تجميعة أسئلة القسم الالكتروني وفق الهيكل الوزاري منهج ريفيل

MCQ Questions (1- 15) الجزء الالكتروني

1	Use trigonometric identities to simplify expressions	Exercises (28-33)	G10Adv(T3) P773

28. $\frac{1-\sin^2\theta}{\sin^2\theta}$

29. $\tan\theta\csc\theta$

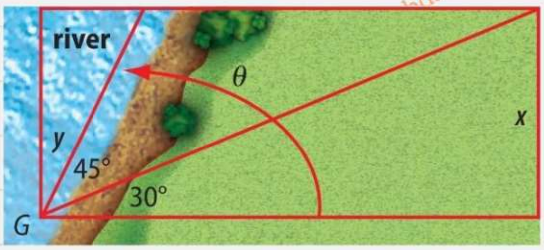
30. $\frac{1}{\sin^2\theta}-\frac{\cos^2\theta}{\sin^2\theta}$

31. $2(\csc^2\theta-\cot^2\theta)$

32. $(1+\sin\theta)(1-\sin\theta)$

33. $2-2\sin^2\theta$

A geologist measures the angle between one side of a rectangular lot and the line from her position to the opposite corner of the lot as 30°. She then measures the angle between that line and the line to the point on the property where a river crosses as 45°. She stands 100 meters from the opposite corner of the property. How far is she from the point at which the river crosses the property line?



$\sin 30^\circ = \frac{x}{100}$

$x = 100 \sin 30^\circ$

$x = 50$

$\cos 15^\circ = \frac{50}{y}$

$\cos(45^\circ - 30^\circ) = \frac{50}{y}$

$\cos 45^\circ \cos 30^\circ + \sin 45^\circ \sin 30^\circ = \frac{50}{y}$

$\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} + \frac{\sqrt{2}}{2} \cdot \frac{1}{2} = \frac{50}{y}$

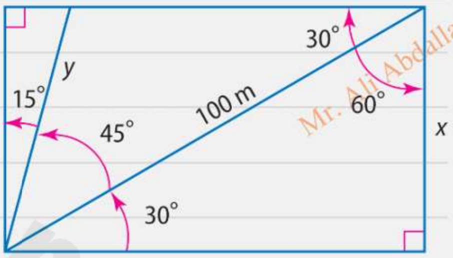
$\frac{\sqrt{6}+\sqrt{2}}{4} = \frac{50}{y}$

$(\sqrt{6}+\sqrt{2})y = 200$

$y = \frac{200}{(\sqrt{6}+\sqrt{2})} \cdot \frac{(\sqrt{6}-\sqrt{2})}{(\sqrt{6}-\sqrt{2})}$

$y = 50(\sqrt{6}-\sqrt{2})$

$y = 50\sqrt{6} - 50\sqrt{2}$ or about 51.8



The harmonic motion of an object can be described by: $x = 4\cos\left(2\pi t - \frac{\pi}{4}\right)$, where x is distance from the equilibrium point in centimeters and t is time in minutes.
Find the exact distance from the equilibrium point at 45 seconds.

Find the exact value of each expression.

12. $\sin 165°$

13. $\cos 135°$

14. $\cos \frac{7\pi}{12}$

15. $\sin \frac{\pi}{12}$

16. $\tan 195°$

17. $\cos \left(-\frac{\pi}{12}\right)$

24. $\tan 165°$

25. $\sec 1275°$

26. $\sin 735°$

27. $\tan \frac{23\pi}{12}$

28. $\csc \frac{5\pi}{12}$

29. $\cot \frac{113\pi}{12}$

KeyConcept Double-Angle Identities

The following identities hold true for all values of θ.

$$\sin 2\theta = 2\sin\theta\cos\theta$$

$$\cos 2\theta = \cos^2\theta - \sin^2\theta$$

$$\cos 2\theta = 2\cos^2\theta - 1$$

$$\cos 2\theta = 1 - 2\sin^2\theta$$

$$\tan 2\theta = \frac{2\tan\theta}{1-\tan^2\theta}$$

KeyConcept Half-Angle Identities

The following identities hold true for all values of θ.

$$\sin\frac{\theta}{2} = \pm\sqrt{\frac{1-\cos\theta}{2}} \qquad \cos\frac{\theta}{2} = \pm\sqrt{\frac{1+\cos\theta}{2}} \qquad \tan\frac{\theta}{2} = \pm\sqrt{\frac{1-\cos\theta}{1+\cos\theta}},\ \cos\theta \neq -1$$

==

Find the exact values of $\sin 2\theta$, $\cos 2\theta$, $\sin\frac{\theta}{2}$, and $\cos\frac{\theta}{2}$.

1. $\sin\theta = \frac{1}{4}$; $0^\circ < \theta < 90^\circ$

2. $\sin\theta = \frac{4}{5}$; $90^\circ < \theta < 180^\circ$

Mr. Ali Abdalla

Grade 11 Advanced Reveal

https://www.youtube.com/c/AliAbdalla

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Find the exact values of $\sin 2\theta$, $\cos 2\theta$, $\sin \frac{\theta}{2}$, and $\cos \frac{\theta}{2}$.

