تجميعة أسئلة القسم الكتابي وفق الهيكل الوزاري منهج ريفيل

EoT2 Grade 11 Advanced 2024-2025
Part 2: FRQ (Writing) (Q16-Q20)

16	Verify trigonometric identities by transforming each side of an equation into the same form	Exercises (19-32)	P779

Verify that each equation is an identity.

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

16	Verify trigonometric identities by transforming each side of an equation into the same form	Exercises (19-32)	P779

Verify that each equation is an identity.

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

16	Verify trigonometric identities by transforming each side of an equation into the same form	Exercises (19-32)	P779

Verify that each equation is an identity.

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

16	Verify trigonometric identities by transforming each side of an equation into the same form	Exercises (19-32)	P779

Verify that each equation is an identity.

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

16	Verify trigonometric identities by transforming each side of an equation into the same form	Exercises (19-32)	P779

Verify that each equation is an identity.

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

16	Verify trigonometric identities by transforming each side of an equation into the same form	Exercises (19-32)	P779

Verify that each equation is an identity.

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

16	Verify trigonometric identities by transforming each side of an equation into the same form	Exercises (19-32)	P779

Verify that each equation is an identity.

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

16	Verify trigonometric identities by transforming each side of an equation into the same form	Exercises (19-32)	P779

Verify that each equation is an identity.

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

16	Verify trigonometric identities by transforming each side of an equation into the same form	Exercises (19-32)	P779

Verify that each equation is an identity.

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

Verify that each equation is an identity.

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

16	Verify trigonometric identities by transforming each side of an equation into the same form	Exercises (19-32)	P779

Verify that each equation is an identity.

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

16	Verify trigonometric identities by transforming each side of an equation into the same form	Exercises (19-32)	P779

Verify that each equation is an identity.

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

16	Verify trigonometric identities by transforming each side of an equation into the same form	Exercises (19-32)	P779

Verify that each equation is an identity.

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

16	Verify trigonometric identities by transforming each side of an equation into the same form	Exercises (19-32)	P779

Verify that each equation is an identity.

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

Solve each equation.

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

Solve each equation.

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

Solve each equation.

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

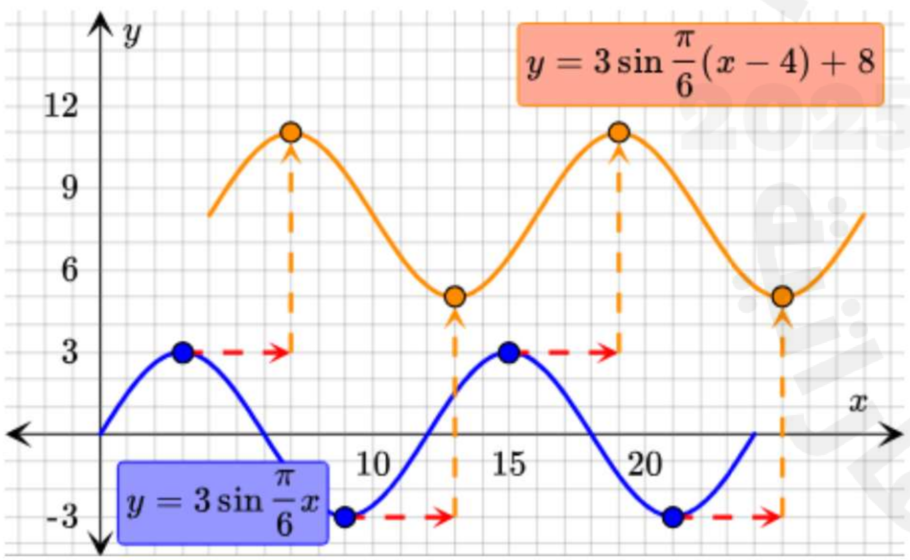
Solve each equation.

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

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 $x = 0, 1, 2, \ldots, 24$ corresponds to 12:00 midnight, 1:00 A.M., 2:00 A.M., ..., 12:00 midnight the next night.

a. What is the maximum depth of the River Thames on that day?

b. At what times does the maximum depth occur?



The maximum depth of the River Thames on that day is 11 meters. This occurs when the sine function reaches its maximum value of 1. To find the times when this occurs, we set the equation:

$$y = 3\sin\left(\frac{\pi}{6}(x-4)\right) + 8 = 11$$

Solving for when the sine function equals 1:

$$\sin\left(\frac{\pi}{6}(x-4)\right) = 1$$

The sine function equals 1 at:

$$\frac{\pi}{6}(x-4) = \frac{\pi}{2} + 2k\pi \quad (k \in \mathbb{Z})$$

This simplifies to:

$$x - 4 = 3 + 12k$$
$$x = 7 + 12k$$

For $k = 0$, $x = 7$ (7:00 a.m.) and for $k = 1$, $x = 19$ (7:00 p.m.). Thus, the maximum depth occurs at 7:00 a.m. and 7:00 p.m.

