Name Answer Key

PreCalculus; Sec 2.3a – Real Zeros of Polynomial Functions

Use either long division or synthetic division to divide.

1. Divide $8x^4 - 5$ by $2x + 1$

$$4x^3 - 2x^2 + x - 0.5 - \frac{4.5}{2x+1}$$

2. Divide $2x^3 - 3x^2 - 50x + 75$ by $2x - 3$

$$x^2 - 25$$

3. $(5x^2 - 17x - 12) \div (x - 4)$

$$5x + 3$$

4. $(x^3 - 729) \div (x - 9)$

$$x^2 + 9x + 81$$

5. $\frac{2x^3 - 4x^2 - 15x + 5}{(x-1)^2}$

$$2x + \frac{-17x+5}{(x-1)^2}$$

6. $\frac{4x^3 + 16x^2 - 23x - 15}{x + \frac{1}{2}}$

$$4x^2 + 14x - 30 = 2x^2 + 7x - 15$$

Use the Remainder Theorem and synthetic division to evaluate the function at each given value.

7. $f(x) = 2x^3 - 7x + 3$

a. $f(1)$

$$f(1) = -2$$

b. $f(-2)$

$$f(-2) = 1$$

c. $f\left(\frac{1}{2}\right)$

$$f\left(\frac{1}{2}\right) = -0.25$$

d. $f(2)$

$$f(2) = 5$$

In Exercise 8, (a) verify the given factor(s) of the function f, (b) find the remaining factors of f, (c) write the complete factorization of f, and (d) list all real zeros of f.

8. $f(x) = x^4 - 4x^3 - 15x^2 + 58x - 40$ Factors: $(x - 5), (x + 4)$

a)

5	1	-4	-15	58	-40
		5	5	-50	40
-4	1	1	-10	8	0
		-4	12	-8	
	1	-3	2	0	

REMAINDER OF 0; $x-5$ IS A FACTOR!

B) $x^2 - 3x + 2$

$(x-1)(x-2)$

c) $f(x) = (x-1)(x-2)(x-5)(x+4)$

D) $x = 1, 2, 5, -4$

Find all real zeros of the polynomial function. (*Hint:* you may need to use the Rational Zero Test.)

9. $f(x) = 3x^4 - 14x^2 - 4x$

$f(x) = x(3x^3 - 14x - 4)$

$x = 0$

$\frac{P}{Q} = \pm \frac{1, 2, 4}{1, 3}$

-2	3	0	-14	-4
		-6	12	4
	3	-6	-2	0

$3x^2 - 6x - 2 = 0$

$x = \frac{6 \pm \sqrt{36 + 24}}{6}$

$= \frac{6 \pm 2\sqrt{15}}{6}$

$= \frac{3 \pm \sqrt{15}}{3}$

10. $g(x) = 4x^4 - 11x^3 - 22x^2 + 8x$

$g(x) = x(4x^3 - 11x^2 - 22x + 8)$

$x = 0$

$\frac{P}{Q} = \pm \frac{1, 2, 4, 8}{1, 2, 4}$

4	4	-11	-22	8
		16	20	-8
	4	5	-2	0

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

$x = \frac{-5 \pm \sqrt{25 + 32}}{8}$

$= \frac{-5 \pm \sqrt{57}}{8}$