



MATHS

BOOKS - KAPLAN INC MATHS

(ENGLISH)

QUADRATIC EQUATIONS AND THEIR GRAPHS

Multiple Choice Question

1. Etienne is graphing the quadratic equation $y = x^2 - 8x - 48$. He substitutes 0 for x and finds that the y -intercept of the graph is -48 . Next, he wants to plot the x -intercepts of the graph, so he rewrites the equation in a different form. Assuming he rewrote the equation correctly and the equation reveals the x -intercepts, which of the following is Etienne's new equation?

A. $Y = (x - 8)^2 - 16$

B. $y = (x - 8)^2 + 16$

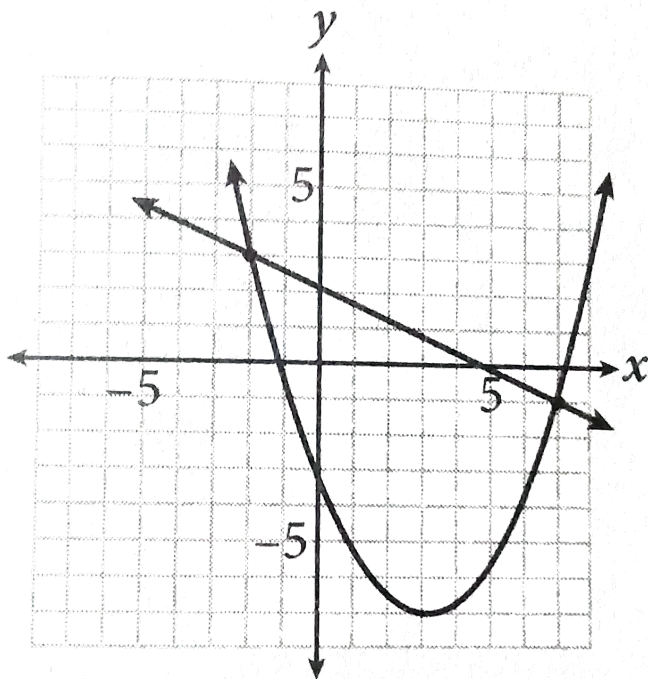
C. $y = (x - 8)(x + 6)$

D. $y = (x - 12)(x + 4)$

Answer: D



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2.

If (x_1, y_1) and (x_2, y_2) are solutions to the system of equations shown on the graph, what is the value of $x_1 + x_2$?

A. -3

B. 0

C. 2

D. 5

Answer: D



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3.



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A system of three equation and their graphs

are shown above. How many solutions does the system of equations have?

A. None

B. One

C. Two

D. Three

Answer: B



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4. If $x^2 + 10x = 24$ and $x > 0$, what is the value of $x + 5$?



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5. If -7 is one solution of the equation $y^2 + cy - 35 = 0$, what is the value of c ?



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6. $x^2 + y^2 = 160$

$y = 3x$

If (x, y) is a solutions to the system of equations above, what is the value of y^2 ?

A. 12

B. 16

C. 120

D. 144

Answer: D



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7. Which of the following expressions is not a factor of $16x^4 - 81y^4$?

A. $2x - 3y$

B. $2x + 3y$

C. $4x - 9y$

D. $4x^2 + 9y^2$

Answer: C



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8. What is the range of the quadratic function whose equation is $q(x) = -(x + 4)^2 + 3$?

A. $y \geq -4$

B. $y \leq 3$

C. $y \geq 3$

D. $y \leq 4$

Answer: B



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9. If $r < 0$ and $(4r - 4)^2 = 36$, what is the value of r ?

A. -6

B. -2

C. -1

D. $-\frac{1}{2}$

Answer: D



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10. The graph of $y = ax^2 + bx + c$ passes through the points $(1, -8)$, $(2, -1)$, $(3, 4)$, and $(5, 8)$. If the maximum value of y-coordinate at $x=5$, through which other point must be graph of y pass?

A. $(4, 6)$

B. $(6, 4)$

C. $(8, -1)$

D. $(10, -8)$

Answer: C



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11. For what values of x is the equation

$$2x^2 = 4x + 3 \text{ true?}$$

A. $\frac{2 \pm \sqrt{10}}{2}$

B. $\frac{2 \pm 5\sqrt{2}}{2}$

C. $1 \pm \sqrt{5}$

D. $1 \pm \sqrt{10}$

Answer: A



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$$12. y = -5t^2 + 2t + 20$$

$$x=2t$$

A cannonball is shot out of a cannon at a 45° angle with an approximate speed of 283m/s. The cannon from which the ball was fired sits on the edges of a cliff, and its height above the ground is 20 meters. The equations given above represent the cannonball's height

above the ground(y) and its horizontal distance (x) from the face of the cliff, t seconds after the ball was fired, where $t \geq 0$. How many seconds after the ball was fired does its vertical height above the ground equal its horizontal distance from the cliff?

A. 1

B. 2

C. 3

D. 4

Answer: B



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Object	Acceleration Due to Gravity (m/s^2)
Earth	9.8
Moon	1.6
Mars	3.7
Venus	9.5
Jupiter	24.5

13.

The approximate height h of an object launched vertically upward after an elapsed time t is represented by the equation

$$h = \frac{1}{2}at^2 + v_0t + h_0, \text{ where } a \text{ is acceleration}$$

due to gravity, v_o is the object's initial velocity, and h_o is the object's initial height. The table above gives the acceleration due to gravity on Earth's moon and several planets. If two identical objects launched vertically upward at an initial velocity of 40m/s from the surfaces of Mars and Earth's moon approximately how many more seconds will it take for the moon projectile to return to the ground than the Mars projectile?

A. 21

B. 28

C. 36

D. 50

Answer: B



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14. If $x = -3$ when $x^2 + 2xr + r^2 = 0$, what is the value of r ?



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$$15. x^2 + 2kx = \frac{j}{3}$$

In the quadratic equation above, j and k are constant. What are the solutions of x ?

$$A. x = -k \pm \frac{\sqrt{3(3k^2 + j)}}{3}$$

$$B. x = -6k \pm \frac{\sqrt{3(3k^2 + j)}}{3}$$

$$C. x = -k \pm \frac{\sqrt{3(3k^2 + j)}}{6}$$

$$D. x = -6k \pm \left(k + \frac{\sqrt{3j}}{3} \right)$$

Answer: A



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16. If $x^2 - 2x - 15 = (x + r)(x + s)$ for all values of x , what is one possible value of $r-s$?

A. -3

B. -2

C. 2

D. 8

Answer: D



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17. If k is a positive integer less than 17, what is the total number of possible integer solutions for the equation $x^2 + 8x + k = 0$?

A. 5

B. 6

C. 7

D. 8

Answer: C



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18. All 50 states have legislation regarding pool safety, the majority of which includes a requirement for safety fence around the perimeter of the top of an in-ground pool. If a rectangular in-ground pool has a length that is 2 feet less than twice its width, and the area of the top of the pool is 480 square feet, how many linear feet of fencing are required, assuming the fence is placed 1 foot from the edge of the water on all sides?

A. 92

B. 100

C. 108

D. 116

Answer: B



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19. If $x - 4$ is a factor of $x^2 - kx + 2k$, where k is a constant, what is the value of k ?

A. -4

B. 4

C. 8

D. 12

Answer: C



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20. What is the sum of the roots of the quadratic equation given above?



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