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

Solve each equation if θ is measured in radians.

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

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

Solve each equation if θ is measured in radians.

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

Solve each equation if θ is measured in degrees.

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

Solve each equation if θ is measured in degrees.

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

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

Solve each equation.

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

Solve each equation.

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

18	Find determinants and inverses of 2 × 2 and 3 × 3 matrices.	Exercises (19-26) &(45-48)	P291&P292

Determine whether A and B are inverse matrices.

19. $A = \begin{bmatrix} 12 & -7 \\ -5 & 3 \end{bmatrix}$ $B = \begin{bmatrix} 3 & 7 \\ 5 & 12 \end{bmatrix}$

18	Find determinants and inverses of 2 × 2 and 3 × 3 matrices.	Exercises (19-26) &(45-48)	P291&P292

Determine whether *A* and *B* are inverse matrices.

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

18	Find determinants and inverses of 2 × 2 and 3 × 3 matrices.	Exercises (19-26) &(45-48)	P291&P292

Determine whether A and B are inverse matrices.

21. $A = \begin{bmatrix} -5 & 3 \\ 6 & -4 \end{bmatrix} \quad B = \begin{bmatrix} 4 & 3 \\ 6 & 5 \end{bmatrix}$

18	Find determinants and inverses of 2 × 2 and 3 × 3 matrices.	Exercises (19-26) &(45-48)	P291&P292

Determine whether *A* and *B* are inverse matrices.

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

18	Find determinants and inverses of 2 × 2 and 3 × 3 matrices.	Exercises (19-26) &(45-48)	P291&P292

Determine whether A and B are inverse matrices.

23. $A = \begin{bmatrix} 9 & 2 \\ 5 & 1 \end{bmatrix}$ $B = \begin{bmatrix} -1 & 2 \\ 5 & -9 \end{bmatrix}$

18	Find determinants and inverses of 2 × 2 and 3 × 3 matrices.	Exercises (19-26) &(45-48)	P291&P292

Determine whether *A* and *B* are inverse matrices.

24. $A = \begin{bmatrix} 7 & 5 \\ -6 & -4 \end{bmatrix}$ $B = \begin{bmatrix} -4 & -5 \\ 6 & 7 \end{bmatrix}$

18	Find determinants and inverses of 2 × 2 and 3 × 3 matrices.	Exercises (19-26) &(45-48)	P291&P292

Determine whether A and B are inverse matrices.

25. $A = \begin{bmatrix} 2 & -3 \\ -3 & 4 \end{bmatrix}$ $B = \begin{bmatrix} -4 & -3 \\ -3 & -2 \end{bmatrix}$

18	Find determinants and inverses of 2 × 2 and 3 × 3 matrices.	Exercises (19-26) &(45-48)	P291&P292

Determine whether *A* and *B* are inverse matrices.

26. $A = \begin{bmatrix} 9 & -7 \\ 8 & -5 \end{bmatrix}$ $B = \begin{bmatrix} 1 & -6 \\ 4 & 10 \end{bmatrix}$

18	Find determinants and inverses of 2 × 2 and 3 × 3 matrices.	Exercises (19-26) &(45-48)	P291&P292

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

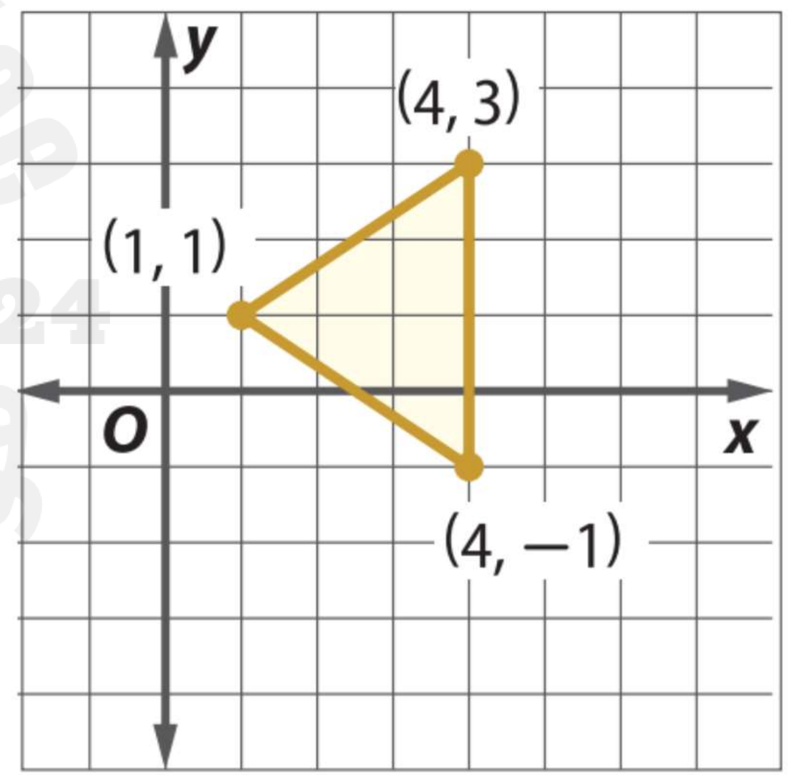
31. $A = \begin{bmatrix} -1 & -1 & -3 \\ 3 & 6 & 4 \\ 2 & 1 & 8 \end{bmatrix}$

