Math 3200 Review- Chapter 3 Polynomials

1. What is the leading coefficient for the polynomial $P(x) = -2(3-x)^2(1+2x)$?

-4

2. What is the degree of the polynomial in #1? 3

3. Solve for x: $-2x(x+5)^2(2x-7) = 0$

$x=0 \quad x=-5 \quad x=\frac{7}{2}$

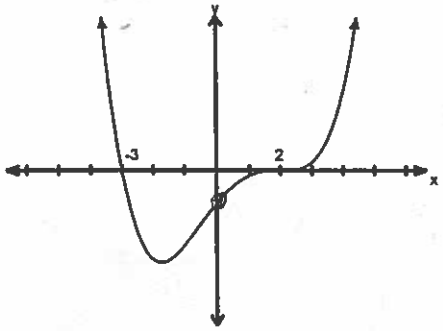
4. What are the x-intercepts for the function $f(x) = x^2 - 3$? $x = \pm\sqrt{3}$

5. What is the y-intercept for the function $f(x) = (x-3)(2x-5)+7$?

$y = 22$

$(-3)(-5)+7$
$15+7 = 22$

6. What is the equation for the quartic below? The y-intercept is (0, -1)



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

$-1 = a(0+3)(0-2)^3$

$-1 = a(3)(-8)$

$\frac{-1}{-24} = \frac{a(-24)}{-24}$

$\frac{1}{24} = a$

$y = \frac{1}{24}(x+3)(x-2)^3$

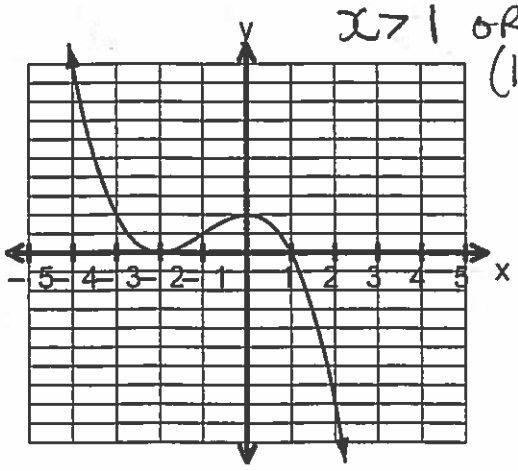
7. What is the quotient when $P(x) = 3x^3 - 7x^2 + 8x - 2$ is divided by $(x+1)$?

$3x^2 - 10x + 18$

-1	3	-7	8	-2
	↓	-3	10	-18
	3	-10	18	-20

8. On what interval(s) is $f(x)$ negative?

$x > 1$ or $(1, \infty)$



11. What type of polynomial has at most four different single roots?

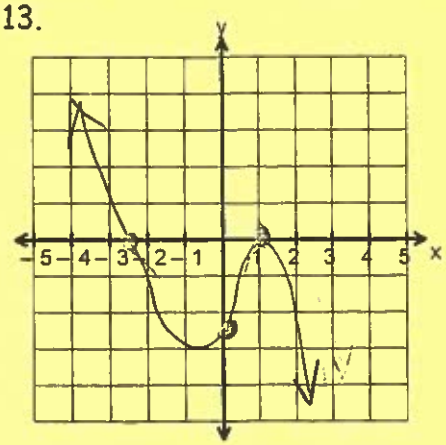
quartic

12. Sketch the following function without using your graphing calculator.

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

y-int: -2.5

13.



13, $8x^3(x+1) - 1(x+1)$

$(x+1)(8x^3-1)$

~~13. Completely factor the polynomial: $8x^4 + 8x^3 - x - 1$~~

14. Find the remainder when $P(x) = 2x^{50} - 7$ is divided by $(x+1)$ $R = -5$

15. List the possible factors for $P(x) = 2x^3 - 3x^2 + 4x - 6$. $\pm 1, \pm 2, \pm 3, \pm 6$

16. If $P(-5) = 0$, then what binomial must be a factor of $P(x)$? $(x+5)$

17. If $P(-2) = 0$, then -2 must be an x-intercept of the graph of $P(x)$.

18. If $(x+2)$ is a factor of $3x^3 + kx^2 - 31x - 54$, then find the value of k. $3(-2)^3 + K(-2)^2 - 31(-2) - 54 \rightarrow -24 + 4K + 62 - 54 = 0$

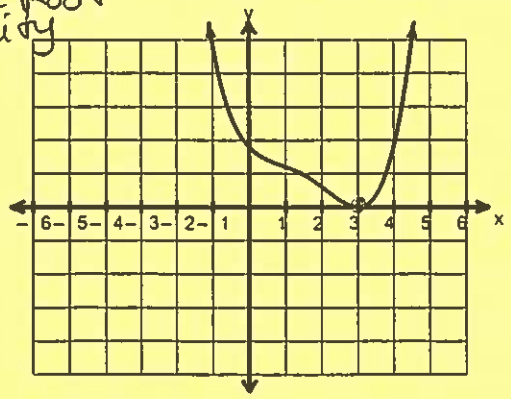
$\frac{4K}{4} = \frac{16}{4}$ $K = 4$

19. The graph of the polynomial $P(x) = a(x-2)(3x+4)(x+1)$ passes through the point $(-2, 16)$. Find the value of "a".

20. Solve for x: $x^2 + 5x - 6 = 0$ $(x+6)(x-1) = 0$ $x = -6, 1$

21. What kind of root does the quartic graphed below have at 3?

Double Root (multiplicity 2)



