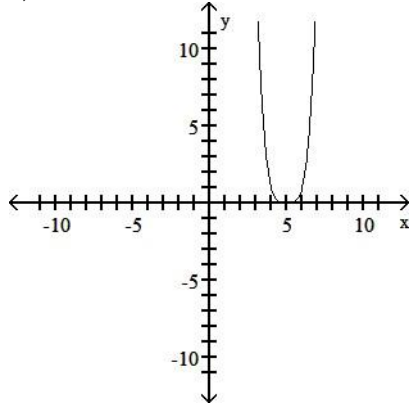


## Chapter 4 Spiral Review Solutions

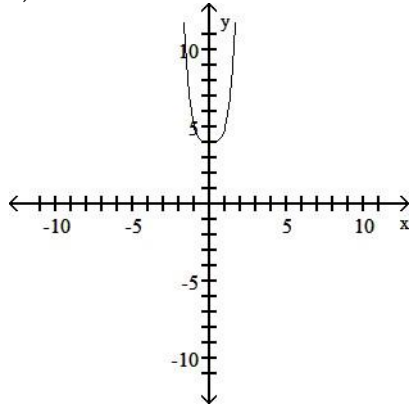
1) Yes; degree 3

2) Yes; degree 2

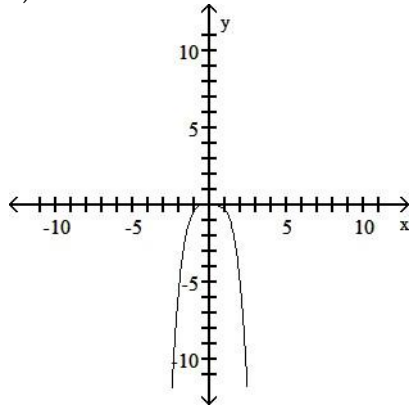
3)



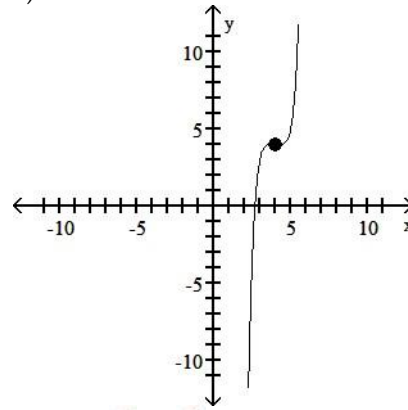
4)



5)



6)



7)  $f(x) = x^3 + 2x^2 - 9x - 18$  for  $a = 1$

8)  $f(x) = x^3 - 4x + 4x^2 - 16$  for  $a = 1$

9) -1, multiplicity 1, crosses x-axis; -2, multiplicity 3, crosses x-axis

10) -1, multiplicity 2, touches x-axis

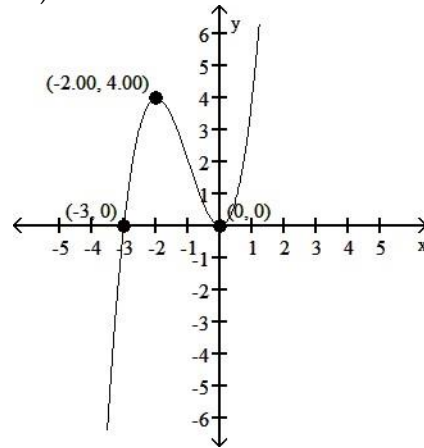
11) x-intercepts: -3, -2, 2; y-intercept: -12

12) x-intercepts: -7, -1, 0, 1; y-intercept: 0

13) 6

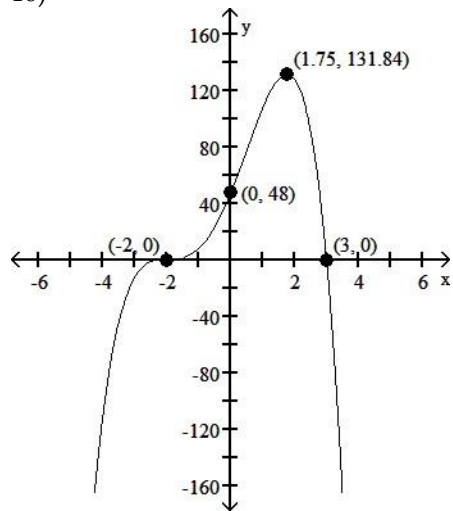
14) 2

15)



$x = -3$ , multiplicity of 1  
 $x = 0$ , multiplicity of 2

16)