18	Find determinants and inverses of 2 × 2 and 3 × 3 matrices.	Exercises (19-26) &(45-48)	P291&P292

Find the area A of each triangle with vertices (x_1, y_1), (x_2, y_2), and (x_3, y_3),

by using $A = \frac{1}{2}\left|\det(X)\right|$, where X is $\begin{bmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{bmatrix}$.

45.

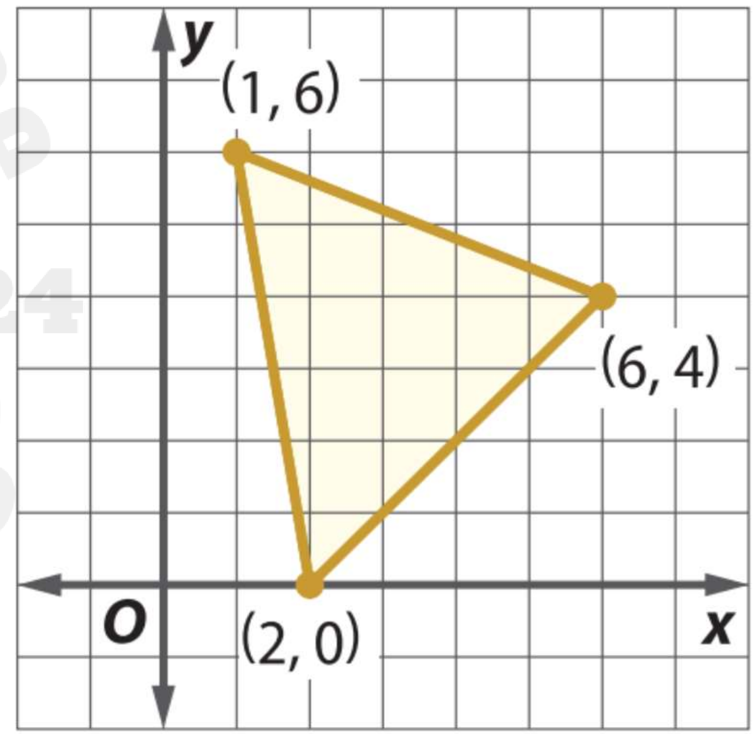


18	Find determinants and inverses of 2 × 2 and 3 × 3 matrices.	Exercises (19-26) &(45-48)	P291&P292

Find the area A of each triangle with vertices (x_1, y_1), (x_2, y_2), and (x_3, y_3),

by using $A = \frac{1}{2}|\det(X)|$, where X is $\begin{bmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{bmatrix}$.

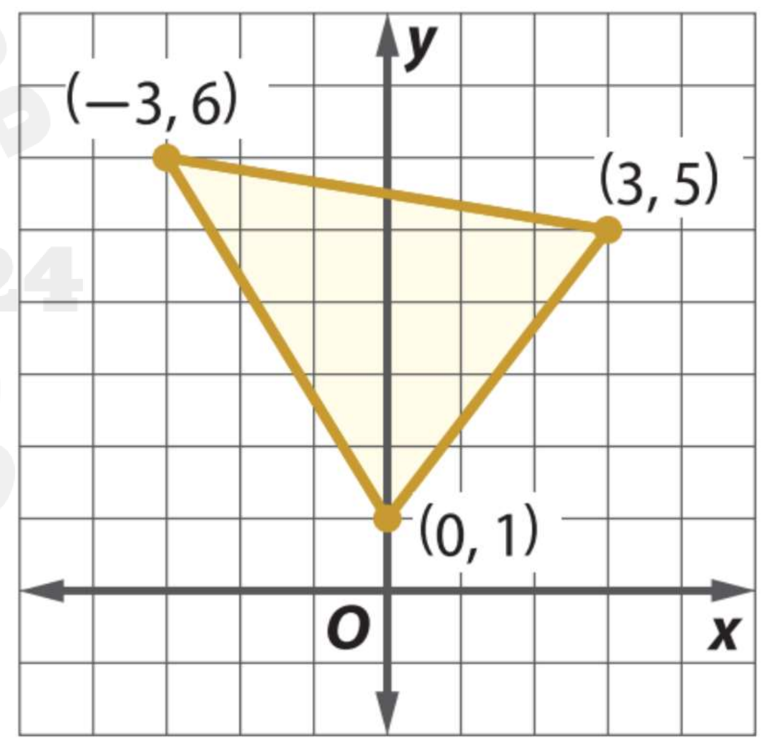
46.



