Name: __Key__

Algebra 1 w/ Quadratic Emphasis

Solve each equation by completing the square. If necessary, round to the nearest hundredth.

1. $x^2 - 18x = 19$ $\qquad$ $\left(\frac{b}{2}\right)^2 = \left(\frac{-18}{2}\right)^2 = 81$

$x^2 - 18x + 81 = 100$ $\qquad$ $\sqrt{(x-9)^2} = \sqrt{100}$

$(x-9)^2 = 100$ $\qquad$ $(x-9) = \pm 10$ $\boxed{x = 19, -1}$

Simplify each expression. Use positive exponents.

2. $(2x^2 y^4 z^5)^3 = \boxed{8x^6 y^{12} z^{15}}$

3. $\dfrac{3x^3 y^{-4} z^3}{12x^{-4} y z^{-2}} = \frac{1}{4} x^7 y^{-5} z^5$

$\qquad = \boxed{\dfrac{x^7 z^5}{4y^5}}$

Multiply.

4. $(2x - 3)(4x + 9)$

$8x^2 + 18x - 12x - 27 = \boxed{8x^2 + 6x - 27}$

Divide.

5. $\dfrac{4a^2 + 4a - 3}{2a + 3} \div \dfrac{2a - 1}{a}$ $\quad \dfrac{4a^2 + 4a - 3}{2a + 3} \cdot \dfrac{a}{2a - 1} = \dfrac{(2a+3)(2a-1)}{(2a+3)} \cdot \dfrac{a}{(2a-1)} = \boxed{a}$

Solve by using factoring.

6. $x^2 - 7x = -12$ $\qquad (x - 4)(x - 3) = 0$

$x^2 - 7x + 12 = 0$ $\qquad \boxed{x = 4, 3}$

7. $2x^2 - 9x - 5 = 0$

$(2x + 1)(x - 5) = 0$ $\qquad \boxed{x = -\frac{1}{2}, 5}$

Simplify each radical expression.

8. $4\sqrt{72x^5}$ $\quad 4 \cdot 6\sqrt{2} \cdot \sqrt{x^5}$ $\qquad \boxed{24x^2 \sqrt{2x}}$

$\sqrt{36}\sqrt{2}$ $\quad 24\sqrt{2} \cdot \sqrt{x^5}$

$\sqrt{x^4}\sqrt{x}$

Find the vertex of the graph of the equation.

9. $y = -x^2 + 4x + 3$ $\quad x = \dfrac{-b}{2a} = \dfrac{-4}{-2} = 2$

$y = -(2)^2 + 4(-2) + 3$ $\qquad \boxed{(2, 7)}$

$y = 7$

10. Write an equation representing the population of bacteria after t years if the current population is 200 and increases by 25% each year. What is the population in 5 years? What was the population a year ago?

$f(x) = 200(1 + .25)^t$

$f(5) = 610.35$ bacteria $\qquad f(-1) = 160$ bacteria
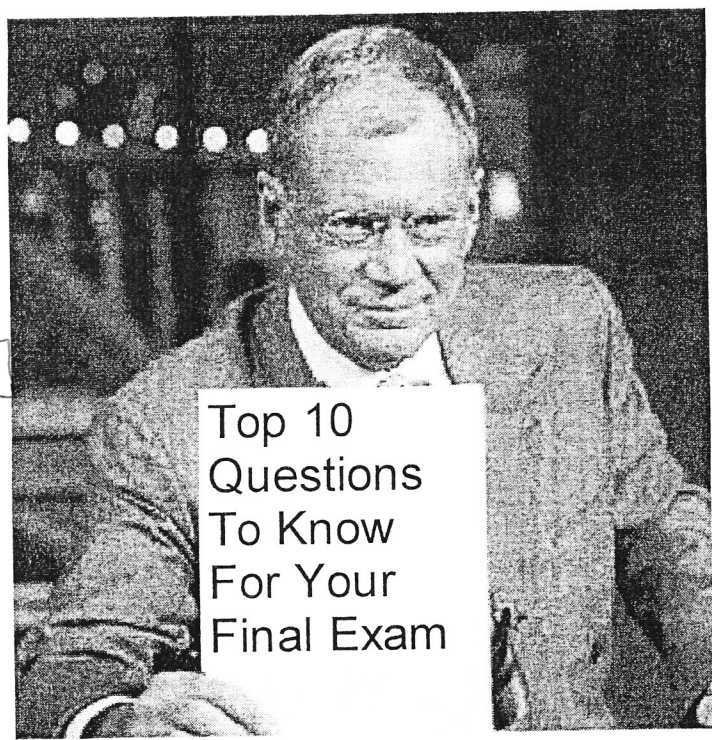
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