3. $\cos \theta = -\frac{5}{13}$; $\frac{\pi}{2} < \theta < \pi$

4. $\cos \theta = \frac{3}{5}$; $270^\circ < \theta < 360^\circ$

5. $\tan \theta = -\frac{8}{15}$; $90^\circ < \theta < 180^\circ$

Find the exact values of **$\sin 2\theta$, $\cos 2\theta$, $\sin \frac{\theta}{2}$, and $\cos \frac{\theta}{2}$.**

6. $\tan \theta = \frac{5}{12}$; $\pi < \theta < \frac{3\pi}{2}$

12. $\sin \theta = \frac{2}{3}$; $90^\circ < \theta < 180^\circ$

13. $\sin \theta = -\frac{15}{17}$; $\pi < \theta < \frac{3\pi}{2}$

Find the exact values of $\sin 2\theta$, $\cos 2\theta$, $\sin \frac{\theta}{2}$, and $\cos \frac{\theta}{2}$.

14. $\cos \theta = \frac{3}{5}$; $\frac{3\pi}{2} < \theta < 2\pi$

15. $\cos \theta = \frac{1}{5}$; $270^\circ < \theta < 360^\circ$

16. $\tan \theta = \frac{4}{3}$; $180^\circ < \theta < 270^\circ$

17. $\tan \theta = -2$; $\frac{\pi}{2} < \theta < \pi$

Find A^{-1}, if it exists. If A^{-1} does not exist, write *singular*.

27. $A = \begin{bmatrix} -4 & 2 \\ -6 & 3 \end{bmatrix}$

28. $A = \begin{bmatrix} -4 & 8 \\ 1 & -2 \end{bmatrix}$

29. $A = \begin{bmatrix} 3 & 5 \\ -2 & -3 \end{bmatrix}$

30. $A = \begin{bmatrix} 8 & 5 \\ 6 & 4 \end{bmatrix}$

31. $A = \begin{bmatrix} -1 & -1 & -3 \\ 3 & 6 & 4 \\ 2 & 1 & 8 \end{bmatrix}$

32. $A = \begin{bmatrix} 4 & 2 & 1 \\ -2 & 3 & 5 \\ 6 & -1 & -4 \end{bmatrix}$

33. $A = \begin{bmatrix} 5 & 2 & -1 \\ 4 & 7 & -3 \\ 1 & -5 & 2 \end{bmatrix}$

34. $A = \begin{bmatrix} 2 & 3 & -4 \\ 3 & 6 & -5 \\ -2 & -8 & 1 \end{bmatrix}$

Find AB and BA, if possible.

1. $A = \begin{bmatrix} 8 & 1 \end{bmatrix}$ $\quad B = \begin{bmatrix} 3 & -7 \\ -5 & 2 \end{bmatrix}$

2. $A = \begin{bmatrix} 2 & 9 \\ -7 & 3 \end{bmatrix}$ $\quad B = \begin{bmatrix} 6 & -4 \\ 0 & 3 \end{bmatrix}$

3. $A = \begin{bmatrix} 3 & -5 \end{bmatrix}$ $\quad B = \begin{bmatrix} 4 & 0 & -2 \\ 1 & -3 & 2 \end{bmatrix}$

4. $A = \begin{bmatrix} 4 \\ 5 \end{bmatrix}$ $\quad B = \begin{bmatrix} 6 & 1 & -10 & 9 \end{bmatrix}$

5. $A = \begin{bmatrix} 2 \\ 5 \\ -6 \end{bmatrix}$ $\quad B = \begin{bmatrix} 6 & 0 & -1 \\ -4 & 9 & 8 \end{bmatrix}$

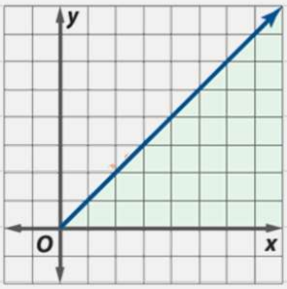
6. $A = \begin{bmatrix} 2 & 0 \\ -4 & -3 \\ 1 & -2 \end{bmatrix}$ $\quad B = \begin{bmatrix} 0 & 6 & -5 \\ 2 & -7 & 1 \end{bmatrix}$

7. $A = \begin{bmatrix} 3 & 4 \\ -7 & 1 \end{bmatrix}$ $\quad B = \begin{bmatrix} 5 & 2 & -8 \\ -6 & 0 & 9 \end{bmatrix}$

8. $A = \begin{bmatrix} 6 & -9 & 10 \\ 4 & 3 & 8 \end{bmatrix}$ $\quad B = \begin{bmatrix} 6 & -8 \\ 3 & -9 \\ -2 & 5 \\ 4 & 1 \end{bmatrix}$

The graph displays the constraints for an objective function.

Which of the following CANNOT be one of the constraints?



يعرض التمثيل البياني قيود دالة الهدف.

فأي مما يلي لا يمكن أن يكون أحد هذه القيود؟

A $x \ge 0$
C $x - y \ge 0$
B $y \ge 0$
D $x - y \le 0$

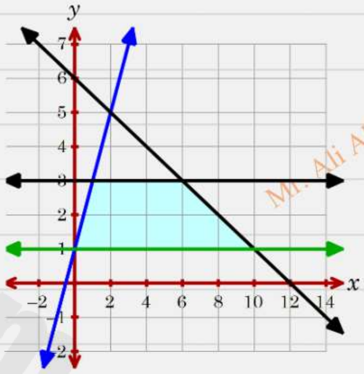
Find the maximum and minimum values of the objective function $f(x, y)$ and for what values of x and y they occur, subject to the given constraints.

