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# G I I Adv Term 2 (2023-24) End of Term (EoT) Questions

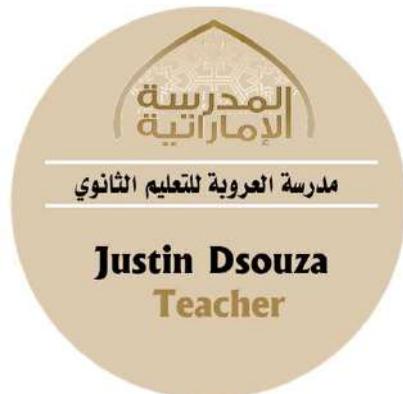
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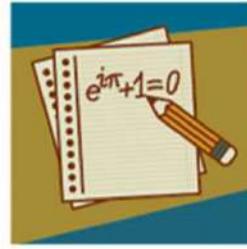
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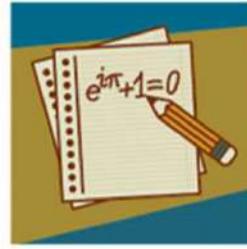
# Justin Daryl Dsouza

## Al Orouba Boys School, Sharjah (5034)



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# G I I Adv Term 2

## Part 1: MCQ & Part 2 FRQ

### EoT2 2023-24

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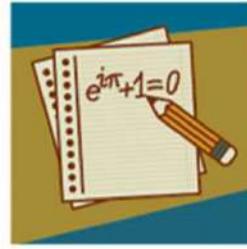


Number of MCQ عدد الأسئلة الموضوعية	15
Marks of MCQ درجة الأسئلة الموضوعية	4
Number of FRQ عدد الأسئلة المقالية	5
Marks per FRQ الدرجات للأسئلة المقالية	(6-10)
Type of All Questions نوع كافة الأسئلة	MCQ/ الأسئلة الموضوعية FRQ/ الأسئلة المقالية
Maximum Overall Grade الدرجة القصوى الممكنة	100
Exam Duration - مدة الامتحان	150 minutes
Mode of Implementation - التطبيق	SwiftAssess & Paper-Based
Calculator	Allowed
الآلة الحاسبة	مسموحة

Question* السؤال*	Learning Outcome/Performance Criteria** نتائج التعلم / معايير الأداء**	Reference(s) in the Student Book (English Version) المرجع في كتاب الطالب (النسخة الانجليزية)	
		Example/Exercise مثال/تمرين	Page الصفحة
1	Use trigonometric identities to simplify expressions	Exercises (28-33)	G10Adv(T3) P773
2	Find values of sine and cosine by using sum and difference identities	Example 2	G10Adv (T3) P783
3	Find values of sine and cosine by using sum and difference identities	Exercises (12-17) & (24-29)	G10Adv (T3) P785
4	Find values of sine and cosine by using half-angle identities	Exercises (1-6) & (12-17)	G10Adv (T3) P793
5	Find inverses of $2 \times 2$ and $3 \times 3$ matrices	Exercises (27-34)	P291
6	Multiply matrices	Exercises (1-8)	P291
7	Use linear programming to solve applications	Exercises (1-8)	P318

Question*	Learning Outcome/Performance Criteria**	Reference(s) in the Student Book (English Version)	
		المرجع في كتاب الطالب (النسخة الانجليزية)	
السؤال*	نتائج التعلم / معايير الأداء**	Example/Exercise	Page
		مثال/تمرين	الصفحة
8	Write equations of parabolas in standard form	Exercises (1-4)	P335
9	Graph parabolas	Exercises (26-31)	P335
10	Graph circles	Exercises (47-50)	P343
11	Write equations of hyperbola	Exercises (1-4)	P360
12	Solve vector problems and resolve vectors into their rectangular components	Exercises (38-44)	P417
13	Represent and operate with vectors in the coordinate plane	Exercises (1-10)	P425
14	Write a vector as a linear combination of unit vectors	Exercises (38-43)	P425
15	Express vectors algebraically and operate with vectors in space	Exercises (36-47)	P442

Question*	Learning Outcome/Performance Criteria**	Reference(s) in the Student Book (English Version)		
		المرجع في كتاب الطالب (النسخة الانجليزية)		
السؤال*	نتائج التعلم / معايير الأداء**	Example/Exercise	Page	
		مثال / تمرين	الصفحة	
FRQ - الأسئلة المقالية -	16	Verify trigonometric identities by transforming each side of an equation into the same form	Exercises (19-32)	P779
	17	Solve trigonometric identities	Exercises (45-55)	P801 & P802
	18	Solve systems of linear equations by using Cramer's rule	Exercises (11-18)	P300
	19	Graph equations of ellipses	Exercises (24-31)	P352
	20	Find the dot product of two vectors and use the dot product to find the angle between them	Exercises (16-23)	P434



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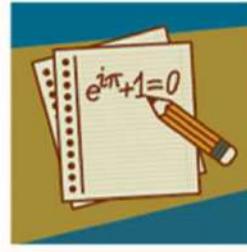
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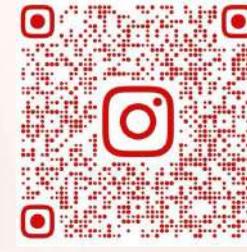




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# GI I Adv Term 2

## Part I: MCQ

### EoT2 2023-24

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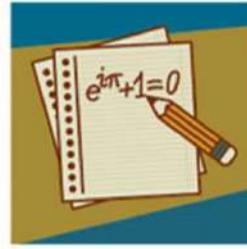
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# Question 1

## Use trigonometric identities to simplify expressions

Page G10Adv(T3) 773

Exercise 28 - 33

YouTube



Simplify each expression.

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

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

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

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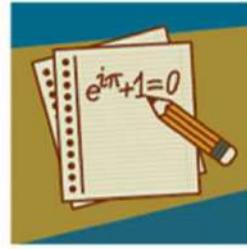
Simplify each expression.

