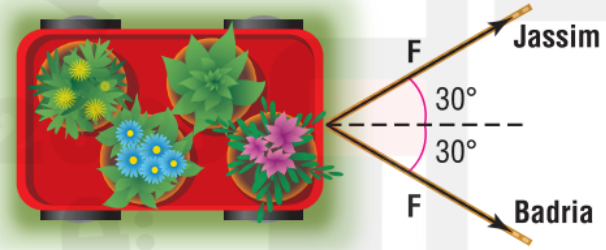
**b.** Find the magnitudes of the horizontal and vertical components. (Example 6)

**43. CLEANING** Buthaina is pushing the handle of a push broom with a force of 190 newtons at an angle of 33° with the ground. (Example 6)


**a.** Draw a diagram that shows the resolution of this force into its rectangular components.

**b.** Find the magnitudes of the horizontal and vertical components.

**44. GARDENING** Jassim and his sister Badria are pulling a wagon full of plants. Each person pulls on the wagon with equal force at an angle of 30° with the axis of the wagon. The resultant force is 120 newtons.




**a.** How much force is each person exerting?

**b.** If each person exerts a force of 75 newtons, what is the resultant force?

**c.** How will the resultant force be affected if Jassim and Badria move closer together?



**49 SLEDDING** Bilal is pulling his sister on a sled. The direction of his resultant force is 31°, and the horizontal component of the force is 86 newtons.

**a.** What is the vertical component of the force?

**b.** What is the magnitude of the resultant force?

**Find the component form of $\overrightarrow{AB}$ with initial point $A(-4, 2)$ and terminal point $B(3, -5)$.**

$\overrightarrow{AB} = \langle x_2 - x_1, y_2 - y_1 \rangle$ Component form

$= \langle 3 - (-4), -5 - 2 \rangle$ $(x_1, y_1) = (-4, 2)$ and $(x_2, y_2) = (3, -5)$

$= \langle 7, -7 \rangle$ Subtract.

**Find the component form of $\overrightarrow{AB}$ with the given initial and terminal points.**

**1A.** $A(-2, -7), B(6, 1)$

**1B.** $A(0, 8), B(-9, -3)$

**Find the component form and magnitude of $\overrightarrow{AB}$ with the given initial and terminal points.** (Examples 1 and 2)

**1.** $A(-3, 1), B(4, 5)$

**2.** $A(2, -7), B(-6, 9)$

**3.** $A(10, -2), B(3, -5)$

**4.** $A(-2, 7), B(-9, -1)$

**5.** $A(-5, -4), B(8, -2)$

**6.** $A(-2, 6), B(1, 10)$

**7.** $A(2.5, -3), B(-4, 1.5)$

**8.** $A(-4.3, 1.8), B(9.4, -6.2)$

**9.** $A\left(\frac{1}{2}, -9\right), B\left(6, \frac{5}{2}\right)$

**10.** $A\left(\frac{3}{5}, -\frac{2}{5}\right), B(-1, 7)$

**Let $\overrightarrow{DE}$ be the vector with initial point $D(-2, 3)$ and terminal point $E(4, 5)$. Write $\overrightarrow{DE}$ as a linear combination of the vectors i and j.**

First, find the component form of $\overrightarrow{DE}$.

$\overrightarrow{DE} = \langle x_2 - x_1, y_2 - y_1 \rangle$ Component form

$= \langle 4 - (-2), 5 - 3 \rangle$ $(x_1, y_1) = (-2, 3)$ and $(x_2, y_2) = (4, 5)$

$= \langle 6, 2 \rangle$ Simplify.

Then rewrite the vector as a linear combination of the standard unit vectors.

$\overrightarrow{DE} = \langle 6, 2 \rangle$ Component form

$= 6\mathbf{i} + 2\mathbf{j}$ $\langle a, b \rangle = a\mathbf{i} + b\mathbf{j}$

**Let $\overrightarrow{DE}$ be the vector with the given initial and terminal points. Write $\overrightarrow{DE}$ as a linear combination of the vectors i and j.**

**5A.** $D(-6, 0), E(2, 5)$

**5B.** $D(-3, -8), E(-7, 1)$

**Let $\overrightarrow{DE}$ be the vector with the given initial and terminal points. Write $\overrightarrow{DE}$ as a linear combination of the vectors i and j.** (Example 5)

**28.** $D(4, -1), E(5, -7)$

**29.** $D(9, -6), E(-7, 2)$

**30.** $D(3, 11), E(-2, -8)$

**31.** $D(9.5, 1), E(0, -7.3)$

**32.** $D(-3, -5.7), E(6, -8.1)$

**33.** $D(-4, -6), E(9, 5)$

**34.** $D\left(\frac{1}{8}, 3\right), E\left(-4, \frac{2}{7}\right)$

**35.** $D(-3, 1.5), E(-3, 1.5)$

**Use the dot product to find the magnitude of $\mathbf{a} = \langle -5, 12 \rangle$.**

Since $|\mathbf{a}|^2 = \mathbf{a} \cdot \mathbf{a}$, then $|\mathbf{a}| = \sqrt{\mathbf{a} \cdot \mathbf{a}}$.