1. $f(x, y) = 3x + y$

$y \le 2x + 1$

$x + 2y \le 12$

$1 \le y \le 3$

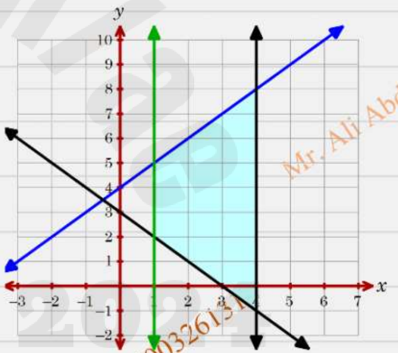


2. $f(x, y) = -x + 4y$

$y \le x + 4$

$y \ge -x + 3$

$1 \le x \le 4$



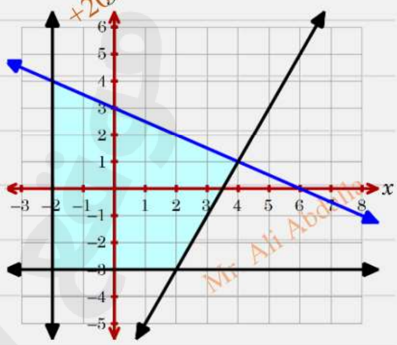
3. $f(x, y) = x - y$

$x + 2y \le 6$

$2x - y \le 7$

$x \ge -2$

$y \ge -3$



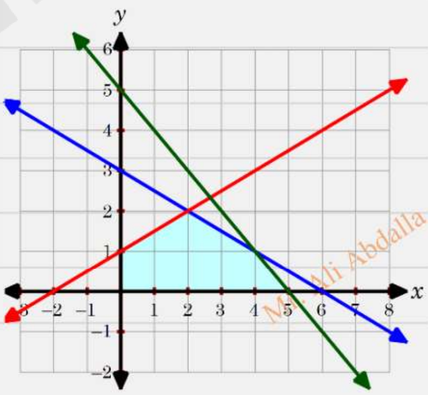
4. $f(x, y) = 3x - 5y$

$x \ge 0, y \ge 0$

$x + 2y \le 6$

$2y - x \le 2$

$x + y \le 5$

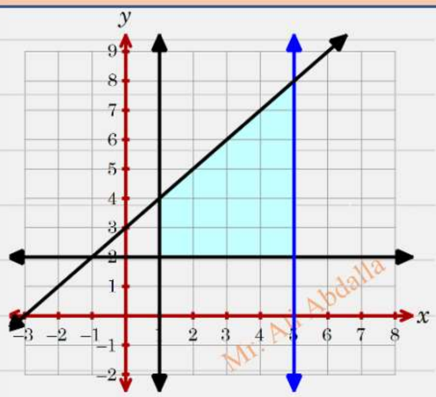


5. $f(x, y) = 3x - 2y$

$y \leq x + 3$

$1 \leq x \leq 5$

$y \geq 2$

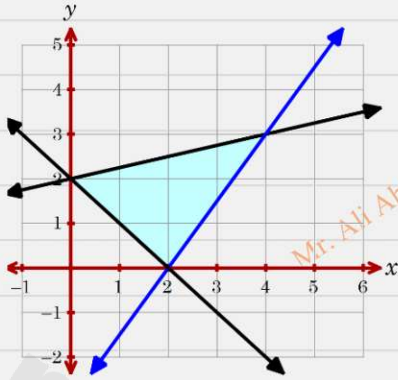


6. $f(x, y) = 3y + x$

$4y \leq x + 8$

$2y \geq 3x - 6$

$2x + 2y \geq 4$



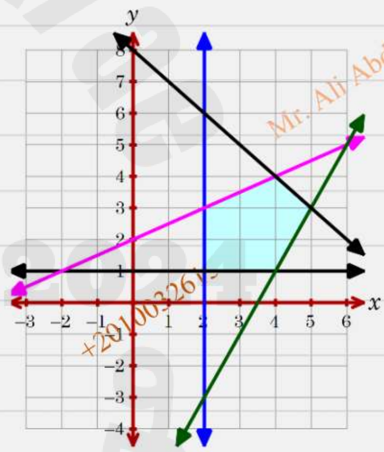
7. $f(x, y) = x - 4y$

$x \geq 2, y \geq 1$

$x - 2y \geq -4$

$2x - y \leq 7$

$x + y \leq 8$

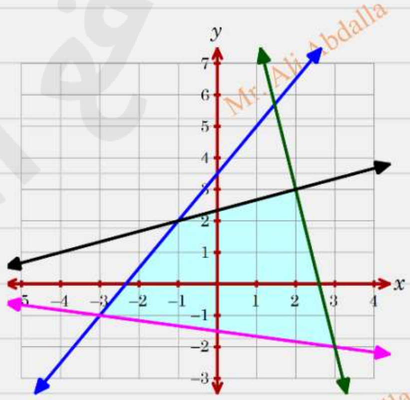


8. $f(x, y) = x - y$

$3x - 2y \geq -7$

$x + 6y \geq -9$

$5x + y \leq 13, x - 3y \geq -7$



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. Write $x + 3y^2 + 12y = 18$ in standard form. Identify the vertex, axis of symmetry, and direction of opening of the parabola.