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

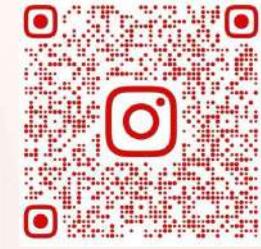
32.  $(1 + \sin \theta)(1 - \sin \theta)$

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

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## Question 2

Find values of sine and cosine by using sum and difference identities

Page G10Adv (T3) 783

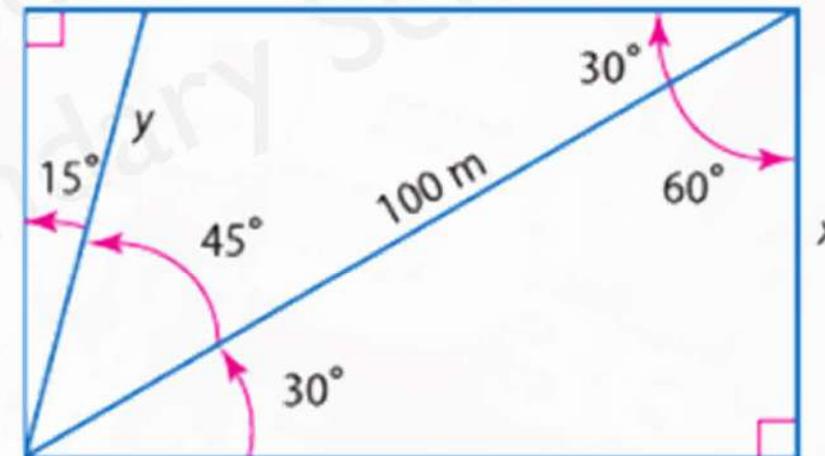
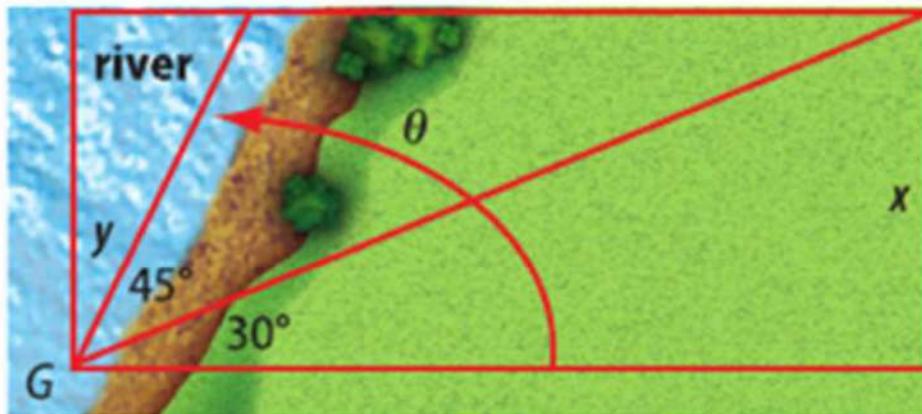
Example 2

YouTube



## Example 2 Sum and Difference of Angles Identities (Real-World)

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  $30^\circ$ . She then measures the angle between that line and the line to the point on the property where a river crosses as  $45^\circ$ . 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?



**Understand** The question asks for the distance between the geologist and the point where the river crosses the property line, or  $y$ .

**Plan** Draw a picture that labels all the things that you know from the information given.

**Solution:****Solve** Solve for  $x$ .

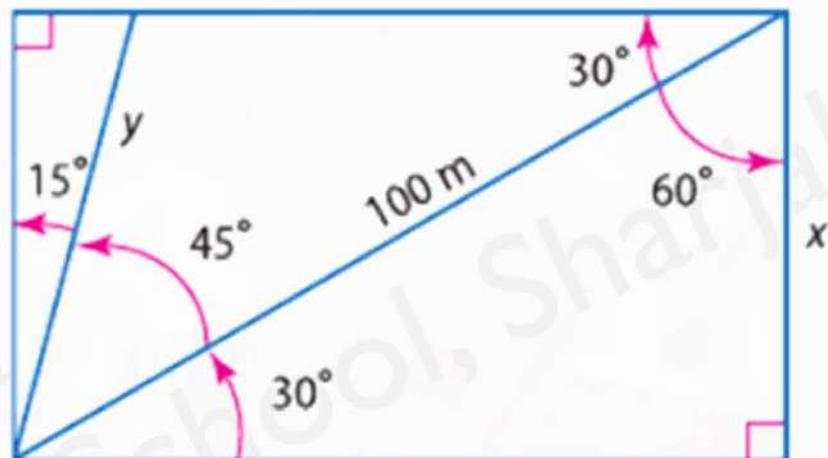
$$\sin 30^\circ = \frac{x}{100}$$

Definition of sine

$$x = 100 \sin 30^\circ$$

$$x = 50$$

Since the lot is rectangular, opposite sides are equal.

Now look at the triangle on the far left and solve for  $y$ .

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

Definition of cosine

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

$$15 = 45 - 30$$

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

Difference identity

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

Evaluate.

**Solution (Continued):**

$$\frac{\sqrt{6} + \sqrt{2}}{4} = \frac{50}{y} \quad \text{Simplify.}$$

$$(\sqrt{6} + \sqrt{2})y = 200 \quad \text{Cross products}$$

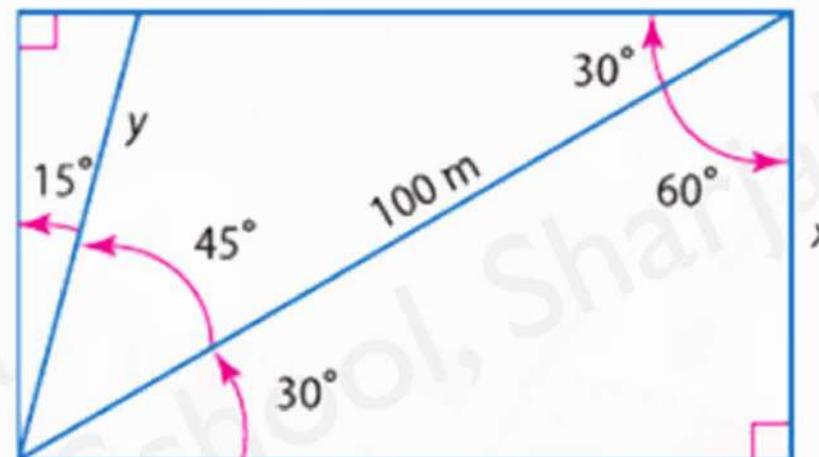
$$y = \frac{200}{(\sqrt{6} + \sqrt{2})} \cdot \frac{(\sqrt{6} - \sqrt{2})}{(\sqrt{6} - \sqrt{2})}$$

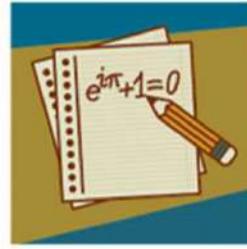
$$y = 50(\sqrt{6} - \sqrt{2})$$

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

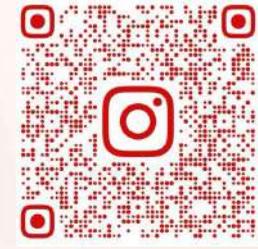
The geologist is about 51.8 meters from the point where the river crosses the property line.