$|\langle -5, 12 \rangle| = \sqrt{\langle -5, 12 \rangle \cdot \langle -5, 12 \rangle}$ $\quad \mathbf{a} = \langle -5, 12 \rangle$

$= \sqrt{(-5)^2 + 12^2}$ or 13 $\quad$ Simplify.

**GuidedPractice** **Use the dot product to find the magnitude of the given vector.**

**2A.** $\mathbf{b} = \langle 12, 16 \rangle$

**2B.** $\mathbf{c} = \langle -1, -7 \rangle$

**Use the dot product to find the magnitude of the given vector.** (Example 2)

**10.** $\mathbf{m} = \langle -3, 11 \rangle$

**11.** $\mathbf{r} = \langle -9, -4 \rangle$

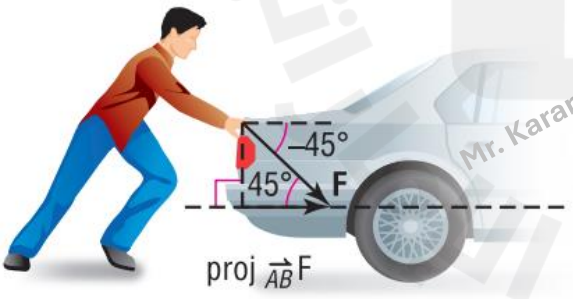
**12.** $\mathbf{n} = \langle 6, 12 \rangle$

**13.** $\mathbf{v} = \langle 1, -18 \rangle$

**14.** $\mathbf{p} = \langle -7, -2 \rangle$

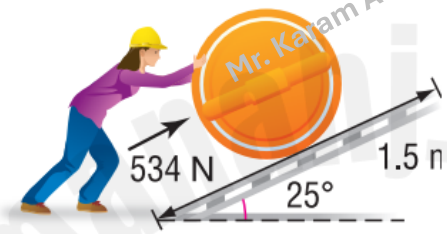
**15.** $\mathbf{t} = \langle 23, -16 \rangle$

**ROADSIDE ASSISTANCE** **A person pushes a car with a constant force of 120 newtons at a constant angle of 45° as shown. Find the work done in joules moving the car 10 meters.**



**7.** **CLEANING** Khalid is pushing a vacuum cleaner with a force of 375 newtons. The handle of the vacuum cleaner makes a 60° angle with the floor. How much work in newton-meters does he do if he pushes the vacuum cleaner 2 meters?


**35.** **PHYSICS** Rana is pushing a construction barrel up a ramp 1.5 meters long into the back of a truck. She is using a force of 534 newtons and the ramp is 25° from the horizontal. How much work in joules is Rana doing? (Example 7)




**36.** **SHOPPING** Reham is pushing a shopping cart with a force of 125 newtons at a downward angle, or angle of depression, of 52°. How much work in joules would Reham do if she pushed the shopping cart 200 meters? (Example 7)

**26. WAGON** Sultan uses a wagon to carry newspapers for his paper route. He is pulling the wagon with a force of 25 newtons at an angle of 30° with the horizontal. (Lesson 8-3)


**a.** How much work in joules is Sultan doing when he pulls the wagon 150 meters?

**b.** If the handle makes an angle of 40° with the ground and he pulls the wagon with the same distance and force, is Sultan doing more or less work? Explain your answer.

