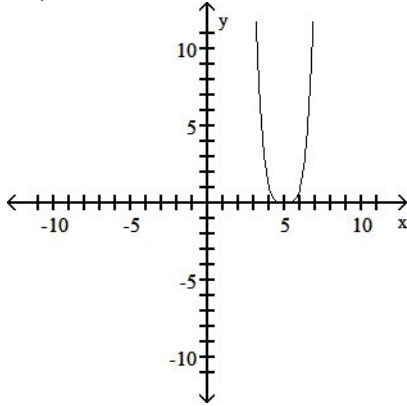


## Chapter 4 Spiral Review Solutions

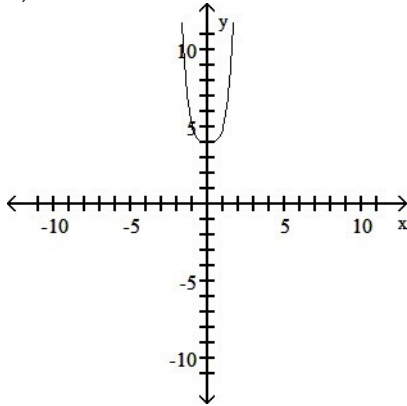
1) Yes; degree 3

2) Yes; degree 2

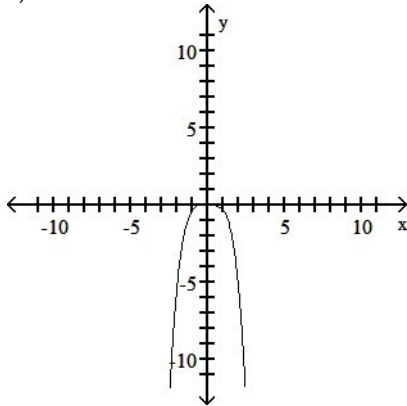
3 a)



b)



c)



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

5) a) -1, multiplicity 1, crosses x-axis; -2, multiplicity 3, crosses x-axis

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

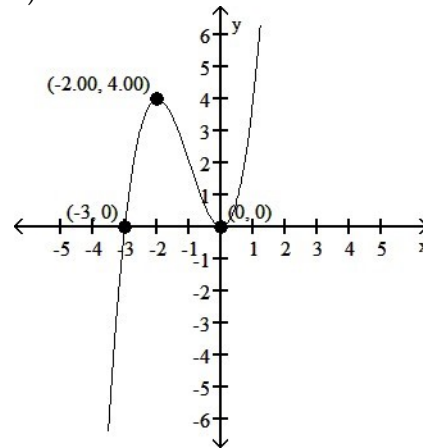
6) a) x-intercepts: -3, -2, 2; y-intercept: -12

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

7) a) 6

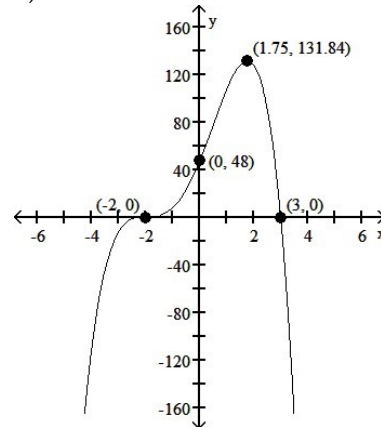
b) 2

8)



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

b)



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

9)  $R = 16$

10) a) yes

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

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

12) a)  $x = -3, -1, 2$

$f(x) = (x + 3)(x + 4)(x - 2)$

b)  $x = -2, -3, -4$

$f(x) = (x + 2)(x + 3)(x + 4)$

13)  $\left\{ \frac{1}{2}, \pm \sqrt{10} \right\}$

14)  $x = -2, 2 \pm \sqrt{6}$ ,

$f(x) = (x + 2)(x - 2\sqrt{6})(x - 2 - \sqrt{6})$

15) a)  $5 + 5i, -2i$

b)  $4 + i$

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

17) a)  $x = 1, \pm 5i$ ,

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

b)  $x = 2, 3 \pm 2i$ ,

$f(x) = (x - 2)(x - 3 + 2i)(x - 3 - 2i)$

19) a)  $\{x \mid x \neq -1, x \neq 1\}$

b) all real numbers

20) a)  $x = -8, x = 8$

b) none

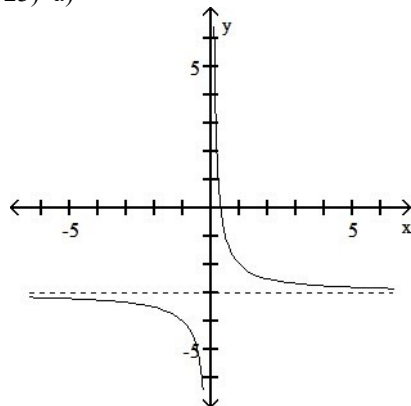
21) a)  $y = 4$

b)  $y = 0$

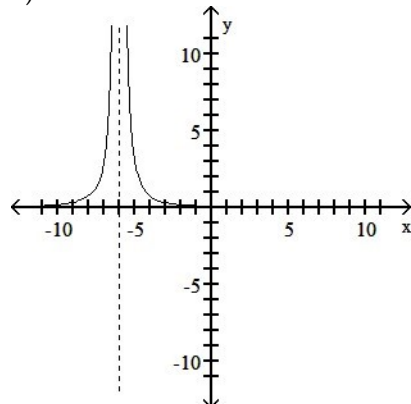
c)  $y = -1$

22) a)  $y = x + 10$

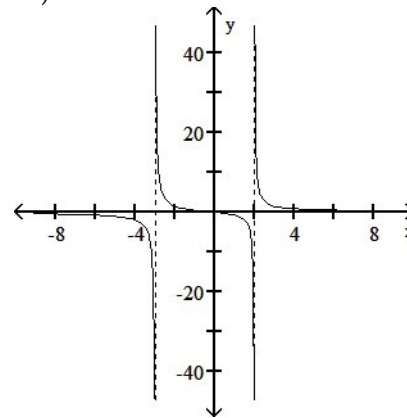
23) a)



b)



24)



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

26) a)  $(-\infty, -6) \cup (-3, -1)$

b)  $(6, \infty)$

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

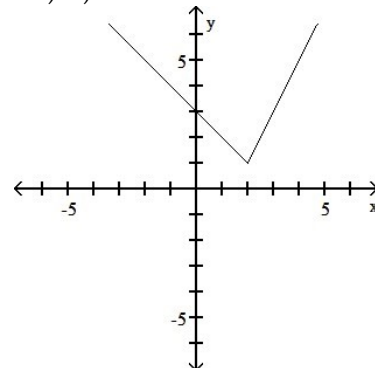
d)  $(-2, 1)$

27) even

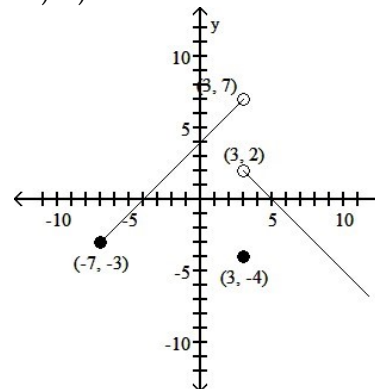
b) neither

c) odd

28) a)



28) b)



29)  $5x^2 - 8x + 9$

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

31) 3

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

local minimum at  $(2.67, -3.48)$

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

decreasing on  $(0, 2.67)$