**Check** Use a calculator to find the Arccos of  $\frac{50}{51.8} \approx 15^\circ$ . ✓





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## Question 3

Find values of sine and cosine by using sum and difference identities

Page G10Adv (T3) 785

Exercise 12 – 17 & 24 - 29

YouTube



Find the exact value of each expression.

12.  $\sin 165^\circ$

13.  $\cos 135^\circ$

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

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

16.  $\tan 195^\circ$

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

Find the exact value of each expression.

24.  $\tan 165^\circ$

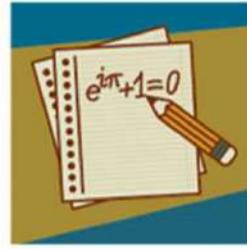
25.  $\sec 1275^\circ$

26.  $\sin 735^\circ$

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

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

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



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## Question 4

Find values of sine and cosine by using half-angle identities

Page G10Adv (T3) 793

Exercise 1 – 6 & 12 - 17

YouTube



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

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

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

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

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

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

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

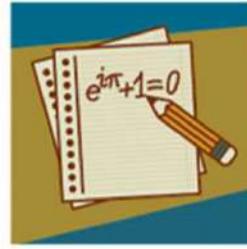
15.  $\cos \theta = \frac{1}{5}; 270^\circ < \theta < 360^\circ$

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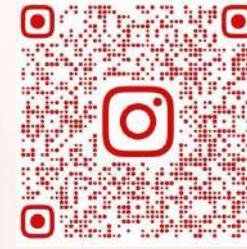
Find the exact values of  $\sin 2\theta$ ,  $\cos 2\theta$ ,  $\sin \frac{\theta}{2}$ , and  $\cos \frac{\theta}{2}$ .

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

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



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## Question 5

Find inverses of  $2 \times 2$  and  $3 \times 3$  matrices

Page 291

Exercise 27 - 34

YouTube



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

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

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

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

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

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

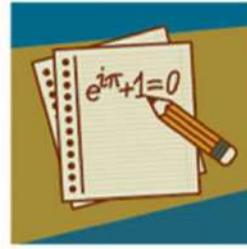
32.  $A = \begin{bmatrix} 4 & 2 & 1 \\ -2 & 3 & 5 \\ 6 & -1 & -4 \end{bmatrix}$

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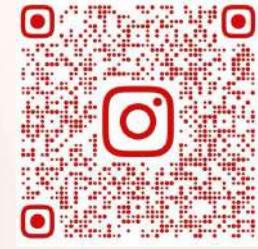
Find  $A^{-1}$ , if it exists. If  $A^{-1}$  does not exist, write *singular*.

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

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



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# Question 6

## Multiply matrices

Page 291

Exercise 1 - 8

YouTube



Find  $AB$  and  $BA$ , if possible.

1.  $A = [ 8 \quad 1 ]$

$$B = \begin{bmatrix} 3 & -7 \\ -5 & 2 \end{bmatrix}$$

2.  $A = \begin{bmatrix} 2 & 9 \\ -7 & 3 \end{bmatrix}$

$$B = \begin{bmatrix} 6 & -4 \\ 0 & 3 \end{bmatrix}$$

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Find  $AB$  and  $BA$ , if possible.

3.  $A = [3 \quad -5]$

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

4.  $A = \begin{bmatrix} 4 \\ 5 \end{bmatrix}$

$$B = [6 \quad 1 \quad -10 \quad 9]$$

Find  $AB$  and  $BA$ , if possible.

$$5. A = \begin{bmatrix} 2 \\ 5 \\ -6 \end{bmatrix}$$

$$B = \begin{bmatrix} 6 & 0 & -1 \\ -4 & 9 & 8 \end{bmatrix}$$

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

$$B = \begin{bmatrix} 0 & 6 & -5 \\ 2 & -7 & 1 \end{bmatrix}$$

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Find  $AB$  and  $BA$ , if possible.

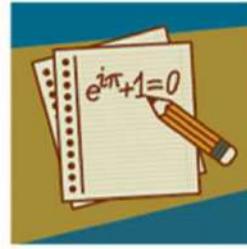
$$7. A = \begin{bmatrix} 3 & 4 \\ -7 & 1 \end{bmatrix}$$

$$B = \begin{bmatrix} 5 & 2 & -8 \\ -6 & 0 & 9 \end{bmatrix}$$

$$8. A = \begin{bmatrix} 6 & -9 & 10 \\ 4 & 3 & 8 \end{bmatrix}$$

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

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## Question 7

# Use linear programming to solve applications

Page 318

Exercise 1 - 8

YouTube



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

$$y \leq 2x + 1$$

$$x + 2y \leq 12$$

$$1 \leq y \leq 3$$

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

$$y \leq x + 4$$

$$y \geq -x + 3$$

$$1 \leq x \leq 4$$

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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.

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

$$x + 2y \leq 6$$

$$2x - y \leq 7$$

$$x \geq -2$$

$$y \geq -3$$

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

$$x \geq 0, y \geq 0$$

$$x + 2y \leq 6$$

$$2y - x \leq 2$$

$$x + y \leq 5$$

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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.

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

$$y \leq x + 3$$

$$1 \leq x \leq 5$$

$$y \geq 2$$

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

$$4y \leq x + 8$$

$$2y \geq 3x - 6$$

$$2x + 2y \geq 4$$

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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.