## Second : free response questions ثانيا الاسئلة

**Use Cramer's Rule to find the solution of the system of linear equations, if a unique solution exists.**

$-x - 2y = -4z + 12$
$3x - 6y + z = 15$
$2x + 5y + 1 = 0$

**Use Cramer's Rule to find the solution of each system of linear equations, if a unique solution exists.**

**4A.** $8x + 12y - 24z = -40$
$3x - 8y + 12z = 23$
$2x + 3y - 6z = -10$

**4B.** $-2x + 4y - z = -3$
$3x + y + 2z = 6$
$x - 3y = 1$

**Use Cramer's Rule to find the solution of each system of linear equations, if a unique solution exists.** (Examples 3 and 4)

**15.** $2x - y + z = 1$
$x + 2y - 4z = 3$
$4x + 3y - 7z = -8$

**16.** $x + y + z = 12$
$6x - 2y - z = 16$
$3x + 4y + 2z = 28$

**17.** $x + 2y = 12$
$3y - 4z = 25$
$x + 6y + z = 20$

**18.** $9x + 7y = -30$
$8y + 5z = 11$
$-3x + 10z = 73$

**ENVIRONMENT** Solar energy may be harnessed by using parabolic mirrors. The mirrors reflect the rays from the Sun to the focus of the parabola. The focus of each parabolic mirror at the facility described at the left is 6.25 feet above the vertex. The latus rectum is 25 feet long.

**a.** Assume that the focus is at the origin. Write an equation for the parabola formed by each mirror.

In order for the mirrors to collect the Sun's energy, the parabola must open upward. Therefore, the vertex must be below the focus.

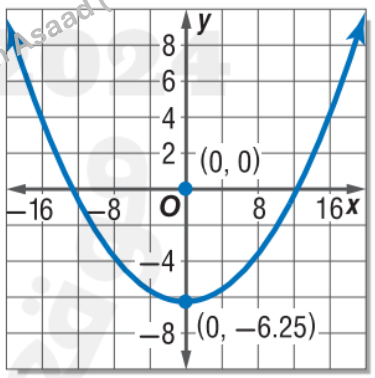
focus: (0, 0) vertex: (0, −6.25)

The measure of the latus rectum is 25. So $25 = \left|\frac{1}{a}\right|$, and $a = \frac{1}{25}$.

Using the form $y = a(x - h)^2 + k$, an equation for the parabola formed by each mirror is $y = \frac{1}{25}x^2 - 6.25$.

**b.** Graph the equation.

Now use all of the information to draw a graph.




**5.** Write and graph an equation for a parabolic mirror that has a focus 1.4 meters above the vertex and a latus rectum that is 5.5 meters long, when the focus is at the origin.

13. **ASTRONOMY** Consider a parabolic mercury mirror like the one described at the beginning of the lesson. The focus is 6 feet above the vertex and the latus rectum is 24 feet long.

   a. Assume that the focus is at the origin. Write an equation for the parabola formed by the parabolic microphone.

   b. Graph the equation.

32. **BASEBALL** When a ball is thrown, the path it travels is a parabola. Suppose a baseball is thrown from ground level, reaches a maximum height of 50 feet, and hits the ground 200 feet from where it was thrown. Assuming this situation could be modeled on a coordinate plane with the focus of the parabola at the origin, find the equation of the parabolic path of the ball. Assume the focus is on ground level.

33. **PERSEVERANCE** Ground antennas and satellites are used to relay signals between the NASA Mission Operations Center and the spacecraft it controls. One such parabolic dish is 146 feet in diameter. Its focus is 48 feet from the vertex.

   a. Sketch two options for the dish, one that opens up and one that opens left.

   b. Write two equations that model the sketches in part a.

   c. If you wanted to find the depth of the dish, does it matter which equation you use? Why or why not?

Find the center and radius of each circle. Then graph the circle.

31. $x^2 + y^2 = 75$

32. $(x - 3)^2 + y^2 = 4$

33. $(x - 1)^2 + (y - 4)^2 = 34$

34. $x^2 + (y - 14)^2 = 144$

35. $(x - 5)^2 + (y + 2)^2 = 16$

36. $x^2 + y^2 = 256$

37. $(x - 4)^2 + y^2 = \frac{8}{9}$

38. $\left(x + \frac{2}{3}\right)^2 + \left(y - \frac{1}{2}\right)^2 = \frac{16}{25}$

39. $x^2 + y^2 + 4x = 9$

40. $x^2 + y^2 - 6y + 8x = 0$

41. $x^2 + y^2 + 2x + 4y = 9$

42. $x^2 + y^2 - 3x + 8y = 20$

43. $x^2 + y^2 + 6y = -50 - 14x$

44. $x^2 - 18x + 53 = 18y - y^2$

45. $2x^2 + 2y^2 - 4x + 8y = 32$

46. $3x^2 + 3y^2 - 6y + 12x = 24$

**Find each of the following for $\mathbf{w} = \langle -4, 1\rangle$, $\mathbf{y} = \langle 2, 5\rangle$, and $\mathbf{z} = \langle -3, 0\rangle$.**

**a.** $\mathbf{w} + \mathbf{y}$

$\mathbf{w} + \mathbf{y} = \langle -4, 1\rangle + \langle 2, 5\rangle$ Substitute.