A) $x = (y-4)^2 - 27$ **B)** $y = (x-4)^2 - 27$

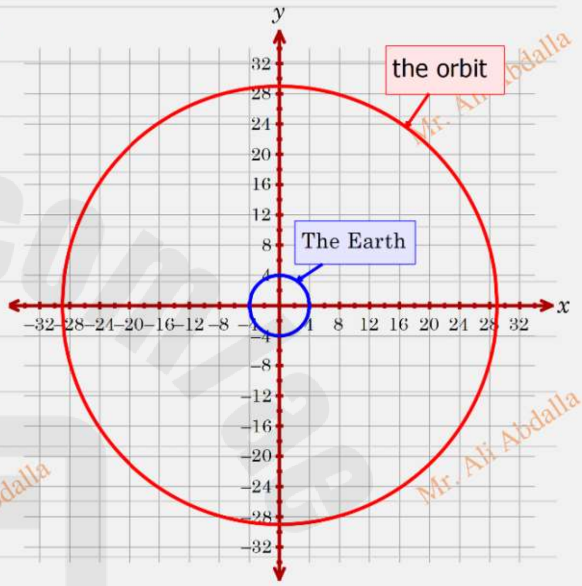
C) $y = -3(y+2)^2 + 30$ **D)** $y = 2(x-6)^2 - 32$

47. **SPACE** A satellite is in a circular orbit 25,000 miles above Earth.

a. Write an equation for the orbit of this satellite if the origin is at the center of Earth. Use 8000 miles as the diameter of Earth.

$x^2 + y^2 = 841{,}000{,}000$

b. Draw a sketch of Earth and the orbit to scale. Label your sketch.



48. **SENSE-MAKING** Suppose an unobstructed radio station broadcast could travel 120 kilometers. Assume the station is centered at the origin.

a. Write an equation to represent the boundary of the broadcast area with the origin as the center.

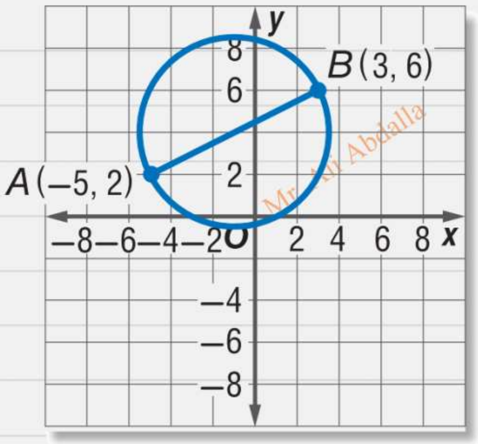
$x^2 + y^2 = 14{,}400$

b. If the transmission tower is relocated 40 kilometers east and 10 kilometers south of the current location, and an increased signal will transmit signals an additional 80 kilometers, what is an equation to represent the new broadcast area?

$(x - 40)^2 + (y + 10)^2 = 40{,}000$

49. GEOMETRY Concentric circles are circles with the same center but different radii. Refer to the graph at the right where $\overline{AB}$ is a diameter of the circle.

a. Write an equation of the circle on centric with the circle at the right, with radius 4 units greater.

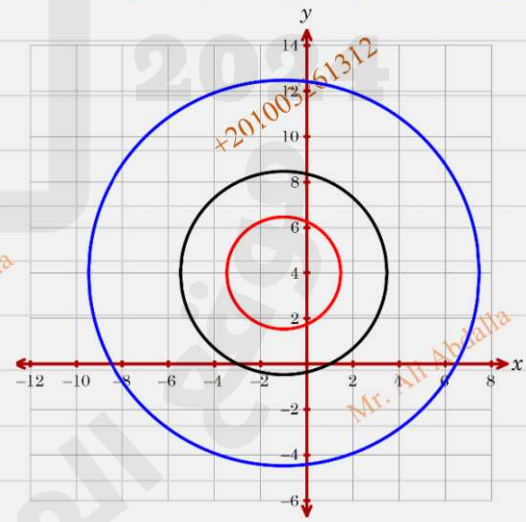


$$(x+1)^2 + (y-4)^2 = 36 + 16\sqrt{5}$$

b. Write an equation of the circle concentric with the circle at the right, with a radius of 2 units less.

$$(x+1)^2 + (y-4)^2 = 24 - 8\sqrt{5}$$

c. Graph the circles from parts **a** and **b** on the same coordinate plane.



50. **EARTHQUAKES** A stadium is located about 35 kilometers west and 40 kilometers north of a city. Suppose an earthquake occurs with its epicenter about 55 kilometers from the stadium. Assume that the origin of a coordinate plane is located at the center of the city. Write an equation for the set of points that could be the epicenter of the earthquake.

$$(x+35)^2+(y-40)^2=3025$$

What is the radius of the circle with equation $x^2+2x+y^2+14y+34=0$?

A 2

B 4

C 8

D 16

Write the standard form of the equation of the circle with center at $(2, -7)$ and radius 5.