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

$$x \geq 2, y \geq 1$$

$$x - 2y \geq -4$$

$$2x - y \leq 7$$

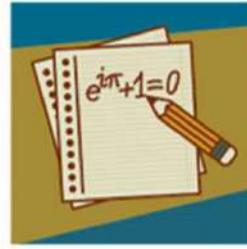
$$x + y \leq 8$$

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

$$3x - 2y \geq -7$$

$$x + 6y \geq -9$$

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



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## Question 8

# Write equations of parabolas in standard form

Page 335

Exercise 1 - 4

YouTube



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

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

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

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

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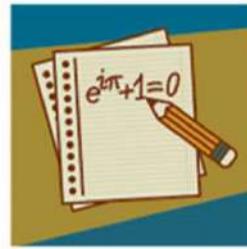




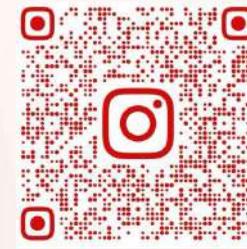
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# Question 9

## Graph parabolas

Page 335

Exercise 26 - 31

YouTube



المدرسة  
الإماراتية

مدرسة العروبة للتعليم الثانوي

Justin Dsouza  
Teacher

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

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

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

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

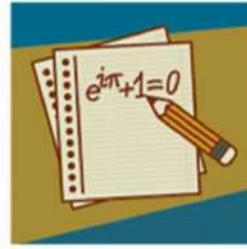
28. focus  $(-2, -4)$ , directrix  $x = -6$

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

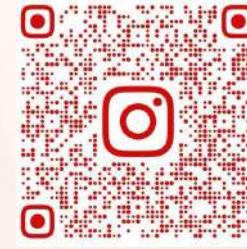
Write an equation for each parabola described below. Then graph the equation.

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

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



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# Question 10

## Graph circles

Page 343

Exercise 47 - 50

YouTube



10	Graph circles	Exercises (47-50)	P343
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**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.
- b. Draw a sketch of Earth and the orbit to scale. Label your sketch.

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10	Graph circles	Exercises (47-50)	P343
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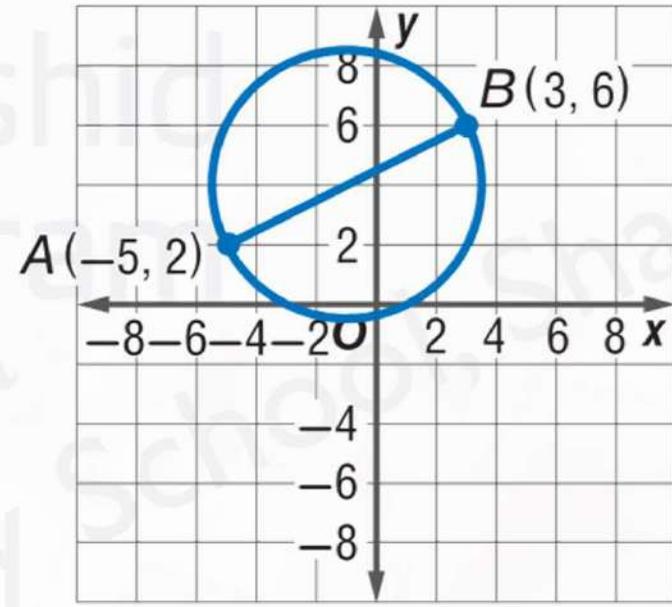
- 48. SENSE-MAKING** Suppose an unobstructed radio station broadcast could travel 120 kilometers. Assume the station is centered at the origin.
- a. Write an equation to represent the boundary of the broadcast area with the origin as the center.
  - b. If the transmission tower is relocated 40 kilometers 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?

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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.

- Write an equation of the circle concentric with the circle at the right, with radius 4 units greater.
- Write an equation of the circle concentric with the circle at the right, with radius 2 units less.
- Graph the circles from parts a and b on the same coordinate plane.

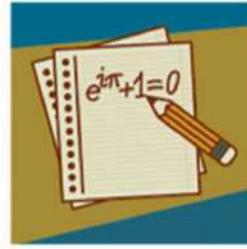


10	Graph circles	Exercises (47-50)	P343
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**50. EARTHQUAKES** A stadium is located about 35 kilometers west and 40 kilometers north of a city. Suppose an earthquake occurs with its epicenter about 55 kilometers from the stadium. Assume that the origin 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.

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## Question 11

# Write equations of hyperbola

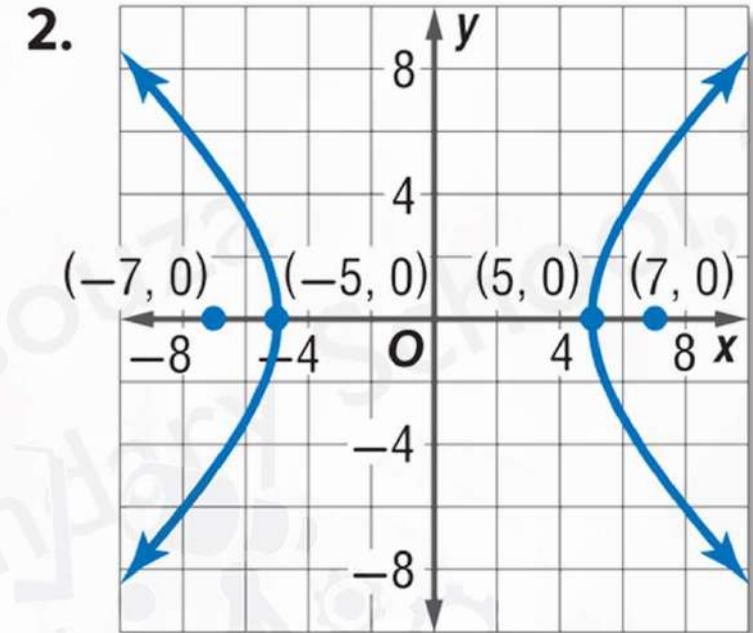
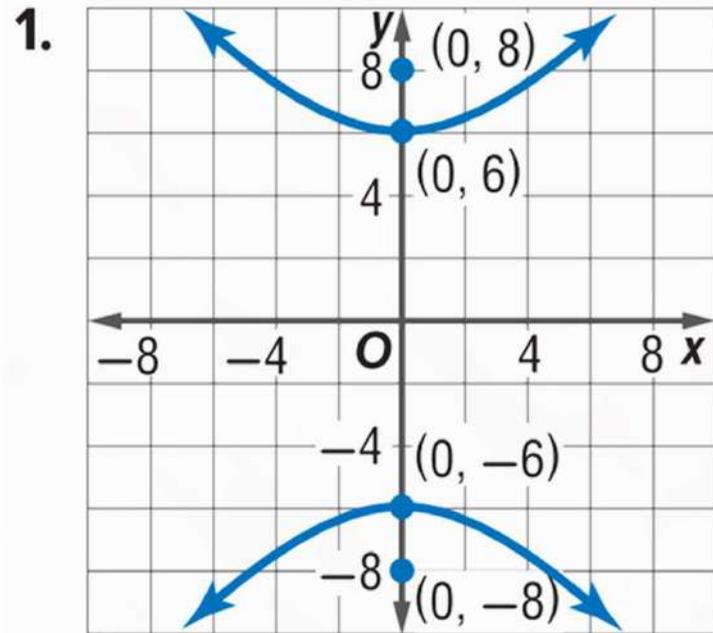
Page 360