$= \langle -4 + 2, 1 + 5\rangle$ or $\langle -2, 6\rangle$ Vector addition

**b.** $\mathbf{z} - 2\mathbf{y}$

$\mathbf{z} - 2\mathbf{y} = \mathbf{z} + (-2)\mathbf{y}$ Rewrite subtraction as addition.

$= \langle -3, 0\rangle + (-2)\langle 2, 5\rangle$ Substitute.

$= \langle -3, 0\rangle + \langle -4, -10\rangle$ or $\langle -7, -10\rangle$ Scalar multiplication and vector addition

**3A.** $4\mathbf{w} + \mathbf{z}$ **3B.** $-3\mathbf{w}$ **3C.** $2\mathbf{w} + 4\mathbf{y} - \mathbf{z}$

**Find each of the following for $\mathbf{f} = \langle 8, 0\rangle$, $\mathbf{g} = \langle -3, -5\rangle$, and $\mathbf{h} = \langle -6, 2\rangle$.** (Example 3)

**11.** $4\mathbf{h} - \mathbf{g}$ **12.** $\mathbf{f} + 2\mathbf{h}$

**13.** $3\mathbf{g} - 5\mathbf{f} + \mathbf{h}$ **14.** $2\mathbf{f} + \mathbf{g} - 3\mathbf{h}$

**15.** $\mathbf{f} - 2\mathbf{g} - 2\mathbf{h}$ **16.** $\mathbf{h} - 4\mathbf{f} + 5\mathbf{g}$

**17.** $4\mathbf{g} - 3\mathbf{f} + \mathbf{h}$ **18.** $6\mathbf{h} + 5\mathbf{f} - 10\mathbf{g}$

**Find the component form of the vector v with magnitude 10 and direction angle 120°.**

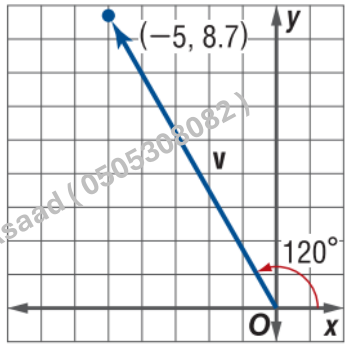
$\mathbf{v} = \langle |\mathbf{v}| \cos\theta, |\mathbf{v}| \sin\theta \rangle$ Component form of v in terms of $|\mathbf{v}|$ and $\theta$

$= \langle 10 \cos 120^\circ, 10 \sin 120^\circ \rangle$ $|\mathbf{v}| = 10$ and $\theta = 120^\circ$

$= \left\langle 10\left(-\frac{1}{2}\right), 10\left(\frac{\sqrt{3}}{2}\right) \right\rangle$ $\cos 120^\circ = -\frac{1}{2}$ and $\sin 120^\circ = \frac{\sqrt{3}}{2}$

$= \langle -5, 5\sqrt{3} \rangle$ Simplify.

**CHECK** Graph $\mathbf{v} = \langle -5, 5\sqrt{3} \rangle \approx \langle -5, 8.7 \rangle$. The measure of the angle v makes with the positive $x$-axis is about 120° as shown, and $|\mathbf{v}| = \sqrt{(-5)^2 + (5\sqrt{3})^2}$ or 10. ✔




## GuidedPractice

**Find the component form of v with the given magnitude and direction angle.**

**6A.** $|\mathbf{v}| = 8, \theta = 45^\circ$

**6B.** $|\mathbf{v}| = 24, \theta = 210^\circ$

**Find the component form of $v$ with the given magnitude and direction angle.** (Example 6)

**38.** $|\mathbf{v}| = 12, \theta = 60^\circ$

**39.** $|\mathbf{v}| = 4, \theta = 135^\circ$

**40.** $|\mathbf{v}| = 6, \theta = 240^\circ$

**41.** $|\mathbf{v}| = 16, \theta = 330^\circ$

**42.** $|\mathbf{v}| = 28, \theta = 273^\circ$

**43.** $|\mathbf{v}| = 15, \theta = 125^\circ$

**Find the angle $\theta$ between vectors u and v to the nearest tenth of a degree.**

**a.** $\mathbf{u} = \langle 6, 2 \rangle$ and $\mathbf{v} = \langle -4, 3 \rangle$

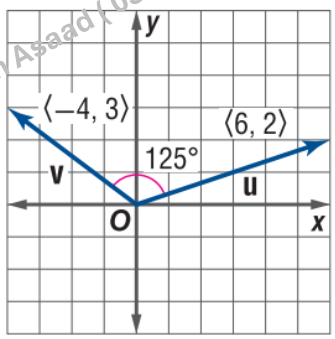
$$\cos\theta = \frac{\mathbf{u} \cdot \mathbf{v}}{|\mathbf{u}|\,|\mathbf{v}|}$$ Angle between two vectors