A $(x-2)^2+(y+7)^2=25$

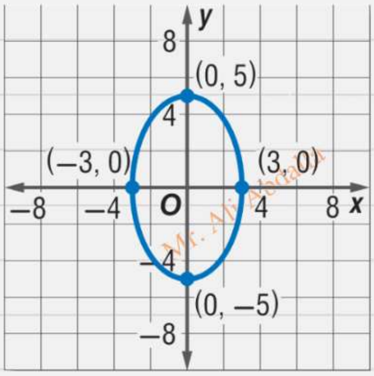
B $(x-2)^2+(y+7)^2=5$

C $(x-2)^2+(y+7)^2=16$

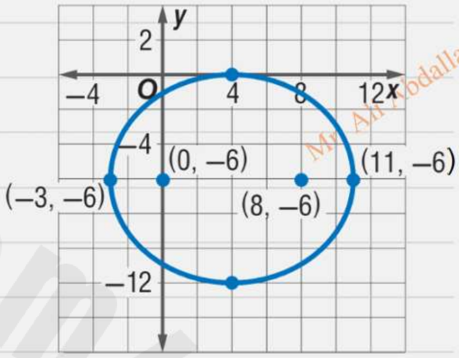
D $(x+2)^2+(y-7)^2=25$

Write an equation for the ellipse.

(1)



(2)



Write an equation for an ellipse that satisfies each set of conditions.

(3) vertices at $(-2, -6)$ and $(-2, 4)$, co-vertices at $(-5, \ -1)$ and $(1, \ -1)$.

(4) vertices at $(-2, 5)$ and $(14, 5)$, co-vertices at $(6, 1)$ and $(6, 9)$.

Which equation represents an ellipse with endpoints of the major axis at $(-4, 10)$ and $(-4, -6)$ and foci at about $(-4, 7.3)$ and $(-4, -3.3)$?

A $\frac{(x-2)^2}{36}+\frac{(y+4)^2}{64}=1$

B $\frac{(x+4)^2}{64}+\frac{(y-2)^2}{36}=1$

C $\frac{(y-2)^2}{64}+\frac{(x+4)^2}{36}=1$

D $\frac{(x-2)^2}{64}+\frac{(y+4)^2}{36}=1$

Which is the equation for an ellipse with vertices $(-3, 4)$, $(11, 4)$ and foci $(-1, 4)$, $(9, 4)$?

F $\frac{(x-4)^2}{49}+\frac{(y-4)^2}{24}=1$

G $\frac{(x-4)^2}{49}+\frac{(y-4)^2}{25}=1$

H $\frac{x^2}{7}+\frac{y^2}{5}=1$

J $\frac{(x-4)^2}{24}-\frac{(y-4)^2}{49}=1$

For Questions 1–3, refer to the ellipse represented by $\frac{(x-1)^2}{16}+\frac{(y+2)^2}{9}=1$.

1. Find the coordinates of the center.

A $(1, 2)$ **B** $(1, -2)$ **C** $(-1, 2)$ **D** $(-2, 1)$

2. Find the coordinates of the foci.

F $\left(1 \pm \sqrt{7}, -2\right)$

G $\left(1, -2 \pm \sqrt{7}\right)$

H $(5, -2), (-3, -2)$

J $(1, 4), (1, -8)$

3. Find the coordinates of the vertices and co-vertices.

A $(1, 2), (1, -6), (4, -2), (-2, -2)$

B $(4, 2), (-2, 2), (1, 1), (1, -5)$

C $(5, -2), (-3, -2), (1, 1), (1, -5)$

D $(5, -2), (-3, -2), (1, 2), (1, -6)$

For Questions 1–3, refer to the ellipse represented by the equation

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

1. Find the coordinates of the center.

A $(2, 3)$ **B** $(3, 2)$ **C** $(-3, -2)$ **D** $(-2, -3)$

2. Find the coordinates of the foci.

A $\left(3, 2 \pm 2\sqrt{6}\right)$ **B** $(-2, 2), (8, 2)$ **C** $\left(3 \pm 2\sqrt{6}, 2\right)$ **D** $\left(2 \pm 2\sqrt{6}, 3\right)$

3. Find the coordinates of the vertices and co-vertices.

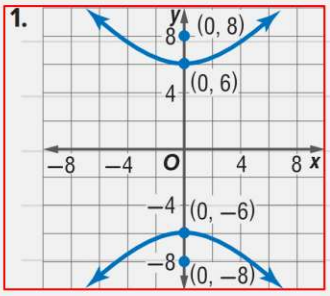
A $(8, 2), (-2, 2), (3, 3), (3, 1)$

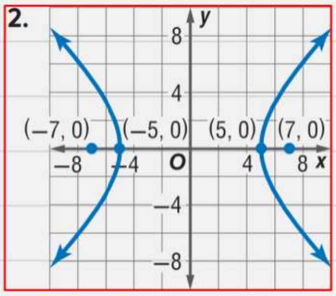
B $(8, 2), (-2, 2), (3, 7), (3, -3)$

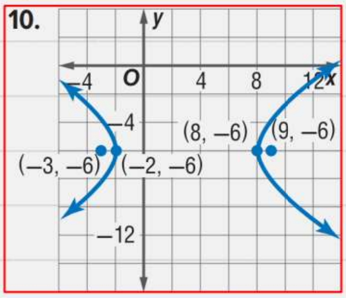
C $(4, 2), (2, 2), (3, 3), (3, 1)$

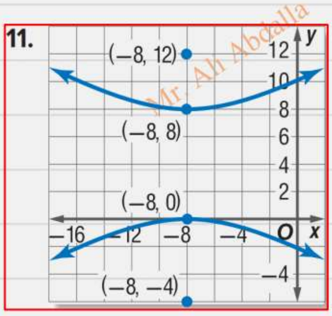
D $(4, 2), (2, 2), (3, 7), (3, -3)$

Which of the following represent the graph of $\frac{y^2}{36}-\frac{x^2}{28}=1$ **.**