Exercise 1 - 4

YouTube



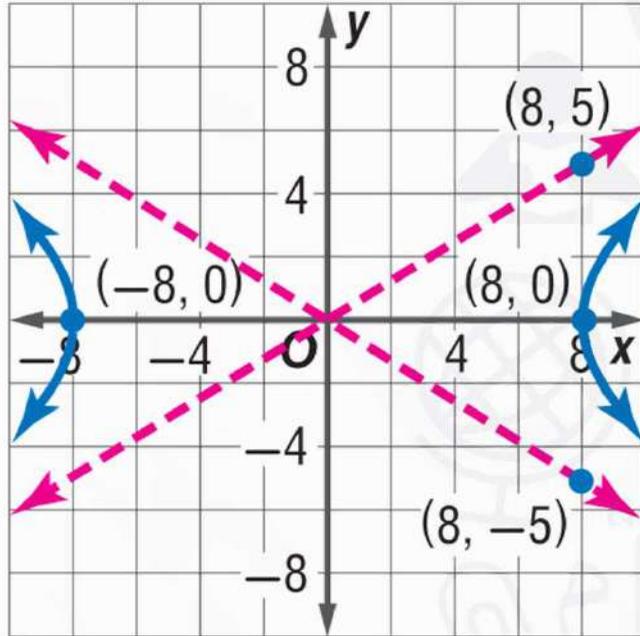
Write an equation for each hyperbola.



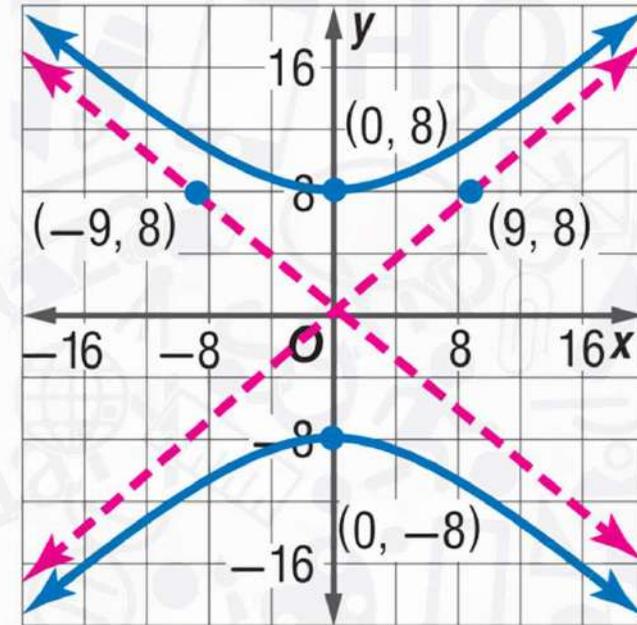
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Write an equation for each hyperbola.

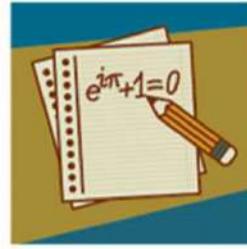
3.



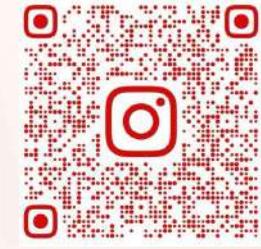
4.



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## Question 12

# Solve vector problems and resolve vectors into their rectangular components

Page 417

Exercise 38 - 44

YouTube



12	Solve vector problems and resolve vectors into their rectangular components	Exercises (38-44)	P417
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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.

**39.** 1.5 centimeters at a bearing of  $N49^\circ E$

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12	Solve vector problems and resolve vectors into their rectangular components	Exercises (38-44)	P417
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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.

**40.** 3.2 centimeters per hour at a bearing of  $S78^\circ W$

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12	Solve vector problems and resolve vectors into their rectangular components	Exercises (38-44)	P417
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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.

41.  $\frac{3}{4}$  centimeter per minute at a bearing of  $255^\circ$

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12	Solve vector problems and resolve vectors into their rectangular components	Exercises (38-44)	P417
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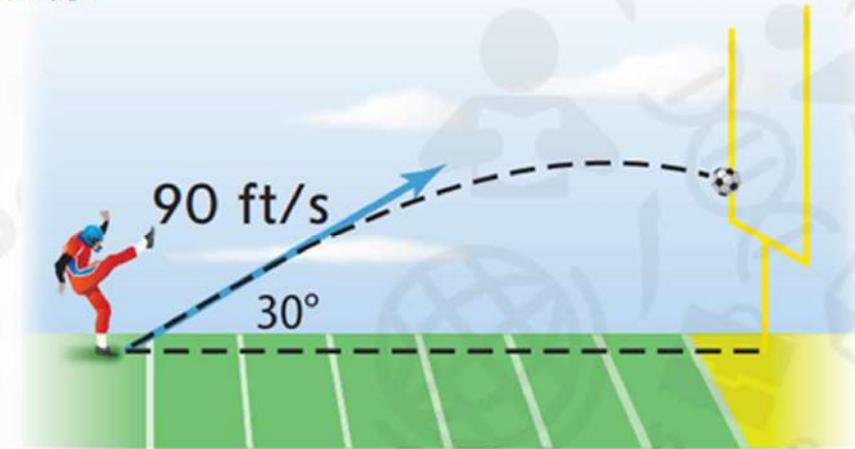
Draw a diagram that shows the resolution of each vector into its rectangular components. Then find the magnitudes of the vector's horizontal and vertical components.

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

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42. **FOOTBALL** For a goal attempt, a ball is kicked with the velocity shown in the diagram below.
- Draw a diagram that shows the resolution of this force into its rectangular components.
  - Find the magnitudes of the horizontal and vertical components.