$$\cos\theta = \frac{\langle 6, 2 \rangle \cdot \langle -4, 3 \rangle}{|\langle 6, 2 \rangle|\,|\langle -4, 3 \rangle|}$$ $\mathbf{u} = \langle 6, 2 \rangle$ and $\mathbf{v} = \langle -4, 3 \rangle$

$$\cos\theta = \frac{-24 + 6}{\sqrt{40}\sqrt{25}}$$ Evaluate.

$$\cos\theta = \frac{-9}{5\sqrt{10}}$$ Simplify.

$$\theta = \cos^{-1}\frac{-9}{5\sqrt{10}} \text{ or about } 124.7^\circ$$ Solve for $\theta$.




The measure of the angle between **u** and **v** is about 124.7°.

**b.** $\mathbf{u} = \langle 3, 1 \rangle$ and $\mathbf{v} = \langle 3, -3 \rangle$

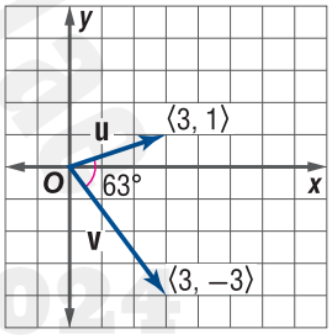
$$\cos\theta = \frac{\mathbf{u} \cdot \mathbf{v}}{|\mathbf{u}|\,|\mathbf{v}|}$$ Angle between two vectors

$$\cos\theta = \frac{\langle 3, 1 \rangle \cdot \langle 3, -3 \rangle}{|\langle 3, 1 \rangle|\,|\langle 3, -3 \rangle|}$$ $\mathbf{u} = \langle 3, 1 \rangle$ and $\mathbf{v} = \langle 3, -3 \rangle$

$$\cos\theta = \frac{9 + (-3)}{\sqrt{10}\sqrt{18}}$$ Evaluate.

$$\cos\theta = \frac{1}{\sqrt{5}}$$ Simplify.

$$\theta = \cos^{-1}\frac{1}{\sqrt{5}} \text{ or about } 63.4^\circ$$ Solve for $\theta$.




The measure of the angle between **u** and **v** is about 63.4°.

**3A.** $\mathbf{u} = \langle -5, -2 \rangle$ and $\mathbf{v} = \langle 4, 4 \rangle$

**3B.** $\mathbf{u} = \langle 9, 5 \rangle$ and $\mathbf{v} = \langle -6, 7 \rangle$

**Find the angle $\theta$ between u and v to the nearest tenth of a degree.** (Example 3)

16. $\mathbf{u} = \langle 0, -5 \rangle, \mathbf{v} = \langle 1, -4 \rangle$

17. $\mathbf{u} = \langle 7, 10 \rangle, \mathbf{v} = \langle 4, -4 \rangle$

18. $\mathbf{u} = \langle -2, 4 \rangle, \mathbf{v} = \langle 2, -10 \rangle$

19. $\mathbf{u} = -2\mathbf{i} + 3\mathbf{j}, \mathbf{v} = -4\mathbf{i} - 2\mathbf{j}$

20. $\mathbf{u} = \langle -9, 0 \rangle, \mathbf{v} = \langle -1, -1 \rangle$

21. $\mathbf{u} = -\mathbf{i} - 3\mathbf{j}, \mathbf{v} = -7\mathbf{i} - 3\mathbf{j}$

22. $\mathbf{u} = \langle 6, 0 \rangle, \mathbf{v} = \langle -10, 8 \rangle$

23. $\mathbf{u} = -10\mathbf{i} + \mathbf{j}, \mathbf{v} = 10\mathbf{i} - 5\mathbf{j}$

24. **CAMPING** Khalifa and Khamis set off from their campsite to search for firewood. The path that Khalifa takes can be represented by $\mathbf{u} = \langle 3, -5 \rangle$. The path that Khamis takes can be represented by $\mathbf{v} = \langle -7, 6 \rangle$. Find the angle between the pair of vectors. (Example 3)



**مع اطيب امنياتي بالنجاح والتفوق للجميع**

**أ / كرم اسعد**