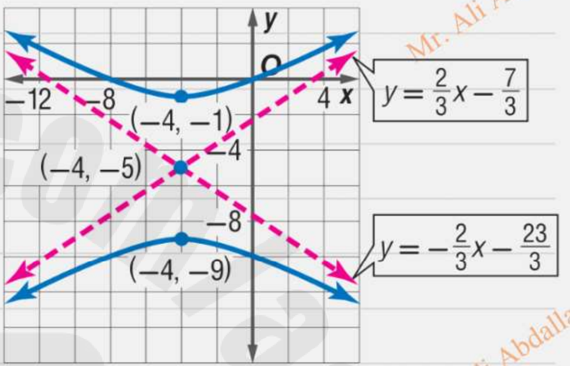






Which of the following equations, represented by the graph on the right:

12.



○ $\frac{(x+4)^2}{36}-\frac{(y+5)^2}{16}=1$

○ $\frac{(x+4)^2}{9}-\frac{(y+5)^2}{4}=1$

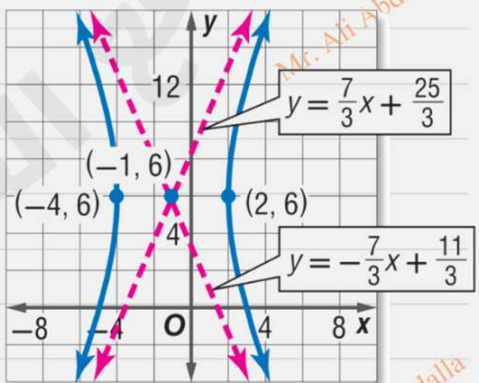
○ $\frac{(y+5)^2}{16}-\frac{(x+4)^2}{36}=1$

○ $\frac{(y-5)^2}{16}-\frac{(x-4)^2}{36}=1$

The vertices are equidistant from the center. So, the center is at $(-4,-5)$*. The value of a is the distance between a vertex and the center, or 4 units.*

Which of the following equations, represented by the graph on the right:

13.



○ $\frac{(x-1)^2}{9}-\frac{(y+6)^2}{49}=1$

○ $\frac{(y-6)^2}{49}-\frac{(x+1)^2}{9}=1$

○ $\frac{(x+1)^2}{9}-\frac{(y-6)^2}{49}=1$

○ $\frac{(x+1)^2}{9}+\frac{(y-6)^2}{49}=1$

The vertices are equidistant from the center. So, the center is at $(-1,6)$*. The value of a is the distance between a vertex and the center, or 3 units.*

Which of the following equations, represented by the graph on the right:

3.

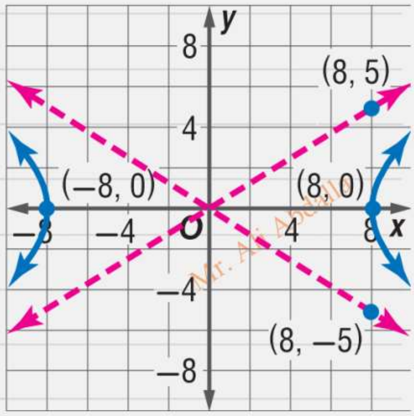
○ $\frac{x^2}{64} - \frac{y^2}{25} = 1$

○ $\frac{y^2}{64} - \frac{x^2}{25} = 1$

○ $\frac{x^2}{64} + \frac{y^2}{25} = 1$

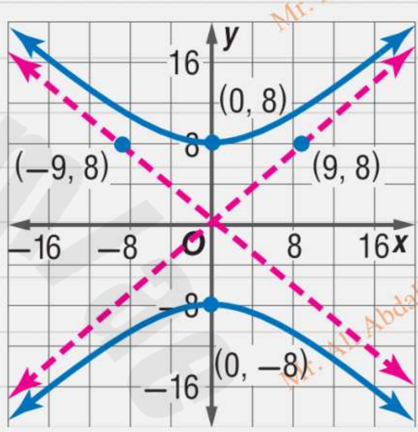
○ $\frac{x^2}{8} - \frac{y^2}{5} = 1$

The vertices are equidistant from the center. So, the center is at $(0, 0)$. The value of a is the distance between a vertex and the center, or 8 units.



Write an equation for hyperbola shown below.

4.



Which are the equations of the asymptotes of $\frac{x^2}{36} - \frac{y^2}{25} = 1$?

A $y = \pm\frac{6}{5}x$

B $y = \pm\frac{5}{6}x$

C $y = \pm\frac{36}{25}x$

D $y = \pm\frac{25}{36}x$

For Questions 1 and 2, refer to the hyperbola represented by $\frac{y^2}{4} - \frac{x^2}{2} = 1$.

