

1. Simplify each of the following expressions.

(a) $\sqrt{700} - \sqrt{63} + 2\sqrt{28} = 11\sqrt{7}$

(b) $(4 - 3\sqrt{5})^2 = 61 - 24\sqrt{5}$

(c) $(2\sqrt{6} - 1)^3 = 54\sqrt{6} - 73$

(d) $\frac{\sqrt{180}}{\sqrt{125}} = \frac{6}{5}$

2. Rationalize the denominator in each of the following expressions.

(a) $\frac{2}{\sqrt{5} - 1} = \frac{\sqrt{5} + 1}{2}$

(b) $\frac{18}{\sqrt{12} - 3} = 12\sqrt{3} + 18$

(c) $\frac{4x - 50}{\sqrt{2x} + 5} = 2\sqrt{2x} - 10$

3. Find the exact value of $a^2 - 10a + 10$ if $a = 5 - 2\sqrt{3}$. -3

4. Factor each of the following by completing the square or state if it does not factor.

(a) $x^2 - 26x + 185 = \text{does not factor}$

(b) $20x + x^2 - 525 = (x - 15)(x + 35)$

(c) $64x + 4x^2 - 144 = 4(x - 2)(x + 18)$

(d) $5x + x^2 - 66 = (x - 6)(x + 11)$

(e) $x^2 - 5x + 12 = \text{does not factor}$

(f) $x + 6x^2 - 35 = (2x + 5)(3x - 7)$

(g) $x^2 - 3x + 1 = \left(x - \frac{3 - \sqrt{5}}{2}\right) \left(x - \frac{3 + \sqrt{5}}{2}\right)$

5. Consider the equation $x^2 + 93 = 20x$

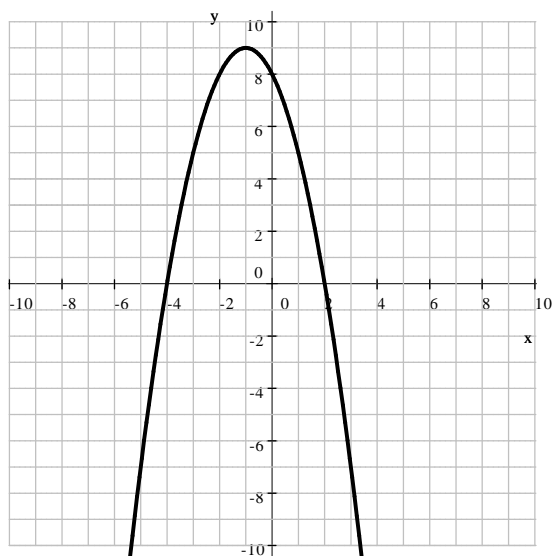
(a) Find the exact value(s) of all solutions of the equation by completing the square.

(b) Check your solution using the exact values.

6. Graph the parabola $y = 8 - x^2 - 2x$. Clearly label the coordinates of five points on the parabola, including vertex and intercepts.

y -intercept: $(0, 8)$ vertex: $(-1, 9)$ x -intercepts: $(2, 0)$ and $(-4, 0)$

other points on the graph: $(-2, 8)$, $(-3, 5)$, $(1, 5)$, and $(3, -7)$



7. Find the distance between $(-3, -5)$ and $(5, 10)$. **17 units**
8. One side of a rectangle is 5 in shorter than 4 times the other side. Find the sides of the rectangle if its area is 279 in^2 . **9 in by 31 in**
9. A book went on a 12% sale. The sale price is \$ 79.20. Find the original price. **\$ 90**
10. How much of a 12% solution should be mixed with 6 gallons of a 20% solution to obtain a mixture that is 15%? **10 gallons**
11. The hypotenuse of a right triangle is 122 cm. The difference between the other two sides is 98 cm. Find the sides of the triangle. **22 cm and 120 cm**
12. Find all the numbers such that the number squared is equal to the number. **0 and 1**
13. Find all the numbers such that the number cubed is equal to the number. **-1, 0 and 1**