

A.APR.B.3: Solving Polynomial Equations

- 1 How many negative solutions to the equation $2x^3 - 4x^2 + 3x - 1 = 0$ exist?
 - 1) 1
 - 2) 2
 - 3) 3
 - 4) 0

- 2 Which values of x are solutions of the equation $x^3 + x^2 - 2x = 0$?
 - 1) 0, 1, 2
 - 2) 0, 1, -2
 - 3) 0, -1, 2
 - 4) 0, -1, -2

- 3 What is the solution set of the equation $3x^5 - 48x = 0$?
 - 1) $\{0, \pm 2\}$
 - 2) $\{0, \pm 2, 3\}$
 - 3) $\{0, \pm 2, \pm 2i\}$
 - 4) $\{\pm 2, \pm 2i\}$

- 4 Solve the equation $2x^3 - x^2 - 8x + 4 = 0$ algebraically for all values of x .

- 5 Solve the equation $8x^3 + 4x^2 - 18x - 9 = 0$ algebraically for all values of x .

- 6 Solve $x^3 + 5x^2 = 4x + 20$ algebraically.

- 7 Solve algebraically for all values of x : $x^4 + 4x^3 + 4x^2 = -16x$

- 8 Solve, giving 4 roots, $x^4 - 13x^2 + 36 = 0$

- 9 Solve: $x^4 - 3x^2 = 4$ (Find 4 roots.)

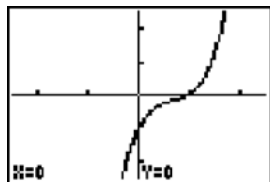
- 10 Solve: $x^4 + 4x^2 = 32$. Find 4 roots.

- 11 Find *four* roots of the following equation: $2x^4 + 5x^2 = 207$

- 12 Denise is designing a storage box in the shape of a cube. Each side of the box has a length of 10 inches. She needs more room and decides to construct a larger box in the shape of a cube with a volume of 2,000 cubic inches. By how many inches, to the *nearest tenth*, should she *increase* the length of each side of the original box?

A.APR.B.3: Solving Polynomial Equations Answer Section

1 ANS: 4



REF: 061222a2

2 ANS: 2

$$x^3 + x^2 - 2x = 0$$

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

$$x(x+2)(x-1) = 0$$

$$x = 0, -2, 1$$

REF: 011103a2

3 ANS: 3

$$3x^5 - 48x = 0$$

$$3x(x^4 - 16) = 0$$

$$3x(x^2 + 4)(x^2 - 4) = 0$$

$$3x(x^2 + 4)(x+2)(x-2) = 0$$

REF: 011216a2

4 ANS:

$$x^2(2x - 1) - 4(2x - 1) = 0$$

$$(x^2 - 4)(2x - 1) = 0$$

$$(x+2)(x-2)(2x-1) = 0$$

$$x = \pm 2, \frac{1}{2}$$

REF: 081537a2

5 ANS:

$$\pm\frac{3}{2}, -\frac{1}{2} \quad 8x^3 + 4x^2 - 18x - 9 = 0$$

$$4x^2(2x + 1) - 9(2x + 1) = 0$$

$$(4x^2 - 9)(2x + 1) = 0$$

$$4x^2 - 9 = 0 \text{ or } 2x + 1 = 0$$

$$(2x + 3)(2x - 3) = 0 \quad x = -\frac{1}{2}$$

$$x = \pm\frac{3}{2}$$

REF: fall0937a2

6 ANS:

$$x^3 + 5x^2 - 4x - 20 = 0$$

$$x^2(x + 5) - 4(x + 5) = 0$$

$$(x^2 - 4)(x + 5) = 0$$

$$(x + 2)(x - 2)(x + 5) = 0$$

$$x = \pm 2, -5$$

REF: 061437a2

7 ANS:

$$x^4 + 4x^3 + 4x^2 + 16x = 0$$

$$x(x^3 + 4x^2 + 4x + 16) = 0$$

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

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

$$x = 0, \pm 2i, -4$$

REF: 061339a2

8 ANS:

$$\pm 2, \pm 3$$

REF: 089604a1

9 ANS:

$$\pm 2, \pm i$$

REF: 069407a1

10 ANS:

$$\pm 2, \pm 2i\sqrt{2}$$

REF: 089409a1

11 ANS:

$$\pm 3, \pm \frac{i\sqrt{46}}{2}$$

REF: 089812a1

12 ANS:

$$V = s^3$$

2.6. $2000 = (s + 10)^3$. Increase the length of each side of the box by 2.6 inches (12.6 – 10).

$$\sqrt[3]{2000} = s + 10$$

$$s \approx 12.6$$

REF: 060724b