ALBERTA MATH 20-1 · FINAL EXAM · 50 QUESTIONS

Final Exam — 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 15th term of the arithmetic sequence 3, 8, 13, … is**

- A 73
- B 68
- C 78
- D 75

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2 **The reference angle for an angle of 218° in standard position is**

- A 38°
- B 52°
- C 128°
- D 142°

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3 **The quadratic equation with roots 3 and -2 is**

- **A** $x^2 - x - 6 = 0$
- **B** $x^2 + x - 6 = 0$
- **C** $x^2 - 5x + 6 = 0$
- **D** $x^2 + 5x + 6 = 0$

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4 **The simplified form of $\sqrt{12} + \sqrt{27}$ is**

- **A** $\sqrt{39}$
- **B** $5\sqrt{6}$
- **C** $5\sqrt{3}$
- **D** $6\sqrt{3}$

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5 When simplified, $\frac{4x - 8}{x^2 - 4}$ is equivalent to

A $\frac{2}{x + 2}$

B $\frac{4}{x - 2}$

C $\frac{4}{x + 2}$

D $\frac{x - 2}{x + 2}$

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6 The graph shown is an absolute value function with its vertex marked V. The vertex is

A (-3, 2)

B (3, 2)

C (3, -2)

D (-3, -2)

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7 **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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8 **The sum of the first 6 terms of the geometric series $3 + 6 + 12 + \ldots$ is**

A 189

B 96

C 381

D 192

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9 If $\sin\theta = -\frac{\sqrt{3}}{2}$ and θ is in Quadrant IV, then the measure of θ is

- A 60°
- B 120°
- C 240°
- D 300°

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10 When completing the square on the expression $x^2 + 6x$, the constant that must be added is

- A 36
- B 9
- C 3
- D 6

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11 The simplified form of $\sqrt[3]{54}$ is

A $2\sqrt[3]{3}$

B $3\sqrt[3]{6}$

C $9\sqrt[3]{2}$

D $3\sqrt[3]{2}$

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12 When simplified, $\frac{2}{x} + \frac{3}{x+1}$ is equivalent to

A $\frac{5}{x(x+1)}$

B $\frac{5x+2}{2x+1}$

C $\frac{5x+2}{x(x+1)}$

D $\frac{2x+5}{x(x+1)}$

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13 **The product of the x-intercepts of the graph of y = |x + 2| - 6 is ____.**

ANSWER _____

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14 **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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15 In a geometric sequence, $t_3 = 36$ and $t_6 = 972$. The common ratio of the sequence is

A 2

B 4

C 9

D 3

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16 The right triangle ABC shown represents a 5.2 m ladder leaning against a vertical wall, with its foot at A, 1.6 m from the wall. The angle that the ladder makes with the ground, to the nearest degree, is

A 18°

B 63°

C 69°

D 72°

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17 The height, in metres, of a ball t seconds after it is thrown is given by $h(t) = -5t^2 + 20t + 15$. The maximum height reached by the ball is

- A 15 m
- B 20 m
- C 35 m
- D 40 m

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18 For $x \geq 0$, the simplified form of $\sqrt{50x^3}$ is

- A $25x\sqrt{2x}$
- B $5x\sqrt{2x}$
- C $5x^2\sqrt{2x}$
- D $10x\sqrt{x}$

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19 **When simplified, $\frac{1}{x^2 + 3x + 2} + \frac{1}{x^2 + 4x + 3}$ is equivalent to**

A $\frac{2x + 5}{(x + 2)(x + 3)}$

B $\frac{x + 5}{(x + 1)(x + 2)(x + 3)}$

C $\frac{2x + 5}{(x + 1)(x + 2)(x + 3)}$

D $\frac{2}{(x + 1)(x + 2)(x + 3)}$

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20 **The graphs of $y = x^2 - 4$ and $y = \frac{1}{x^2 - 4}$ share invariant points. The x-coordinates of these invariant points are**

A $x = \pm 2$

B $x = \pm\sqrt{3}$ and $x = \pm\sqrt{5}$

C $x = \pm\sqrt{5}$ only

D $x = 0$

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21 **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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22 **A geometric sequence has $t_1 = 27$ and $t_3 = 3$, where the common ratio is positive. The sum of the infinite geometric series is ____.**

ANSWER _____

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23 A parallelogram has sides of 9 cm and 14 cm, and one diagonal measures 17 cm. The measure of the smaller angle of the parallelogram, to the nearest degree, is

- **A** 76°
- **B** 83°
- **C** 93°
- **D** 87°

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24 The equation $3x^2 + kx + 12 = 0$ has exactly one real root. The positive value of k is

ANSWER _____

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25 When the denominator of $\frac{6}{3-\sqrt{3}}$ is rationalized, the result is

A $3-\sqrt{3}$

B $2+\sqrt{3}$

C $9+3\sqrt{3}$

D $3+\sqrt{3}$

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26 The positive solution to the equation $\frac{1}{x}+\frac{1}{x+3}=\frac{5}{18}$ is ____

ANSWER _____

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27 **The solutions to the equation $|5 - x| = 2x + 1$ are**

- **A** $x = -6$ and $x = \frac{4}{3}$
- **B** no solution
- **C** $x = -6$ only
- **D** $x = \frac{4}{3}$ only

