Name key Hr____

PreCalculus B

Review 2.2-2.4 Polynomials of Higher Degree

Determine whether the following are polynomial functions and if they are, state the degree.

1. $(x-2)(x+7)$ yes, 2
2. $x^2+2.3x-5$ yes, 2
3. $x^{1/3}+2x$ no
4. $1/x+5x$ no
5. $x(x-3)^3(x+2)$ yes, 5

Find all the real zeros and state their multiplicities.

6. $x(x-3)^3(x+2)$ 0 mult 1, 3 mult 3, -2 mult 1
7. $4(x-5)^4(x+16)^2$ 5 mult 4, -16 mult 2
8. $5x^2(3-x)(x+2)^7$ 0 mult 2, 3 mult 1, -2 mult 7
9. x^2+7x-8 $(x+8)(x-1)$ -8 mult 1, 1 mult 1

Find a polynomial of minimum degree that has the given zeros. (Put #10 in Standard Form)

10. 3, 5, -2 $(x-3)(x-5)(x+2)$ $(x^2-8x+15)(x+2)$

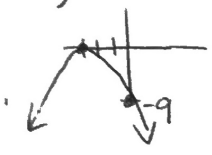
$x^3+2x^2-8x^2-16x+15x+30$

x^3-6x^2-x+30

11. 0, 7, 4, -3 $x(x-7)(x-4)(x+3)$
12. -2 (multiplicity 3), 4 (multiplicity 2) $(x+2)^3(x-4)^2$
13. 0 (multiplicity 4), 6 (multiplicity 3) $x^4(x-6)^3$

For each polynomial (a) list each real zero and its multiplicity (b) determine whether the graph touches or crosses at each x-intercept (c) find the y-intercept (d) sketch the graph.

14. $f(x)=-(x+3)^2$ (14) a) -3 mult 2 b) touches at -3 c) $f(0)=-(0+3)^2=-9$ d)



15. $2x^5-6x^4-8x^3$
16. $x^2(x-2)^3(x+3)^2$

(15) $2x^3(x^2-3x-4)$

$2x^3(x-4)(x+1)$

a) 0 mult 3, 4 mult 1, -1 mult 1

b) 0 cross, 4 cross, -1 cross

c) $2(0)^5-6(0)^4-8(0)=0$

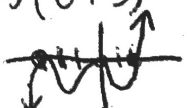
d)

(16) a) 0 mult 2, 2 mult 3, -3 mu

b) 0 touch, 2 cross, -3 to

c) $0^2(0-2)^3(0+3)^2=0$

d)



Divide Using Long Division.

17) $(b^3 - b^2 - 74b - 24) \div (b + 8)$

18) $(x^3 - x^2 - 6x - 10) \div (x + 1)$

19) $(27x^2 - 66x - 6) \div (3x - 8)$

20) $(18a^2 + 60a + 38) \div (3a + 7)$

Divide Using Synthetic Division.

21) $(10x^2 - 40x + 28) \div (x - 3)$

22) $(2b^2 + 12b + 5) \div (b + 6)$

23) $(n^3 + 5n^2 + 4) \div (n + 5)$

24) $(n^3 + n^2 + 8n) \div (n + 1)$

State if the given binomial (or zero) gives a factor of the given polynomial.

25) $(r^3 + 3r^2 + 5r + 36) \div (r + 4)$

26) $(m^3 + 2m^2 - 25m - 56) \div (m + 5)$

27) $(x^3 - 3x^2 - 20x + 35) \div (x + 4)$

28) $(n^3 - 16n^2 + 68n - 80) \div (n - 10)$

29) $f(x) = -6x^4 - 17x^3 - 10x^2 - 4x - 10$ at $x = -2$

30) $f(a) = a^3 + 5a^2 - 7a - 6$ at $a = -6$

31) $f(a) = 2a^3 - 8a^2 + 6a - 24$ at $a = 4$

32) $f(n) = n^3 - 4n^2 - 4n + 24$ at $n = 4$

State the possible rational zeros for each function. Then find at least 1 actual zero.

33) $f(x) = 2x^3 + 21x^2 + 42x + 5$

34) $f(x) = 5x^3 + 21x^2 - 21x - 5$

Answers to

17) $b^2 - 9b - 2 - \frac{8}{b+8}$

18) $x^2 - 2x - 4 - \frac{6}{x+1}$

19) $9x + 2 + \frac{10}{3x-8}$

20) $6a + 6 - \frac{4}{3a+7}$

21) $10x - 10 - \frac{2}{x-3}$

22) $2b + \frac{5}{b+6}$

23) $n^2 + \frac{4}{n+5}$

24) $n^2 + 8 - \frac{8}{n+1}$

25) Yes

26) No

27) No

28) Yes

29) -2 No

30) 0 Yes

31) 0 Yes

32) 8 No

33) Possible rational zeros: $\pm 1, \pm 5, \pm\frac{1}{2}, \pm\frac{5}{2}$

Rational zeros: $\left\{-\frac{5}{2}\right\}$

34) Possible rational zeros: $\pm 1, \pm 5, \pm\frac{1}{5}$

Rational zeros: $\left\{-5, -\frac{1}{5}, 1\right\}$