18	Find determinants and inverses of 2 × 2 and 3 × 3 matrices.	Exercises (19-26) &(45-48)	P291&P292

Find the area A of each triangle with vertices (x_1, y_1), (x_2, y_2), and (x_3, y_3), by using $A = \frac{1}{2}\left|\det(X)\right|$, where X is $\begin{bmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{bmatrix}$.

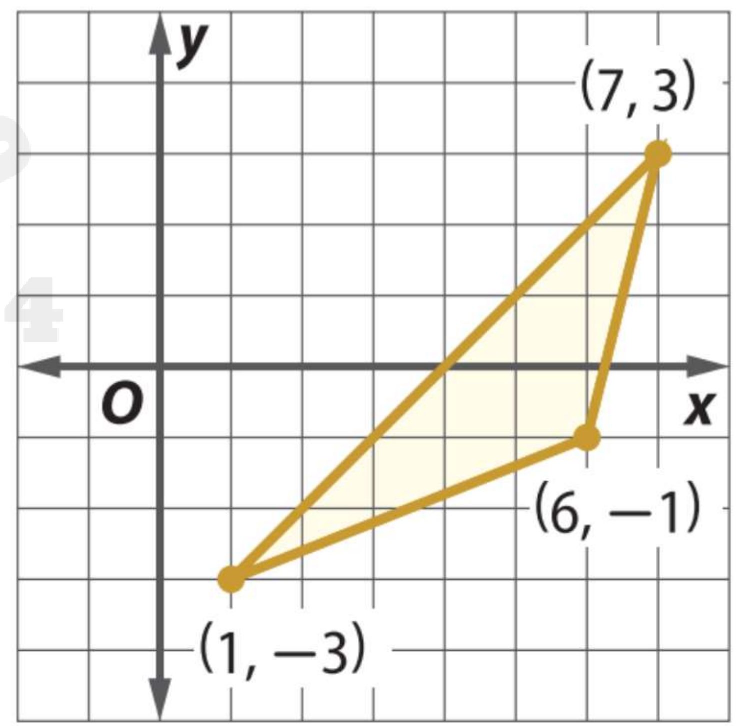
47.



18	Find determinants and inverses of 2 × 2 and 3 × 3 matrices.	Exercises (19-26) &(45-48)	P291&P292

Find the area A of each triangle with vertices (x_1, y_1), (x_2, y_2), and (x_3, y_3), by using $A = \frac{1}{2}\left|\det(X)\right|$, where X is $\begin{bmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{bmatrix}$.

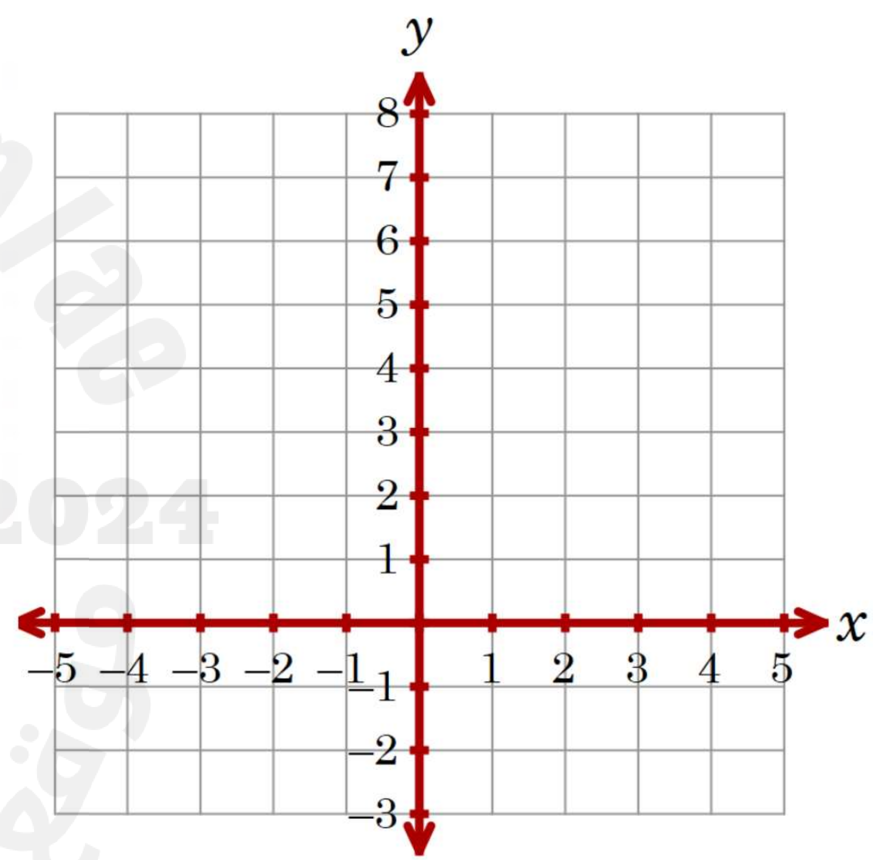
48.