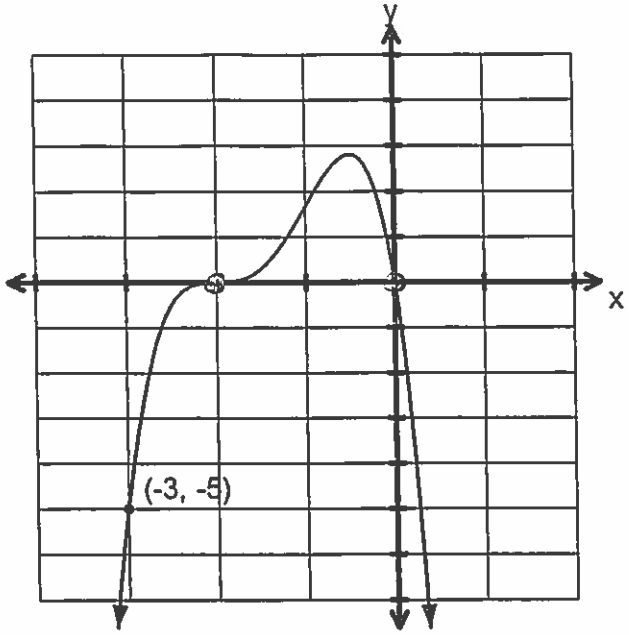
19. $16 = a(-2-2)(3(-2)+4)(-2+1)$

$16 = a(-4)(-2)(-1)$

$\frac{16}{-8} = \frac{a(-8)}{-8}$

$-2 = a$

22. Find an equation for the quartic graph



$y = a(x+2)^3(x)$

$-5 = a(-3+2)^3(-3)$

$-5 = a(-1)^3(-3)$

$-5 = a(3)$

$\frac{-5}{3} = \frac{a(3)}{3}$

$y = -\frac{5}{3}x(x+2)^3$

23. Use the INTEGRAL ROOTS thrm to algebraically solve the polynomial equation: $x^3 - 7x + 6 = 0$.

1	1	0	−7	6
	↓	1	−6	−6
	1	1	−6	0

$x^2 + x - 6$

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

$x = -3, 2, 1$

24. Without using your graphing calculator, sketch the graph of $f(x) = -x^3 - x^2 + 5x - 3$.

$0 = -(x^3 + x^2 - 5x + 3)$

1	1	−5	3
	↓	1	2	−3
	1	2	−3	0

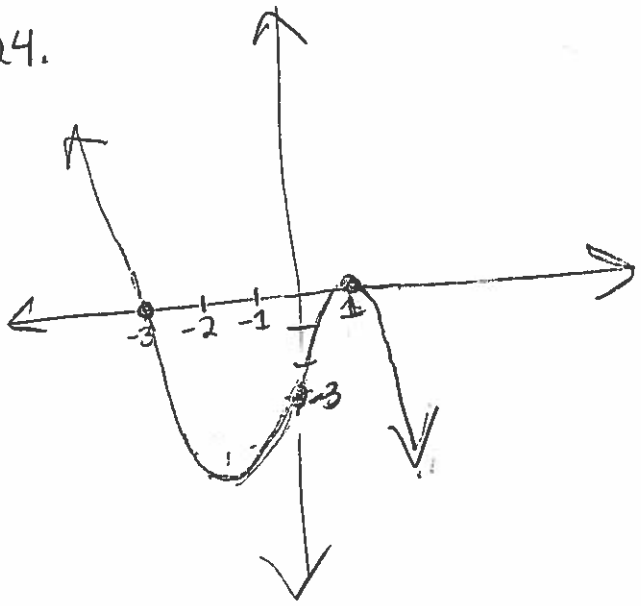
$x^2 + 2x - 3$

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

$x = 1, -3, 1$

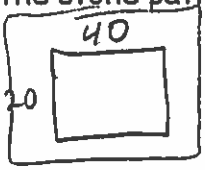
y-int: −3

24.



25. An interlocking stone path that is x ft wide is built around a rectangular garden. The garden is 20 ft wide by 40 ft long. The combined surface area of the garden and the pathway is 1196 ft ^{2}. What is the width of the stone pathway? Solve algebraically and show all workings.

25.



$(20+2x)(40+2x) = 1196$

$800 + 120x + 4x^2 = 1196$

$4x^2 + 120x - 396 = 0$

$4(x^2 + 30x - 99) = 0$

$x = \frac{-30 \pm \sqrt{(30)^2 - 4(1)(-99)}}{2(1)}$

$x = \frac{-30 \pm \sqrt{1296}}{2}$

$x = \frac{-30 \pm 36}{2}$ $x = 3, -33$