ALBERTA MATH 20-1 · UNIT 7 · 25 QUESTIONS

Systems of Equations and Inequalities — Practice Test

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **The graphs shown are a line and a parabola. The number of points of intersection of the two graphs is**

- **A** 0
- **B** 1
- **C** 2
- **D** 3

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2 **The solution to the system $y = x + 2$ and $y = x^2 - 4x + 2$ is**

- **A** (0, 2) only
- **B** (0, 2) and (5, 7)
- **C** (2, 0) and (7, 5)
- **D** there is no solution

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3 **The line $y = 2x + 1$ is tangent to the parabola $y = x^2 - 2x + 5$, so the system has exactly one solution. The y-coordinate of the point of tangency is**

ANSWER _____

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4 **A point that belongs to the solution region of the system $y > x - 1$ and $y \leq 2x + 3$ is**

- A (0, 0)
- B (-2, -4)
- C (2, 8)
- D (5, 3)

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5 **The number of real solutions to the system $y = x^2 + 3$ and $y = 2x + 1$ is**

- A 2
- B 1
- C 3
- D 0

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6 **The two parabolas shown intersect at the points that are the solution to their system. The solution is**

- **A** (2, 3) only
- **B** (-2, -3) and (2, 3)
- **C** (-2, 3) and (2, 3)
- **D** there is no real solution

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7 **The height, h, of a ball in metres after t seconds is given by $h = -5t^2 + 30t$. The later time, in seconds, at which the ball is 25 m above the ground is**

ANSWER _____

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8 **The constraints of a feasible region are $x \geq 0$, $y \geq 0$, $y \leq -x + 6$, and $y \geq x - 4$. A point that does NOT belong to the feasible region is**

A (0, 0)

B (5, 2)

C (3, 3)

D (1, 4)

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9 **A company models its revenue by $R(x) = -x^2 + 50x$ and its costs by $C(x) = 10x + 400$, where x is the number of items sold. The graphs of the two models intersect at exactly one point. The number of items sold at this break-even point is**

A 10

B 30

C 20

D 40

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10 **Two numbers have a sum of 14 and a product of 45. The larger of the two numbers is**

ANSWER

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11 **The graphs shown are two parabolas. Their points of intersection are the solution to their system. The solution is**

A (-1, 8) and (4, 3)

B (1, 8) and (4, 3)

C (-1, 3) and (4, 8)

D (0, 3) and (0, 8)

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12 The system $y = x^2 - 4x + k$ and $y = x$ has exactly one solution when the value of k is

- **A** 5
- **B** 6.25
- **C** 12.5
- **D** 25

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13 The graphs of $y = x^2 + 2x - 3$ and $y = -x^2 + 4x + 9$ intersect at two points. The product of the y-coordinates of the two points of intersection is

ANSWER _____

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14 **The solution region of the system $y > x^2 - 4$ and $y \leq -x + 2$ is the set of points that lie**

- **A** below the parabola $y = x^2 - 4$ and above the line $y = -x + 2$
- **B** above the parabola $y = x^2 - 4$ and strictly below the line $y = -x + 2$
- **C** below the parabola $y = x^2 - 4$ and on or below the line $y = -x + 2$
- **D** above the parabola $y = x^2 - 4$ and on or below the line $y = -x + 2$

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15 **The height, h, of a football in metres after t seconds is given by $h(t) = -5t^2 + 25t + 2$. The ball is at a height of 22 m**

- **A** at 1 s only
- **B** at 4 s only
- **C** at 1 s and 4 s
- **D** at 2 s and 5 s

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16 **The smaller x-coordinate of the points of intersection of $y = x^2 - 9x + 20$ and $y = x - 4$ is**

A 6

B 4

C 2

D 10

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17 **The system $y = 2x^2 + 3x + 5$ and $y = 2x^2 - x + 1$ has**

A no solution

B exactly one solution, (-1, 4)

C exactly two solutions

D infinitely many solutions

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18 **A feasible region is bounded by $x \geq 0$, $y \geq 0$, $x + y \leq 8$, and $2x + y \leq 12$. A vertex of the feasible region is**

- **A** (4, 4)
- **B** (5, 4)
- **C** (2, 7)
- **D** (6, 2)

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19 **The length of a rectangle is 3 cm more than its width, and the area of the rectangle is 70 cm². The length of the rectangle, in centimetres, is**

ANSWER _____

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20 **The graphs shown are f and g. The values of x for which f(x) > g(x) are**

- **A** 0 < x < 3
- **B** x greater than 3 only
- **C** all real values of x
- **D** x < 0 or x > 3

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21 **A point that belongs to the solution region of the system $y \geq x^2 - 2x - 3$ and $y < 3x + 1$ is**

- **A** (0, 0)
- **B** (1, 5)
- **C** (-1, 2)
- **D** (3, 12)

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22 **The system $y = x^2 - 4x + 7$ and $y = -x^2 + 4x - 1$ has exactly one solution. The y-coordinate of this solution is**

ANSWER

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23 **A company models its revenue by $R(x) = -x^2 + 60x$ and its costs by $C(x) = 300 + 20x$, where x is the number of items sold. The company breaks even when x equals**

A 20 only

B 10 only

C 30 only

D 10 or 30

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24 The line $y = 3x + k$ is tangent to the parabola $y = x^2 - 2x + 3$. The value of k is

- A -3.25
- B 3.25
- C -13
- D 13

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25 A projectile has height, h, in metres after t seconds, given by $h = -5t^2 + 40t$. The projectile is 75 m above the ground at two different times. The product of these two times, in seconds, is

ANSWER _____

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ANSWER KEY

1. C
2. B
3. 5
4. A
5. D
6. C
7. 5
8. B
9. C
10. 9
11. A
12. B
13. -36
14. D
15. C
16. B
17. B
18. A
19. 10
20. D
21. A
22. 3
23. D
24. A
25. 15

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