19	Writing and graphing parabolic equations	Exercises (26-31)	P335

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

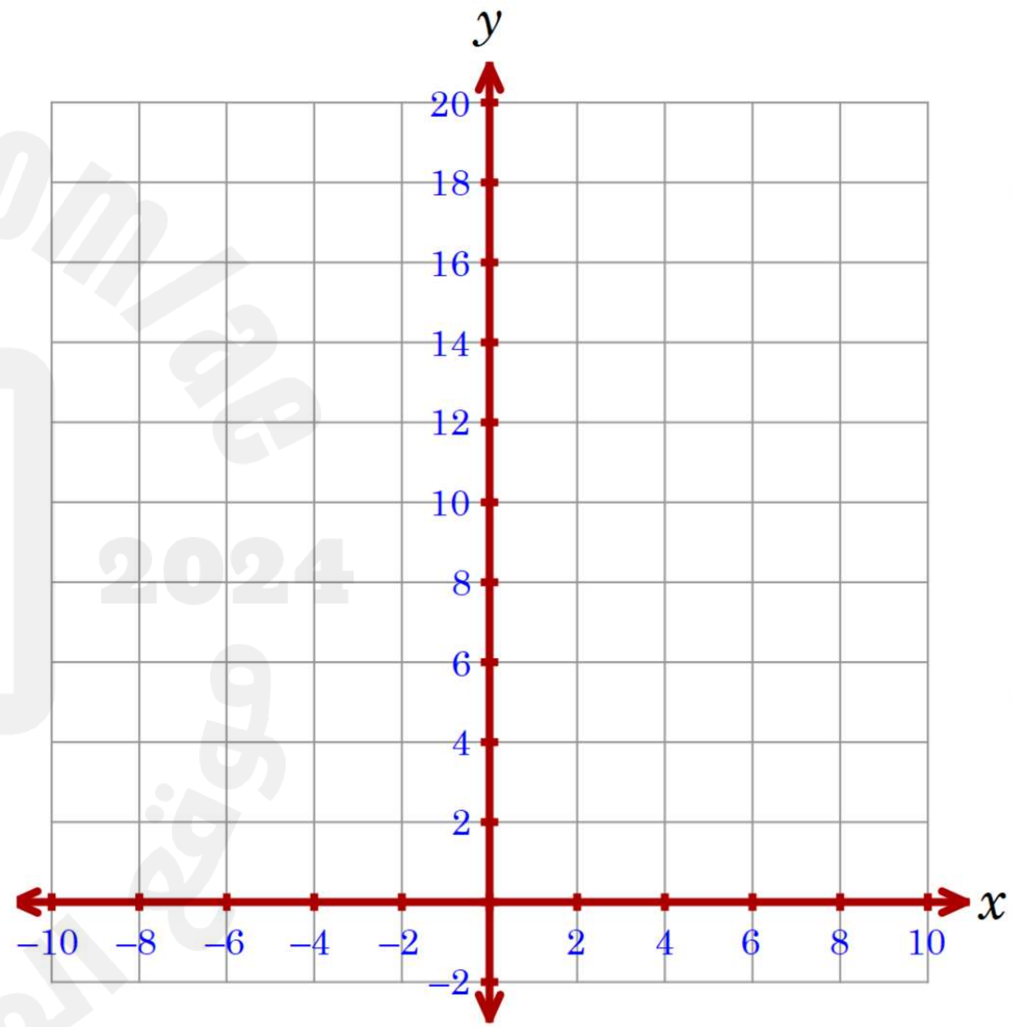
26. vertex (0, 1), focus (0, 4)



