

Algebra 2 Semester 2 Final Exam

Use the zero-factor property to solve the following equations.

(1) $x^2 = 10x - 24$

- (a) $\{4, 6\}$
- (b) $\{-4, -6\}$
- (c) $\{-24, -1\}$
- (d) $\{1, 24\}$

(2) $x^2 = 49$

- (a) $\{7, -7\}$
- (b) $\{24, 5\}$
- (c) $\{8, -8\}$
- (d) $\{7\}$

Use the quadratic equation to solve the following equations.

(3) $2n^2 = -10n - 7$

- (a) $\left\{\frac{-10+\sqrt{11}}{2}, \frac{-10-\sqrt{11}}{2}\right\}$
- (b) $\left\{\frac{-10+\sqrt{11}}{2}, \frac{-10-\sqrt{11}}{2}\right\}$
- (c) $\left\{\frac{-5+\sqrt{11}}{2}, \frac{-5-\sqrt{11}}{2}\right\}$
- (d) $\left\{\frac{-5+\sqrt{11}}{4}, \frac{-5-\sqrt{11}}{4}\right\}$

(4) $x^2 + x + 4 = 0$

- (a) $\left\{\frac{1+i\sqrt{15}}{2}, \frac{1-i\sqrt{15}}{2}\right\}$
- (b) $\left\{\frac{-1+i\sqrt{15}}{2}, \frac{-1-i\sqrt{15}}{2}\right\}$
- (c) $\left\{\frac{1+\sqrt{15}}{2}, \frac{1-\sqrt{15}}{2}\right\}$
- (d) $\left\{\frac{-1+\sqrt{15}}{2}, \frac{-1-\sqrt{15}}{2}\right\}$

Solve the equation by completing the square.

(5) $z^2 + 16z + 44 = 0$

- (a) $\{8 + 2\sqrt{5}\}$
- (b) $\{8 + 2\sqrt{11}, 8 - 2\sqrt{11}\}$
- (c) $\{-16 + 2\sqrt{11}\}$
- (d) $\{-8 + 2\sqrt{5}, -8 - 2\sqrt{5}\}$

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Use the discriminant to determine whether the equation has two rational solutions, one rational solution, two irrational solutions, or two nonreal complex solutions. Do not actually solve.

- (6) $s^2 + 3s - 4 = 0$
- (a) Two nonreal complex solutions
 - (b) One rational solution
 - (c) Two irrational solutions
 - (d) Two rational solutions
- (7) $t^2 + 8t + 16 = 0$
- (a) Two nonreal complex solutions
 - (b) One rational solution
 - (c) Two irrational solutions
 - (d) Two rational solutions
- (8) $4y^2 = 6y - 7$
- (a) Two nonreal complex solutions
 - (b) One rational solution
 - (c) Two irrational solutions
 - (d) Two rational solutions
- (9) Write the logarithmic expression as a single logarithm: $2 \log_b q + 3 \log_b y$
- (a) $(2 + 3)\log_b(q + y)$
 - (b) $\log_b(q^2 y^3)$
 - (c) $\log_b(q^2 + y^3)$
 - (d) $\log_b(qy^{2+3})$
- (10) Expand the logarithmic expression: $\log_4 \frac{3}{x}$
- (a) $\frac{\log_4 3}{\log_4 x}$
 - (b) $-x \log_4 3$
 - (c) $\log_4 x - \log_4 3$
 - (d) $\log_4 3 - \log_4 x$

Evaluate the following expressions

- (11) $\log \left[\frac{1}{1000} \right]$
- (a) 3
 - (b) -3
 - (c) $-\frac{1}{3}$
 - (d) $\frac{1}{1000}$
- (12) $\ln e$
- (a) 1
 - (b) -1
 - (c) 0
 - (d) e



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Solve the exponential equation. Express the solution set in terms of natural logarithms.

(13) $e^{5x} = 2$

(a) $\{\frac{\ln 2}{5}\}$

(b) $\{5 \ln 2\}$

(c) $\{\frac{\ln 5}{2}\}$

(d) $\{\frac{2}{5}e\}$

(14) Identify the conic section represented by the equation $x^2 + 6x + 4y^2 = 9$

(a) Parabola

(b) Circle

(c) Ellipse

(d) Hyperbola

(15) Identify the conic section represented by the equation $x^2 + 6x + 4y^2 + 12y = 9$

(a) Parabola

(b) Circle

(c) Ellipse

(d) Hyperbola

(16) Identify the conic section represented by the equation $x^2 + 6x + y^2 - 18y = 9$

(a) Parabola

(b) Circle

(c) Ellipse

(d) Hyperbola

(17) Identify the conic section represented by the equation $x^2 + 6x - 4y = 9$

(a) Parabola

(b) Circle

(c) Ellipse

(d) Hyperbola

(18) What is the center of the circle $x^2 + y^2 + 4x - 8y + 10 = 0$?

(a) $(-2,4)$

(b) $(2,4)$

(c) $(4,2)$

(d) $(4,-2)$

(19) Which are the foci of the hyperbola $16x^2 - 9y^2 = 144$?

(a) $(\pm 5,0)$

(b) $(0,\pm 5)$

(c) $(\pm 3,0)$

(d) $(0,\pm 3)$

