Algebra III
Sections 2.1 – 2.3
REVIEW

Name KEY

Date

Classify each polynomial function as linear, quadratic, cubic, quartic, or quintic. Give its leading coefficient and degree.

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

Cubic
LC = 2
D = 3

2. $f(x) = 8 + 7x + 3x^3 - x^4$

Quartic
LC = −1
D = 4

If $f(x) = 2x^2 - 7x$, find each of the following.

3. f(11)

$2(11)^2 - 7(11)$
$2(121) - 77$
$242 - 77$
165

4. f(2i)

$2(2i)^2 - 7(2i)$
$2(4i^2) - 14i$
$-8 - 14i$

5. f(n – 1)

$2(n-1)^2 - 7(n-1)$
$2(n^2 - 2n + 1) - 7n + 7$
$2n^2 - 4n + 2 - 7n + 7$
$2n^2 - 11n + 9$

Answer each of the following.

6. Find the remainder when $4x^5 - 12x^3 + x^2 - 40$ is divided by x – 3.

3	4	0	−12	1	0	−40
		12	36	72	219	657
	4	12	24	73	219	617

R = 617

7. Is x + 1 a factor of $x^4 - 5x^3 + 4x^2 - 15x + 2$? Explain your decision.

−1	1	−5	4	−15	2
		−1	6	−10	25
	1	−6	10	−25	27

No, remainder = 27 ≠ 0

8. When a polynomial P(x) is divided by x + 3, the quotient is $x^2 + x + 4$ and the remainder is 7. Find P(x).

(Divisor)(Quotient) + Rem = Dividend
$(x+3)(x^2+x+4) + 7 = P(x)$
$x^3 + x^2 + 4x + 3x^2 + 3x + 12 + 7 = x^3 + 4x^2 + 7x + 19$

9. If x = –2 is a root of $6x^3 + 11x^2 - 4x - 4 = 0$, find the remaining roots.

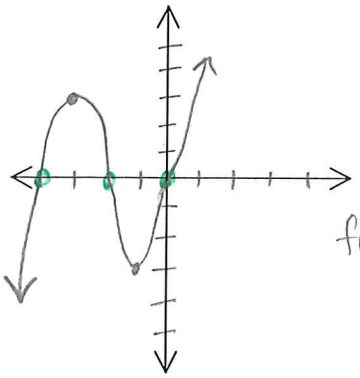
−2	6	11	−4	−4
		−12	2	4
	6	−1	−2	0

$6x^2 - x - 2 = 0$
$(3x-2)(2x+1)$
$x = 2/3$, $x = -1/2$

Sketch a graph of each equation.

10. $y = x(x + 4)(x + 2)$

0 −4 −2



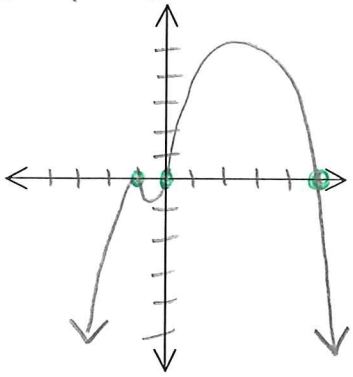
$f(-1) = (-)(+)(+)$
$= neg$

$f(-3) = (-)(+)(-)$
$= pos$

11. $y = x(x + 1)^2(5 - x)$

0 −1 5

double → tangent

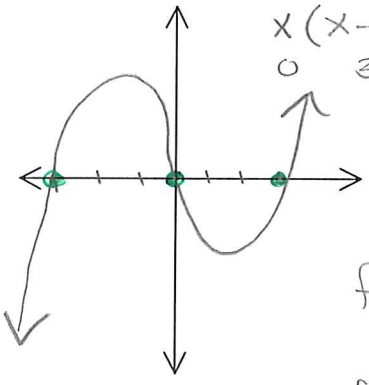


$f(1) = (+)(+)(+)$
$= pos$ =

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

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

0 3 −3



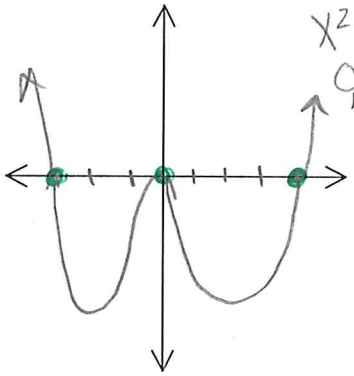
$f(-1) = (-)(-)(+)$
$= pos$

$f(1) = (+)(-)(+) = neg$

13. $f(x) = x^4 - x^3 - 12x^2 = x^2(x^2 - x - 12)$

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

0 4 −3



double tangent

$f(1) = (+)(-)(+)$
$= neg$

$f(-1) = (+)(-)(+)$
$= neg$

Write a possible equation for each polynomial.

14. A cubic equation has a double root at 7 and a root at –2.

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

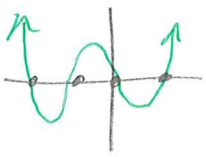
15. A quartic equation has a double root at 5, a root at 1 and 0.

$f(x) = x(x-5)^2(x-1)$

Answer each of the following.

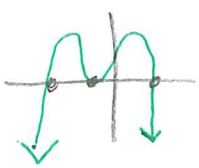
16. If possible sketch a graph of a quartic function that has the given number of real and distinct roots.

a. 4



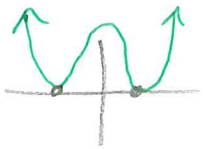
4 single

b. 3



2 single
1 Double

c. 2

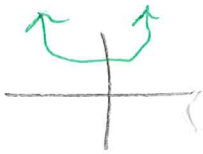


2 double

d. 1

Flattening

e. 0



Imaginary