19	Writing and graphing parabolic equations	Exercises (26-31)	P335

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

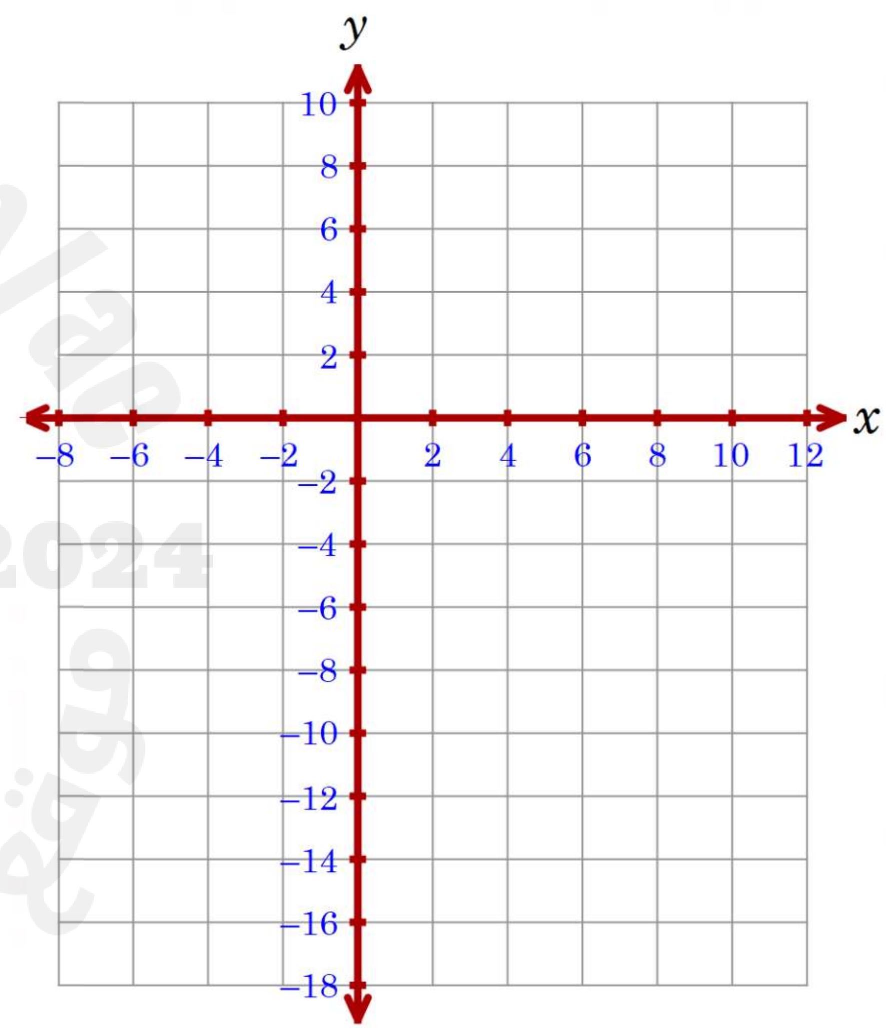
27. vertex $(1, 8)$, directrix $y = 3$



19	Writing and graphing parabolic equations	Exercises (26-31)	P335

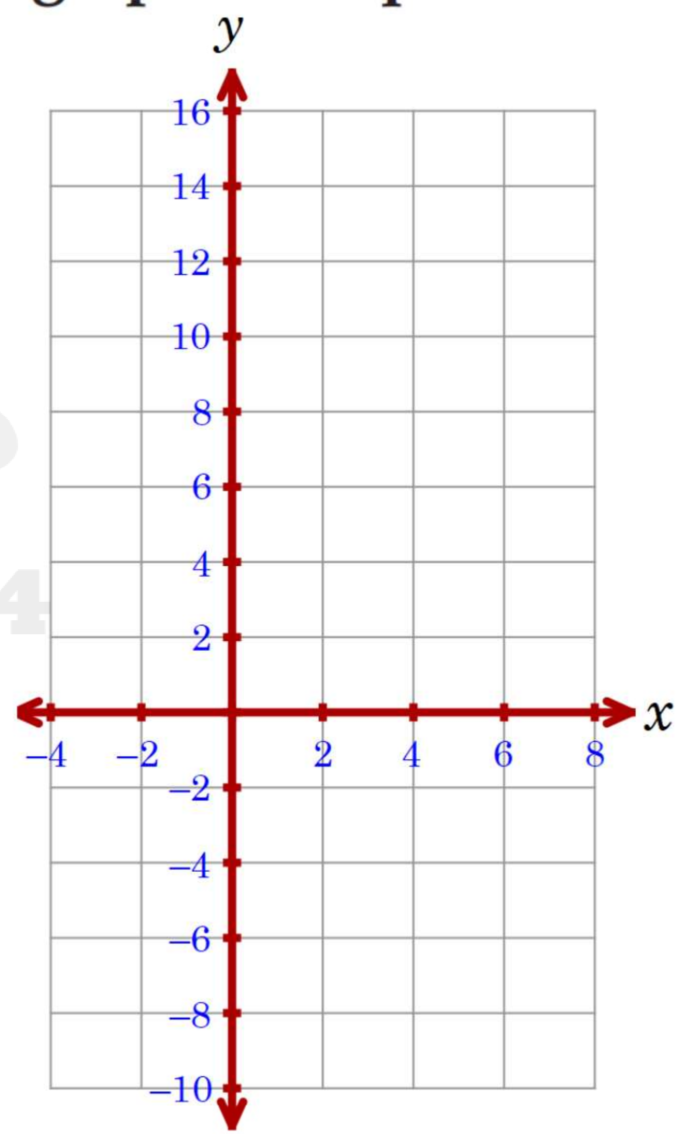
Write an equation for each parabola described below. Then graph the equation.