$x = -2$ , multiplicity of 3  
 $x = 3$ , multiplicity of 1

17)  $R = 16$

18) yes

19) No

20)  $\pm \frac{1}{2}, \pm 1, \pm 2, \pm 4, \pm 8$

21)  $\pm \frac{1}{11}, \pm \frac{5}{11}, \pm 1, \pm 5$

22) -4, 4;  $f(x) = (x - 4)(x + 4)(x^2 + 4)$

23)  $\frac{2}{3}$ ;  $f(x) = (3x - 2)(x^2 + 2)$

24)  $\left\{ \frac{1}{2}, \sqrt{10}, -\sqrt{10} \right\}$

25)  $\{-4, -2, -3\}$

26)  $5 + 5i, -2i$

27)  $4 + i$

28)  $f(x) = x^3 + 4x^2 - 10x + 12$

29)  $f(x) = (x - 1)(x + 5i)(x - 5i)$

30)  $\{x \mid x \neq -1, x \neq 1\}$

31) all real numbers

32)  $x = -8, x = 8$

33) none

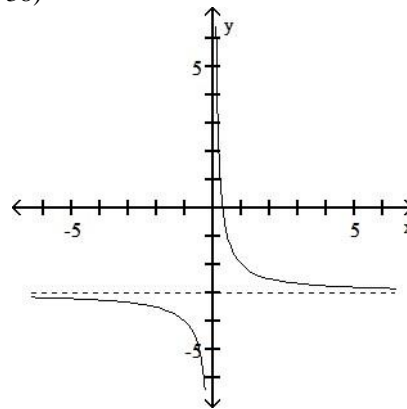
34)  $y = 4$

35)  $y = 0$

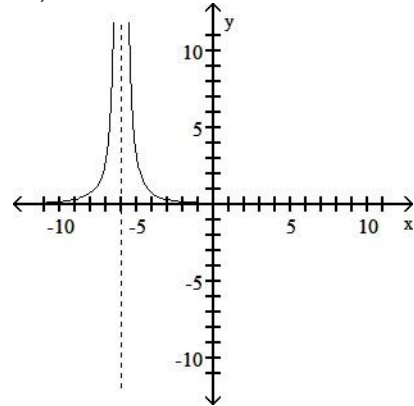
36)  $y = -1$

37)  $y = x + 10$

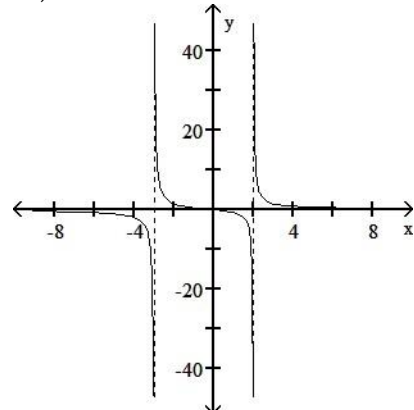
38)



39)



40)



41)  $t = 0.55$  minutes after the injection is given

42)  $(-\infty, -6) \cup (-3, -1)$

43)  $(6, \infty)$

44)  $(-\infty, -3) \cup (2, \infty)$

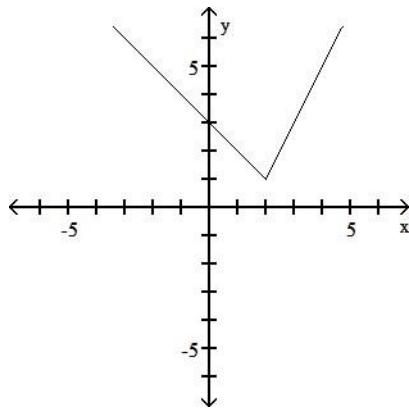
45)  $(-2, 1)$

46) even

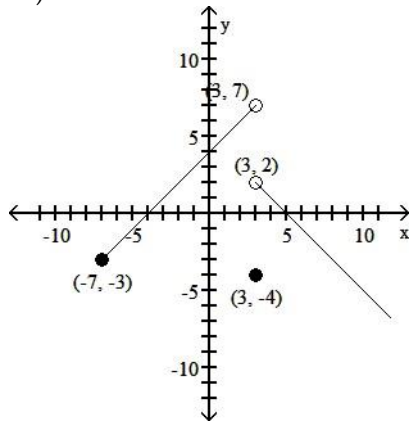
47) neither

48) odd

49



50)



51)  $5x^2 - 8x + 9$

52)  $(f - g)(x) = 2x + 4$ ; all real numbers

53) 3

54) local maximum at  $(0, 6)$

local minimum at  $(2.67, -3.48)$

increasing on  $(-1, 0)$  and  $(2.67, 4)$

decreasing on  $(0, 2.67)$