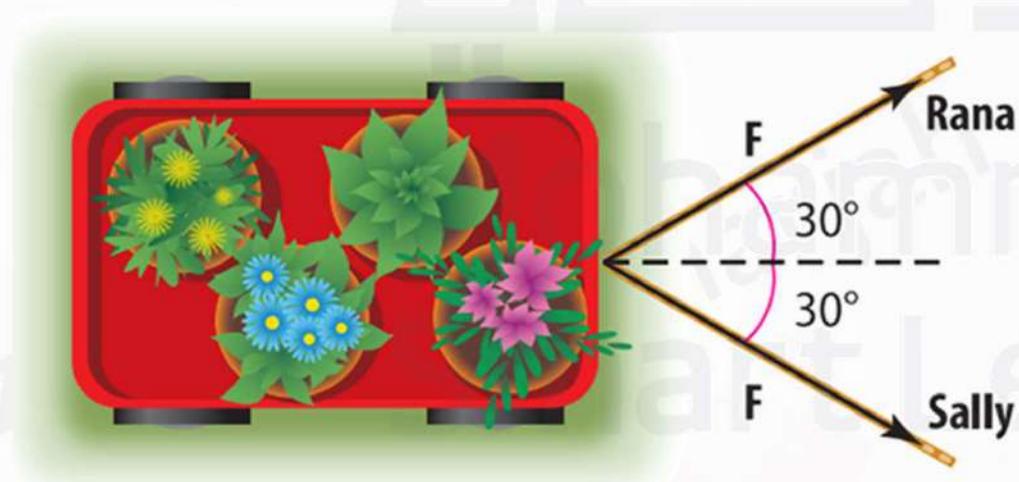
**43. CLEANING** A push broom is pushed with a force of 190 newtons at an angle of  $33^\circ$  with the ground.

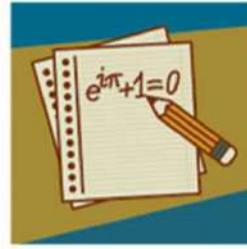
- Draw a diagram that shows the resolution of this force into its rectangular components.
- Find the magnitudes of the horizontal and vertical components.



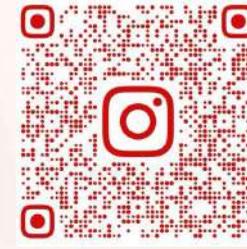
44. **GARDENING** Rana and Sally are pulling a wagon full of plants. Each person pulls on the wagon with equal force at an angle of  $30^\circ$  with the axis of the wagon. The resultant force is 120 newtons.

- How much force is each person exerting?
- If each person exerts a force of 75 newtons, what is the resultant force?
- How will the resultant force be affected if Rana and Sally move closer together?





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## Question 13

# Represent and operate with vectors in the coordinate plane

Page 425

Exercise 1 - 10

YouTube



13	Represent and operate with vectors in the coordinate plane	Exercises (1-10)	P425
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Find the component form and magnitude of  $\overrightarrow{AB}$  with the given initial and terminal points.

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

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

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13	Represent and operate with vectors in the coordinate plane	Exercises (1-10)	P425
----	--	------------------	------

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

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

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

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13	Represent and operate with vectors in the coordinate plane	Exercises (1-10)	P425
----	--	------------------	------

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

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

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

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13	Represent and operate with vectors in the coordinate plane	Exercises (1-10)	P425
----	--	------------------	------

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

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

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

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13	Represent and operate with vectors in the coordinate plane	Exercises (1-10)	P425
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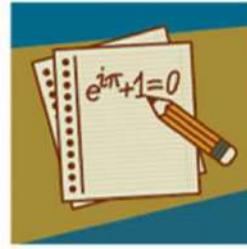
Find the component form and magnitude of  $\overrightarrow{AB}$  with the given initial and terminal points.

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

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

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## Question 14

Write a vector as a linear combination of unit vectors

Page 425

Exercise 38 - 43

YouTube



14	Write a vector as a linear combination of unit vectors	Exercises (38-43)	P425
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Find the component form of  $v$  with the given magnitude and direction angle.

38.  $|v| = 12, \theta = 60^\circ$

39.  $|v| = 4, \theta = 135^\circ$

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14	Write a vector as a linear combination of unit vectors	Exercises (38-43)	P425
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Find the component form of  $v$  with the given magnitude and direction angle.

40.  $|v| = 6, \theta = 240^\circ$

41.  $|v| = 16, \theta = 330^\circ$

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14	Write a vector as a linear combination of unit vectors	Exercises (38-43)	P425
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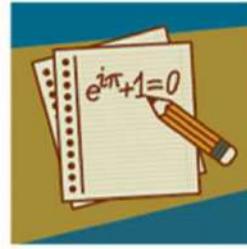
Find the component form of  $v$  with the given magnitude and

42.  $|v| = 28, \theta = 273^\circ$

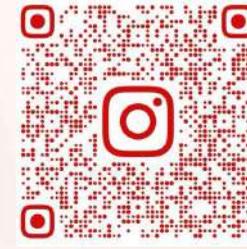
43.  $|v| = 15, \theta = 125^\circ$

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## Question 15

# Express vectors algebraically and operate with vectors in space

Page 442

Exercise 36 - 47

YouTube



15	Express vectors algebraically and operate with vectors in space	Exercises (36-47)	P442
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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.**  $7\mathbf{a} - 5\mathbf{b}$

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15	Express vectors algebraically and operate with vectors in space	Exercises (36-47)	P442
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Find each of the following for  $\mathbf{a} = \langle -5, -4, 3 \rangle$ ,  $\mathbf{b} = \langle 6, -2, -7 \rangle$ , and  $\mathbf{c} = \langle -2, 2, 4 \rangle$ .

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

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



15	Express vectors algebraically and operate with vectors in space	Exercises (36-47)	P442
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Find each of the following for  $\mathbf{a} = \langle -5, -4, 3 \rangle$ ,  $\mathbf{b} = \langle 6, -2, -7 \rangle$ , and  $\mathbf{c} = \langle -2, 2, 4 \rangle$ .

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

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



15	Express vectors algebraically and operate with vectors in space	Exercises (36-47)	P442
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Find each of the following for  $x = -9i + 4j + 3k$ ,  $y = 6i - 2j - 7k$ , and  $z = -2i + 2j + 4k$ .