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



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

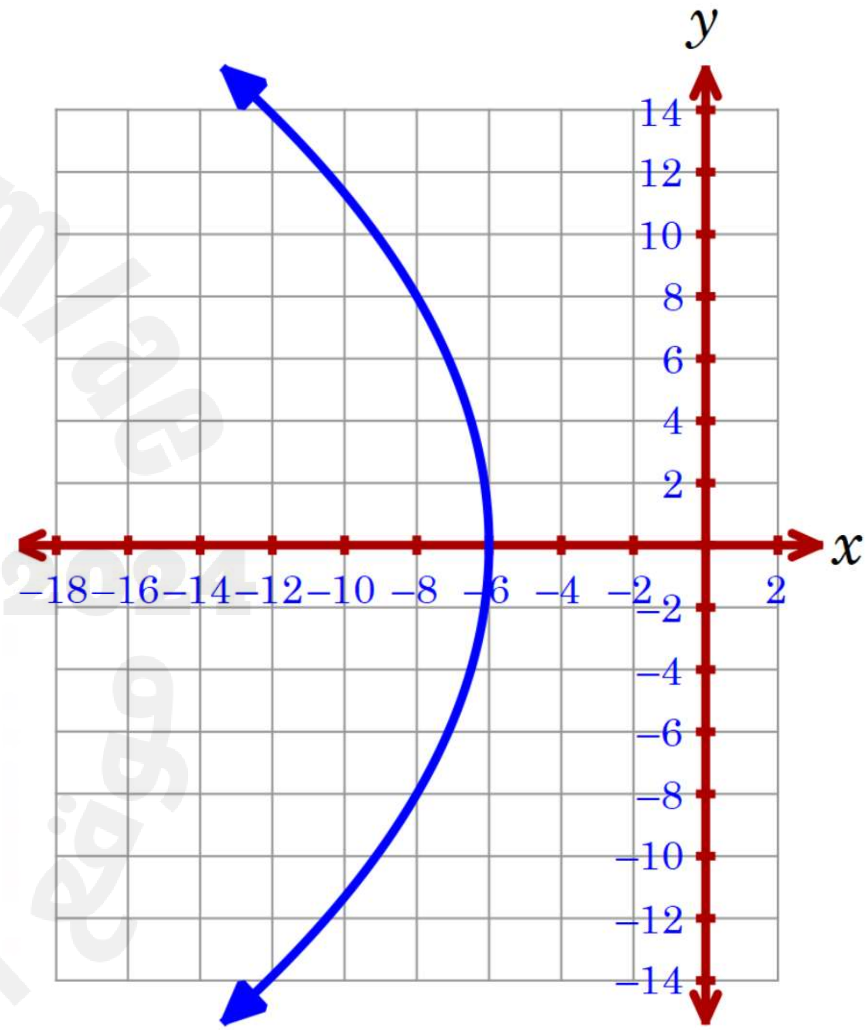
29. focus (2, 4), directrix $x = 10$



19	Writing and graphing parabolic equations	Exercises (26-31)	P335

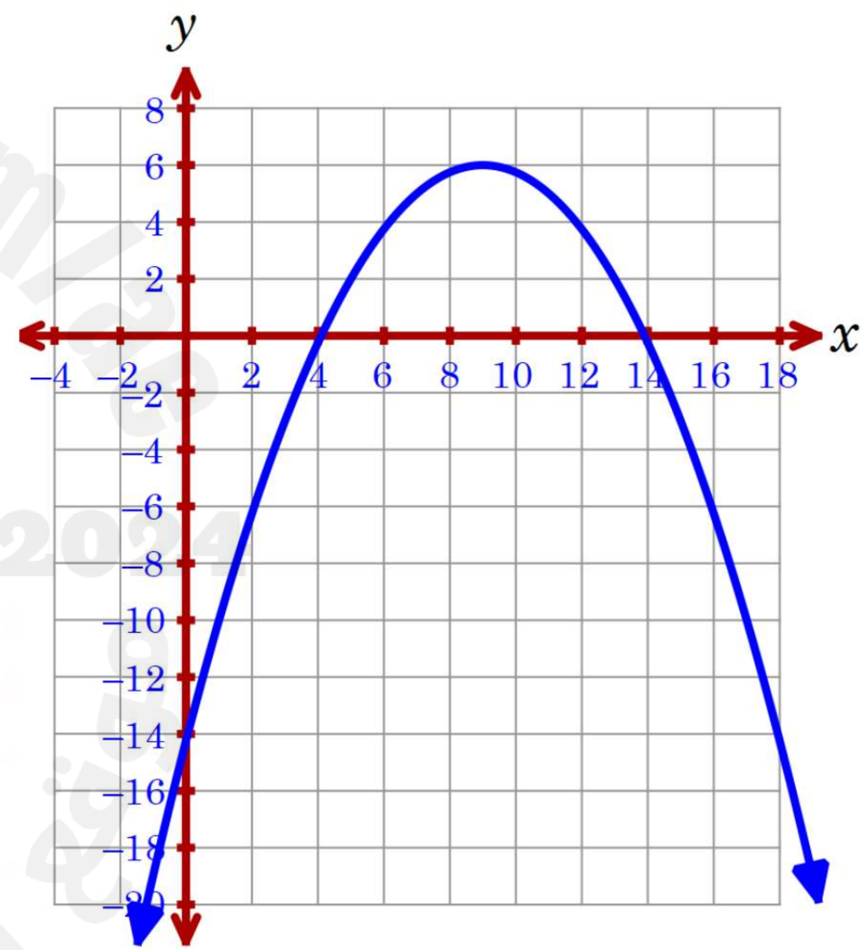
Write an equation for each parabola described below. Then graph the equation.

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



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

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



20	Finding the dot product of two vectors, and the angles between vectors in space	Exercises (10-15)	P450

Find the angle θ between vectors u and v to the nearest tenth of a degree.

10. $\mathbf{u} = \langle 3, -2, 2 \rangle, \mathbf{v} = \langle 1, 4, -7 \rangle$

$$\cos\theta = \frac{\mathbf{u} \cdot \mathbf{v}}{|\mathbf{u}|\ |\mathbf{v}|}$$

20	Finding the dot product of two vectors, and the angles between vectors in space	Exercises (10-15)	P450

Find the angle θ between vectors u and v to the nearest tenth of a degree.

11. $\mathbf{u} = \langle 6, -5, 1 \rangle, \mathbf{v} = \langle -8, -9, 5 \rangle$

