

Practice Test on 6.1 - 6.4

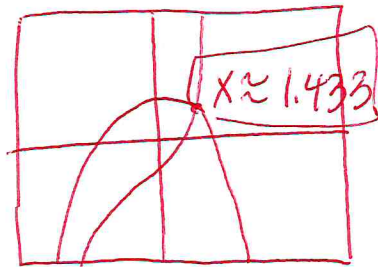
Key

1) Solve by graphing. (C)

$$x^3 - 1 = -x^2 + 4$$

$$y_1 = x^3 - 1$$

$$y_2 = -x^2 + 4$$



$[-10, 10]$ by $[-10, 10]$

2) Factor each polynomial completely. Do not solve. (NC)

a) $x^3 - 216$

$$(x)^3 - 6^3$$

$$a = x \quad b = 6 \quad ab = 6x$$

$$a^2 = x^2 \quad b^2 = 36$$

$$(x-6)(x^2+6x+36)$$

3) Use the given polynomial: (C)

$$(x-y)(x+y)^2 = x^3 + x^2y - xy^2 - y^3$$

a) Prove the polynomial algebraically.

$$(x-y)(x+y)^2$$

$$(x-y)(x+y)(x+y)$$

$$(x^2 - xy + xy - y^2)(x+y)$$

$$(x^2 - y^2)(x+y)$$

$$x^3 + x^2y + xy^2 - y^3 = x^3 + x^2y - xy^2 - y^3 \checkmark$$

4) Solve each of the equations. Find all the solutions. (NC)

a) $x^4 + x^2 - 90 = 0$

$$\begin{array}{r} -90 \\ 10 \times -9 \end{array}$$

$$(x^2+10)(x^2-9) = 0$$

$$x^2+10=0$$

$$x^2 = -10$$

$$x^2 = \pm \sqrt{10} \rightarrow 10$$

$$x = \pm \sqrt{10}$$

$$x^2-9=0$$

$$x^2=9$$

$$x = \pm 3$$

b) $x^3 + 216 = 0$

From (2a)

$$(x-6)(x^2+6x+36) = 0$$

$$x-6=0$$

$$x=6$$

$$x = -6 \pm \frac{\sqrt{6^2 - 4(1)(36)}}{2(1)}$$

$$x = -6 \pm \sqrt{36 - 144}$$

$$x = \frac{-6 \pm \sqrt{-108}}{2} = \frac{-6 \pm 6\sqrt{3}i}{2} = -3 \pm 3i\sqrt{3}$$

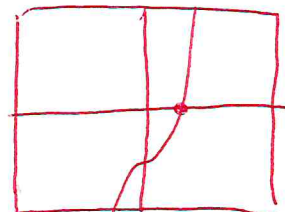
Name:

$$\begin{array}{r} x^3 - 1 = x^2 + 4 \\ +x^2 - 4 \quad +x^2 - 4 \end{array}$$

$$y_1 = x^3 + x^2 - 5$$

or $y_2 = 0$

$$x \approx 1.433$$



$[-10, 10]$ by $[-10, 10]$

b) $x^4 + 2x^2 - 3$

$$\begin{array}{r} -3 \\ 3 \times -1 \\ 2 \end{array} \quad (x^2+3)(x^2-1) \rightarrow \begin{array}{r} -1 \\ 1 \times -1 \\ 0 \end{array}$$

$$(x^2+3)(x-1)(x+1)$$

b) Verify the polynomial numerically

Let $x=2, y=4$

$$(2-4)(2+4)^2 \stackrel{?}{=} 2^3 + 2^2 \cdot 4 - 2 \cdot 4^2 - 4^3$$

$$(-2)(6)^2 \stackrel{?}{=} 8 + 16 - 32 - 64$$

$$(-2)(36) \stackrel{?}{=} -72$$

$$-72 = -72 \checkmark$$