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28 **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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29 **The geometric mean that can be inserted between 4 and 25 is**

A 10

B ± 10

C -10

D $\frac{29}{2}$

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30 **The point (-5, 12) lies on the terminal arm of an angle θ in standard position. The exact value of tanθ is**

A $-\frac{12}{5}$

B $-\frac{5}{12}$

C $\frac{12}{13}$

D $-\frac{12}{13}$

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31 The axis of symmetry of the graph of $y = x^2 + 10x + 3$ is

- **A** $x = 5$
- **B** $x = -10$
- **C** $x = -5$
- **D** $x = 10$

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32 The simplified form of $\sqrt{98}$ is

- **A** $2\sqrt{7}$
- **B** $14\sqrt{2}$
- **C** $7\sqrt{2}$
- **D** $\sqrt{96}$

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33 The non-permissible values of $\frac{4x}{x^2 - x - 6}$ are

- **A** $x \neq 3, x \neq -2$
- **B** $x \neq -3, x \neq 2$
- **C** $x \neq 3, x \neq 2$
- **D** $x \neq -3, x \neq -2$

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34 The value of $|4 - 9| + |-6|$ is

- **A** 1
- **B** -11
- **C** -1
- **D** 11

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35 **The number of points of intersection of the graphs of $y = x - 1$ and $y = x^2 + 1$ is**

A 2

B 0

C 1

D 3

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36 **The sum of the first 15 terms of the arithmetic sequence 6, 11, 16, … is ____.**

ANSWER _____

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37 In △ ABC, ∠ A = 30°, side a = 10 cm, and side b = 20 cm. The number of different triangles that can be constructed is

- A Two
- B One
- C Zero
- D Cannot be determined

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38 The graph shown is a parabola. The y -coordinate of its vertex is

ANSWER _____

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39 The expanded form of $(\sqrt{3} + 4)(\sqrt{3} - 1)$ is

A $7 + 3\sqrt{3}$

B $-1 - 3\sqrt{3}$

C $3 - \sqrt{3}$

D $-1 + 3\sqrt{3}$

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40 When simplified, $\frac{5}{x^2 - x - 6} - \frac{2}{x - 3}$ is equivalent to

A $\frac{2x + 9}{(x - 3)(x + 2)}$

B $\frac{3}{(x - 3)(x + 2)}$

C $\frac{1 - 2x}{(x - 3)(x + 2)}$

D $\frac{1 - 2x}{x + 2}$

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41 The range of the function $y = 3|x + 2| - 4$ is

- A $y \geq -4$
- B $y \leq -4$
- C $y \geq 4$
- D $y \geq -2$

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42 A rectangle has a perimeter of 34 cm and an area of 60 cm². The length of the rectangle, in centimetres, is

- A 10
- B 12
- C 14
- D 15

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43 **The monthly fee for a gym membership is $65 in the first month, and the fee increases by $2 each month. The total amount paid, in dollars, over 24 months is ____.**

ANSWER _____

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44 **A parallelogram has sides of 6 cm and 11 cm, and one diagonal measures 9 cm. The measure of the obtuse angle of the parallelogram, to the nearest degree, is**

A 125°

B 55°

C 118°

D 132°

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45 The sum of the squares of two consecutive positive integers is 85. The larger of the two integers is

- A 7
- B 6
- C 8
- D 9

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46 For $x \geq 0$, the simplified form of $\sqrt{18x} \cdot \sqrt{2x^3}$ is

- A $6x^2$
- B $36x^4$
- C $6x^4$
- D $18x^2$

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47 **When $\frac{x^2 - 4x - 12}{x^2 - 36}$ is simplified and then evaluated at x = 2, its value is equal to ____**

ANSWER

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48 **Which of the following statements about the graph shown is true?**

A The graph has a vertical asymptote at x = 2

B The graph passes through the point $(0, \frac{1}{2})$

C The graph has an x -intercept at (-2, 0)

D The graph has a horizontal asymptote at y = 1

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49 **The graphs of $y = x^2 - 5x + 4$ and $y = -x^2 + 3x - 2$ intersect at two points. The product of the x-coordinates of the two points of intersection is**

ANSWER

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50 **The sum of the infinite geometric series with $t_1 = 45$ and common ratio $\frac{2}{5}$ is ____.**

ANSWER

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ANSWER KEY

1.	A	**18.**	B	**35.**	B
2.	A	**19.**	C	**36.**	615
3.	A	**20.**	B	**37.**	B
4.	C	**21.**	C	**38.**	7
5.	C	**22.**	40.5	**39.**	D
6.	B	**23.**	D	**40.**	C
7.	5	**24.**	12	**41.**	A
8.	A	**25.**	D	**42.**	B
9.	D	**26.**	6	**43.**	2112
10.	B	**27.**	D	**44.**	A
11.	D	**28.**	A	**45.**	A
12.	C	**29.**	B	**46.**	A
13.	-32	**30.**	A	**47.**	0.5
14.	C	**31.**	C	**48.**	B
15.	D	**32.**	C	**49.**	3
16.	D	**33.**	A	**50.**	75
17.	C	**34.**	D		

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