20	Finding the dot product of two vectors, and the angles between vectors in space	Exercises (10-15)	P450

Find the angle θ between vectors u and v to the nearest tenth of a degree.

12. $\mathbf{u} = \langle -8, 1, 12 \rangle, \mathbf{v} = \langle -6, 4, 2 \rangle$

20	Finding the dot product of two vectors, and the angles between vectors in space	Exercises (10-15)	P450

Find the angle θ between vectors u and v to the nearest tenth of a degree.

13. $\mathbf{u} = \langle 10, 0, -8 \rangle, \mathbf{v} = \langle 3, -1, -12 \rangle$

20	Finding the dot product of two vectors, and the angles between vectors in space	Exercises (10-15)	P450

Find the angle θ between vectors u and v to the nearest tenth of a degree.

14. $\mathbf{u} = -3\mathbf{i} + 2\mathbf{j} + 9\mathbf{k}$, $\mathbf{v} = 4\mathbf{i} + 3\mathbf{j} - 10\mathbf{k}$

20	Finding the dot product of two vectors, and the angles between vectors in space	Exercises (10-15)	P450

Find the angle θ between vectors u and v to the nearest tenth of a degree.

15. $\mathbf{u} = -6\mathbf{i} + 3\mathbf{j} + 5\mathbf{k}$, $\mathbf{v} = -4\mathbf{i} + 2\mathbf{j} + 6\mathbf{k}$