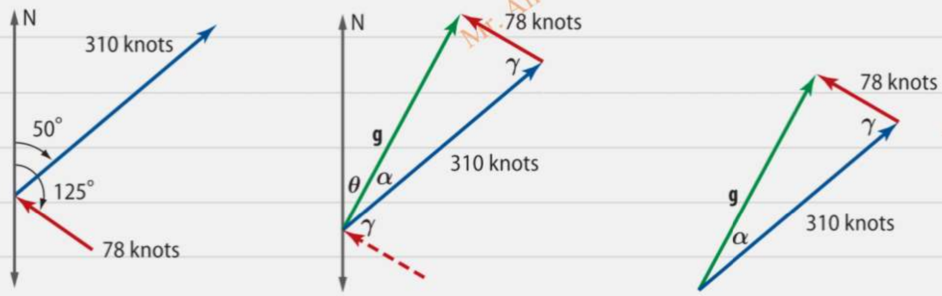
1. Write the equations of the asymptotes.

A $y = \pm 2x$ **B** $y = \pm\frac{1}{2}x$ **C** $y = \pm\sqrt{2}x$ **D** $y = \pm\frac{\sqrt{2}}{2}x$

2. Find the coordinates of the foci.

A $(0, \pm\sqrt{2})$ **B** $(0, \pm\sqrt{6})$ **C** $(\pm\sqrt{2}, 0)$ **D** $(\pm\sqrt{6}, 0)$

AVIATION An airplane is flying with an airspeed of 310 knots on a heading of 050°. If a 78-knot wind is blowing from a true heading of 125°, determine the speed and direction of the plane relative to the ground.



$c^2 = a^2 + b^2 - 2ab\cos\gamma$

$|\mathbf{g}|^2 = 78^2 + 310^2 - 2(78)(310)\cos 75^\circ$

$|\mathbf{g}| = \sqrt{78^2 + 310^2 - 2(78)(310)\cos 75^\circ} \approx 299.4$

The ground speed of the plane is about 299.4 knots.

$\dfrac{\sin\alpha}{a} = \dfrac{\sin\gamma}{c}$

$\dfrac{\sin\alpha}{78} = \dfrac{\sin 75^\circ}{299.4}$

$\sin\alpha = \dfrac{78\sin 75^\circ}{299.4}$

$\alpha = \sin^{-1}\dfrac{78\sin 75^\circ}{299.4} \approx 14.6^\circ$

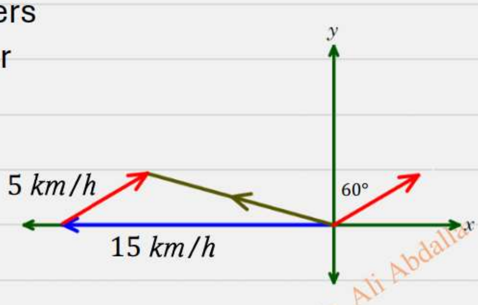
The measure of θ is $50^\circ - \alpha$, which is $50^\circ - 14.6^\circ = 35.4^\circ$.

Therefore, the speed of the plane relative to the ground is about 299.4 knots at about 035°.

RUNNING A runner's resultant velocity is 8 miles per hour due west running with a wind of 3 miles per hour N28°W. What is the runner's speed, to the nearest mile per hour, without the effect of the wind?

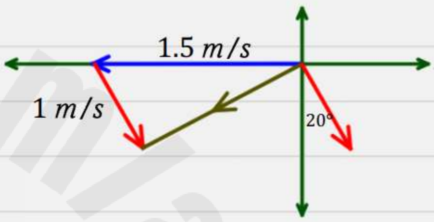
$a^2 = b^2 + c^2 - 2ac\cos\theta$

GLIDING A glider is traveling at an air speed of 15 kilometers per hour due west. If the wind is blowing at 5 kilometers per hour in the direction $N60°E$, what is the resulting ground speed of the glider?



$a^2 = b^2 + c^2 - 2ac\cos\theta$

CURRENT Sally is swimming due west at a rate of 1.5 meters per second. A strong current is flowing $S20°E$ at a rate of 1 meter per second. Find Sally's resulting speed and direction.



$a^2 = b^2 + c^2 - 2ac\cos\theta$

$\frac{\sin\theta}{a} = \frac{\sin\alpha}{b}$

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

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

$|m|^2 = m \cdot m$ then $|m| = \sqrt{m \cdot m}$

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

Find the projection of u = ⟨8, 6⟩ onto v = ⟨2, −3⟩. Then write u as the sum of two orthogonal vectors, one of which is the projection of u onto v.

Step 1 Find the projection of $\mathbf{u}$ onto $\mathbf{v}$.

$$\text{proj}_{\mathbf{v}}\,\mathbf{u} = \left(\frac{\mathbf{u}\cdot\mathbf{v}}{|\mathbf{v}|^2}\right)\mathbf{v}$$

$$= \frac{\langle 8, 6\rangle \cdot \langle 2, -3\rangle}{|\langle 2, -3\rangle|^2}\langle 2, -3\rangle$$

$$= -\frac{2}{13}\langle 2, -3\rangle = \left\langle -\frac{4}{13}, \frac{6}{13}\right\rangle$$

Step 2 Find $\mathbf{u} - \text{proj}_{\mathbf{v}}\,\mathbf{u}$.

$$= \langle 8, 6\rangle - \left\langle -\frac{4}{13}, \frac{6}{13}\right\rangle$$

$$= \left\langle \frac{108}{13}, \frac{72}{13}\right\rangle$$

Therefore, $\text{proj}_{\mathbf{v}}\,\mathbf{u}$ is $\left\langle -\frac{4}{13}, \frac{6}{13}\right\rangle$ and $\mathbf{u} = \left\langle -\frac{4}{13}, \frac{6}{13}\right\rangle + \left\langle \frac{108}{13}, \frac{72}{13}\right\rangle$.