42.  $7x + 6y$

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

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15	Express vectors algebraically and operate with vectors in space	Exercises (36-47)	P442
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Find each of the following for  $x = -9i + 4j + 3k$ ,  $y = 6i - 2j - 7k$ , and  $z = -2i + 2j + 4k$ .

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

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

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15	Express vectors algebraically and operate with vectors in space	Exercises (36-47)	P442
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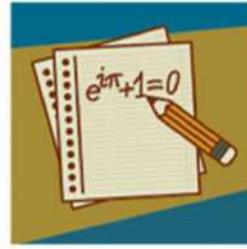
Find each of the following for  $x = -9i + 4j + 3k$ ,  $y = 6i - 2j - 7k$ , and  $z = -2i + 2j + 4k$ .

46.  $-6y - 9z$

47.  $-x - 4y - z$

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# GI I Adv Term 2

## Part 2: Writing (FRQ)

### EoT2 2023-24

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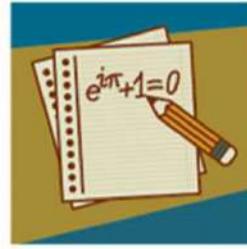
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## Question 16

Verify trigonometric identities by transforming each side of an equation into the same form

Page G10Adv(T3) 779

Exercise 19 - 32

YouTube



Verify that each equation is an identity.

19.  $\sec \theta - \tan \theta = \frac{1 - \sin \theta}{\cos \theta}$

20.  $\frac{1 + \tan \theta}{\sin \theta + \cos \theta} = \sec \theta$

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Verify that each equation is an identity.

21.  $\sec \theta \csc \theta = \tan \theta + \cot \theta$

22.  $\sin \theta + \cos \theta = \frac{2 \sin^2 \theta - 1}{\sin \theta - \cos \theta}$

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Verify that each equation is an identity.

23.  $(\sin \theta + \cos \theta)^2 = \frac{2 + \sec \theta \csc \theta}{\sec \theta \csc \theta}$

24.  $\frac{\cos \theta}{1 - \sin \theta} = \frac{1 + \sin \theta}{\cos \theta}$

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Verify that each equation is an identity.

25.  $\csc \theta - 1 = \frac{\cot^2 \theta}{\csc \theta + 1}$

26.  $\cos \theta \cot \theta = \csc \theta - \sin \theta$

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Verify that each equation is an identity.

27.  $\sin \theta \cos \theta \tan \theta + \cos^2 \theta = 1$

28.  $(\csc \theta - \cot \theta)^2 = \frac{1 - \cos \theta}{1 + \cos \theta}$

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Verify that each equation is an identity.

29.  $\csc^2 \theta = \cot^2 \theta + \sin \theta \csc \theta$

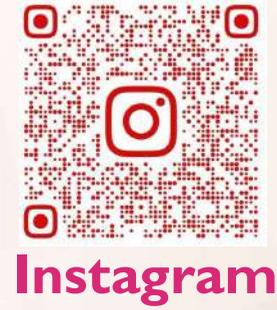
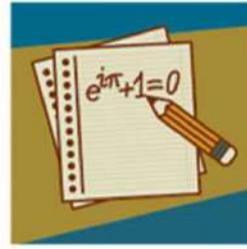
30.  $\frac{\sec \theta - \csc \theta}{\csc \theta \sec \theta} = \sin \theta - \cos \theta$

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Verify that each equation is an identity.

31.  $\sin^2 \theta + \cos^2 \theta = \sec^2 \theta - \tan^2 \theta$

32.  $\sec \theta - \cos \theta = \tan \theta \sin \theta$



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## Question 17

# Solve trigonometric identities

Page G10Adv(T3) 801 & 802

Exercise 45 - 55

YouTube



17	Solve trigonometric identities	Exercises (45-55)	P801 & P802
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Solve each equation.

**45.**  $2 \sin^2 \theta = 3 \sin \theta + 2$

**46.**  $2 \cos^2 \theta + 3 \sin \theta = 3$

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17	Solve trigonometric identities	Exercises (45-55)	P801 & P802
----	--------------------------------	-------------------	-------------

Solve each equation.

47.  $\sin^2 \theta + \cos 2\theta = \cos \theta$

48.  $2 \cos^2 \theta = -\cos \theta$

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**49. SENSE-MAKING** Due to ocean tides, the depth  $y$  in meters of the River Thames in London varies as a sine function of  $x$ , the hour of the day. On a certain day that

function was  $y = 3 \sin \left[ \frac{\pi}{6}(x - 4) \right] + 8$ , where  $x = 0, 1, 2, \dots, 24$  corresponds to 12:00 midnight, 1:00 A.M., 2:00 A.M., ..., 12:00 midnight the next night.

- What is the maximum depth of the River Thames on that day?
- At what times does the maximum depth occur?

17	Solve trigonometric identities	Exercises (45-55)	P801 & P802
----	--------------------------------	-------------------	-------------

Solve each equation if  $\theta$  is measured in radians.

50.  $(\cos \theta)(\sin 2\theta) - 2 \sin \theta + 2 = 0$

51.  $2 \sin^2 \theta + (\sqrt{2} - 1) \sin \theta = \frac{\sqrt{2}}{2}$

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Solve each equation if  $\theta$  is measured in degrees.

52.  $\sin 2\theta + \frac{\sqrt{3}}{2} = \sqrt{3} \sin \theta + \cos \theta$

53.  $1 - \sin^2 \theta - \cos \theta = \frac{3}{4}$

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17	Solve trigonometric identities	Exercises (45-55)	P801 & P802
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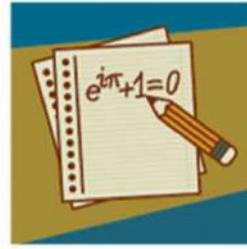
**Solve each equation.**

**54.**  $2 \sin \theta = \sin 2\theta$

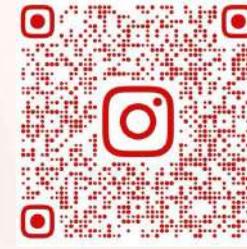
**55.**  $\cos \theta \tan \theta - 2 \cos^2 \theta = -1$

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## Question 18

# Solve systems of linear equations by using Cramer's rule

Page 300

Exercise 11 - 18

YouTube



18	Solve systems of linear equations by using Cramer's rule	Exercises (11-18)	P300
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Use Cramer's Rule to find the solution of each system of linear equations, if a unique solution exists.

