Algebra 2/Trig

Name Answer Key

10.30 Classwork (QUIZ PRACTICE)

State the possible roots. Then find all linear factors and zeros.

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

p: 2, 1

q: 4, 2, 1

Possible Roots: $\pm \frac{1}{2}, 1, 2, \frac{1}{4}$

1] 4 -3 -9 -2
4 1 -8
4 1 -8 [-10] NO!

-1] 4 -3 -9 -2
-4 7 2
4 -7 -2 [0] YES!

$(x+1)(4x^2-7x-2)$

$(x+1)\ 4x^2-8x+x-2$

$4x(x-2)+1(x-2)$

$(x+1)(4x+1)(x-2)$ L.F.

-8 | 1 -7
-8

$\{-1, 2, -\frac{1}{4}\}$

2) $f(x) = x^3 - 7x^2 + 2x + 40$

p: 1, 2, 4, 5, 8, 10, 20, 40

q: 1

Possible Roots: $\pm 1, 2, 4, 5, 8, 10, 20, 40$

1] 1 -7 2 40
1 -6 -4
1 -6 -4 36 NO!

-2] 1 -7 2 40
-2 18 -40
1 -9 20 0 YES

2] 1 -7 2 40
2 -10 -16
1 -5 -8 24 NO!

20 | -5 -4 | -9

$(x+2)(x^2-9x+20) = 0$

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

$\{-2, 4, 5\}$

3) $f(x) = x^3 - 5x^2 - 18x + 72$

p: 1, 2, 4, 6, 8, 9, 12, 18, 36, 72

q: 1

Possible Roots: $\pm 1, 2, 4, 6, 8, 9, 12, 18, 36, 72$

1] 1 -5 -18 72
1 -4 -22
1 -4 -22 [50] NO!

-1] 1 -5 -18 72
-1 6 12
1 -6 -12 [84] No!

4] 1 -5 -18 72
4 -4 -88
1 -1 -22 -16 NO!

-4] 1 -5 -18 72
-4 36 -72
1 -9 18 0 YES

$(x+4)(x^2-9x+18)$

18 | -6 -3 | -9

$(x+4)(x-6)(x-3)$ L.F.

$\{-4, 6, 3\}$

4) $f(x) = 2x^3 - x^2 - 15x + 18$

p: 1, 2, 3, 6, 9, 18

q: 1, 2

Possible Roots: $\pm 1, \frac{1}{2}, 2, 3, \frac{3}{2}, 6, 9, \frac{9}{2}, 18$

1] 2 -1 -15 18
2 1 -14
2 1 -14 4 No

-1] 2 -1 -15 18
-2 3 12
2 -3 -12 6 No!

2] 2 -1 -15 18
4 6 -18
2 3 -9 0 YES!

-18 | +6 -3 | 3

$(x-2)(2x^2+3x-9) = 0$

$2x^2+6x \quad -3x-9$

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

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

$\{2, \frac{3}{2}, -3\}$

Describe the end behavior of each function.

5) $f(x) = -x^5 + 4x^3 - 2x - 1$

As $x \to -\infty$, $f(x) \to \infty$

As $x \to \infty$, $f(x) \to -\infty$

6) $f(x) = -2x^2 - 8x - 4$

As $x \to -\infty$, $f(x) \to -\infty$

As $x \to \infty$, $f(x) \to -\infty$

Divide Using LONG DIVISION.

7) $(2v^3 - 4v^2 - 68v - 10) \div (v - 7)$

$2v^2 + 10v + 2$ remainder 4

$2v^2 + 10v + 2 + \frac{4}{v-7}$

8) $(n^3 + 12n^2 + 32n - 21) \div (n + 7)$

$n^2 + 5n - 3$ remainder 0

$n^2 + 5n - 3$

Evaluate each function at the given value using the REMAINDER THEOREM.

9) $f(a) = -6a^3 + 30a^2 - 19a - 15$ at $a = 4$

4 | −6 30 −19 −15

−24 24 20

−6 6 5 | 5

or $-6(4)^3 + 30(4)^2 - 19(4) - 15 = 5$

$f(4) = 5$

10) $f(m) = 6m^4 - 20m^3 + 3m^2 + 9m + 8$ at $m = 3$

3 | 6 −20 3 9 8

18 −6 −9 0

6 −2 −3 0 | 8

or $6(3)^4 - 20(3)^3 + 3(3)^2 + 9(3) + 8 = 8$

$f(3) = 8$

Using the FACTOR THEOREM, state if each is a factor of the polynomial.

11) $(x^3 - 2x^2 - 62x - 14) \div (x - 9)$

9 | 1 −2 −62 −14

9 63 9

1 7 1 | −5

NO

12) $(7n^3 + 33n^2 - 63n - 54) \div (n + 6)$

−6 | 7 33 −63 −54

−42 54 54

7 −9 −9 | 0

YES