Find the projection of $\mathbf{u} = \langle 4, 2\rangle$ onto $\mathbf{v} = \langle -3, 2\rangle$.

A $\left\langle -\frac{3}{13}, \frac{2}{13}\right\rangle$ **B** $\left\langle \frac{4}{13}, \frac{2}{13}\right\rangle$ **C** $\left\langle -\frac{32}{13}, -\frac{16}{13}\right\rangle$ **D** $\left\langle \frac{24}{13}, -\frac{16}{13}\right\rangle$

Find the projection of u onto v. Then write u as the sum of two orthogonal vectors, one of which is the projection of u onto v.

25. $\mathbf{u} = 3\mathbf{i} + 6\mathbf{j}$, $\mathbf{v} = -5\mathbf{i} + 2\mathbf{j}$

26. $\mathbf{u} = \langle 5, 7\rangle$, $\mathbf{v} = \langle -4, 4\rangle$

Find the projection of $\boldsymbol{u}$ onto $\boldsymbol{v}$.

$$\text{proj}_v u = \left(\frac{\vec{u}\cdot\vec{v}}{|\vec{v}|^2}\right)\vec{v}$$

Mr. Ali Abdalla

Grade 11 Advanced Reveal

https://www.youtube.com/c/AliAbdalla

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27. $\mathbf{u} = \langle 8, 2 \rangle, \mathbf{v} = \langle -4, 1 \rangle$

28. $\mathbf{u} = 6\mathbf{i} + \mathbf{j}, \mathbf{v} = -3\mathbf{i} + 9\mathbf{j}$

29. $\mathbf{u} = \langle 2, 4 \rangle, \mathbf{v} = \langle -3, 8 \rangle$

30. $\mathbf{u} = \langle -5, 9 \rangle, \mathbf{v} = \langle 6, 4 \rangle$

31. $\mathbf{u} = 5\mathbf{i} - 8\mathbf{j}, \mathbf{v} = 6\mathbf{i} - 4\mathbf{j}$

32. $\mathbf{u} = -2\mathbf{i} - 5\mathbf{j}, \mathbf{v} = 9\mathbf{i} + 7\mathbf{j}$

If $\mathbf{u} = \langle -8, 7\rangle$ and $\mathbf{v} = \langle 4, -6\rangle$, find $2\mathbf{u} - \mathbf{v}$.

A $\langle -20, 20\rangle$ **B** $\langle 20, -20\rangle$ **C** $\langle -12, 8\rangle$ **D** $\langle 12, -8\rangle$

For Questions 1 and 2, find each of the following for $\mathbf{v} = \langle -4, 0\rangle$, $\mathbf{w} = \langle -2, 4\rangle$, $\mathbf{r} = \langle -3, 7, 2\rangle$, and $\mathbf{s} = \langle 6, -3, 5\rangle$.

1 $3\mathbf{w} - 4\mathbf{v}$

A $\langle -22, 12\rangle$ **B** $\langle -6, 0\rangle$ **C** $\langle -10, -12\rangle$ **D** $\langle 10, 12\rangle$

2 $2\mathbf{r} - \mathbf{s}$

F $\langle 9, 1, -8\rangle$ **G** $\langle -12, 17, -1\rangle$ **H** $\langle -15, 1, -8\rangle$ **J** $\langle 0, 11, 9\rangle$

Let $\mathbf{u} = \langle 5, 3\rangle$ and $\mathbf{v} = \langle -7, 2\rangle$. Find $2\mathbf{u} + 3\mathbf{v}$.

A $\langle 10, 6\rangle$ **B** $\langle -21, 6\rangle$ **C** $\langle -11, 6\rangle$ **D** $\langle -11, 12\rangle$

Find each of the following for $\mathbf{a} = \langle -5, -4, 3\rangle$, $\mathbf{b} = \langle 6, -2, -7\rangle$, and $\mathbf{c} = \langle -2, 2, 4\rangle$.

36. $6\mathbf{a} - 7\mathbf{b} + 8\mathbf{c}$

37. $7\mathbf{a} - 5\mathbf{b}$

38. $2\mathbf{a} + 5\mathbf{b} - 9\mathbf{c}$

39. $6\mathbf{b} + 4\mathbf{c} - 4\mathbf{a}$

40. $8\mathbf{a} - 5\mathbf{b} - \mathbf{c}$

41. $-6\mathbf{a} + \mathbf{b} + 7\mathbf{c}$

Find each of the following for $x = -9i + 4j + 3k$, $y = 6i - 2j - 7k$, and $z = -2i + 2j + 4k$.

42. $7x + 6y$

43. $3x - 5y + 3z$

44. $4x + 3y + 2z$

45. $-8x - 2y + 5z$

46. $-6y - 9z$

47. $-x - 4y - z$