11.  $-3x + y = 4$   
 $2x + y = -6$

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18	Solve systems of linear equations by using Cramer's rule	Exercises (11-18)	P300
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Use Cramer's Rule to find the solution of each system of linear equations, if a unique solution exists.

12.  $2x + 3y = 4$   
 $5x + 6y = 5$

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18	Solve systems of linear equations by using Cramer's rule	Exercises (11-18)	P300
----	--	-------------------	------

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

**13.**  $5x + 4y = 7$   
 $-x - 4y = -3$

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18	Solve systems of linear equations by using Cramer's rule	Exercises (11-18)	P300
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Use Cramer's Rule to find the solution of each system of linear equations, if a unique solution exists.

14.  $4x + \frac{1}{3}y = 8$   
 $3x + y = 6$

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18	Solve systems of linear equations by using Cramer's rule	Exercises (11-18)	P300
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Use Cramer's Rule to find the solution of each system of linear equations, if a unique solution exists.

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

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18	Solve systems of linear equations by using Cramer's rule	Exercises (11-18)	P300
----	--	-------------------	------

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

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

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18	Solve systems of linear equations by using Cramer's rule	Exercises (11-18)	P300
----	--	-------------------	------

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

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

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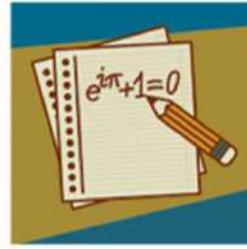
18	Solve systems of linear equations by using Cramer's rule	Exercises (11-18)	P300
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Use Cramer's Rule to find the solution of each system of linear equations, if a unique solution exists.

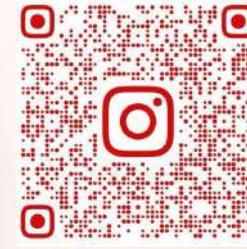
**18.**  $9x + 7y = -30$   
 $8y + 5z = 11$   
 $-3x + 10z = 73$

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# Question 19

## Graph equations of ellipses

Page 352

Exercise 24 - 31

YouTube



19	Graph equations of ellipses	Exercises (24-31)	P352
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Find the coordinates of the center and foci and the lengths of the major and minor axes for the ellipse with the given equation. Then graph the ellipse.

24. 
$$\frac{(x - 3)^2}{36} + \frac{(y - 2)^2}{128} = 1$$

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19	Graph equations of ellipses	Exercises (24-31)	P352
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Find the coordinates of the center and foci and the lengths of the major and minor axes for the ellipse with the given equation. Then graph the ellipse.

25. 
$$\frac{(x + 6)^2}{50} + \frac{(y - 3)^2}{72} = 1$$

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19	Graph equations of ellipses	Exercises (24-31)	P352
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Find the coordinates of the center and foci and the lengths of the major and minor axes for the ellipse with the given equation. Then graph the ellipse.

26.  $\frac{x^2}{27} + \frac{(y - 5)^2}{64} = 1$

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19	Graph equations of ellipses	Exercises (24-31)	P352
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Find the coordinates of the center and foci and the lengths of the major and minor axes for the ellipse with the given equation. Then graph the ellipse.

27.  $\frac{(x + 4)^2}{16} + \frac{y^2}{75} = 1$

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19	Graph equations of ellipses	Exercises (24-31)	P352
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Find the coordinates of the center and foci and the lengths of the major and minor axes for the ellipse with the given equation. Then graph the ellipse.

28.  $3x^2 + y^2 - 6x - 8y - 5 = 0$

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19	Graph equations of ellipses	Exercises (24-31)	P352
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Find the coordinates of the center and foci and the lengths of the major and minor axes for the ellipse with the given equation. Then graph the ellipse.

29.  $3x^2 + 4y^2 - 18x + 24y + 3 = 0$

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19	Graph equations of ellipses	Exercises (24-31)	P352
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Find the coordinates of the center and foci and the lengths of the major and minor axes for the ellipse with the given equation. Then graph the ellipse.

30.  $7x^2 + y^2 - 56x + 6y + 93 = 0$

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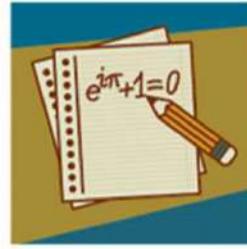
19	Graph equations of ellipses	Exercises (24-31)	P352
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Find the coordinates of the center and foci and the lengths of the major and minor axes for the ellipse with the given equation. Then graph the ellipse.

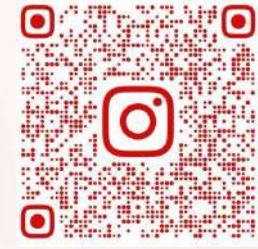
31.  $3x^2 + 2y^2 + 12x - 20y + 14 = 0$

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Grade 11Adv

## Question 20

Find the dot product of two vectors and use the dot product to find the angle between them

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Exercise 16 - 23

YouTube



20	Find the dot product of two vectors and use the dot product to find the angle between them	Exercises (16-23)	P434
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Find the angle  $\theta$  between  $\mathbf{u}$  and  $\mathbf{v}$  to the nearest tenth of a degree.

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

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

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20	Find the dot product of two vectors and use the dot product to find the angle between them	Exercises (16-23)	P434
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Find the angle  $\theta$  between  $u$  and  $v$  to the nearest tenth of a degree.

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

19.  $u = -2i + 3j, v = -4i - 2j$

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20	Find the dot product of two vectors and use the dot product to find the angle between them	Exercises (16-23)	P434
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Find the angle  $\theta$  between  $u$  and  $v$  to the nearest tenth of a degree.

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

21.  $u = -i - 3j, v = -7i - 3j$

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20	Find the dot product of two vectors and use the dot product to find the angle between them	Exercises (16-23)	P434
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Find the angle  $\theta$  between  $\mathbf{u}$  and  $\mathbf{v}$  to the nearest tenth of a degree.

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

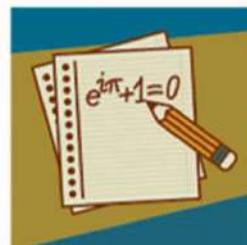
23.  $\mathbf{u} = -10\mathbf{i} + \mathbf{j}, \mathbf{v} = 10\mathbf{i} - 5\mathbf{j}$

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