

Chapter 14 answers

14.1

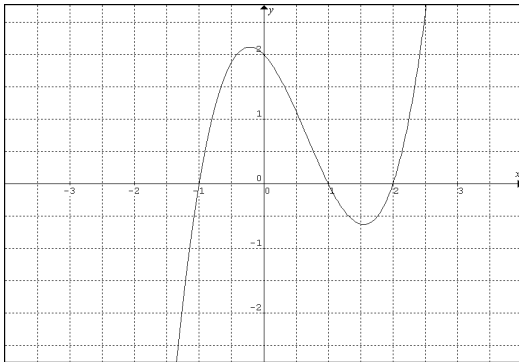
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|---|--|---|---|--------------------------------|
| 1. Yes | 3. No | 5. Yes | 7. No | 9. Yes |
| 11. 2 multiplicity 1, -1 multiplicity 1 | 13. 3 multiplicity 1, -4 multiplicity 2 | 15. 1 multiplicity 3, -2 multiplicity 2 | | |
| 17. $-7/3$ multiplicity 3, -3 multiplicity 3 | 19. 0 multiplicity 3, $1/6$ multiplicity 2, 4 multiplicity 4 | | | |
| 21. $-1/2$ multiplicity 2 | 23. 0 multiplicity 2, -1 multiplicity 2 | 25. 2 multiplicity 2, -2 multiplicity 1 | | |
| 27. $\{2, 1, -1\}$ | 29. $\{3, 1, -2\}$ | 31. $\{1, -1 \pm \sqrt{6}\}$ | 33. $\{3, 1, -\frac{2}{3}\}$ | 35. $\{\frac{1}{3}, 1 \pm i\}$ |
| 37. $\{2, -1, \frac{1}{3}, -\frac{1}{3}\}$ | 39. $\{5, 0\}$ | 41. $\{3, -4\}$ | 43. $\{4, -\frac{1}{3}, \frac{-1 \pm \sqrt{17}}{4}\}$ | |
| 45. $\{-\frac{2}{3}, \frac{1}{2}, \frac{3 \pm i\sqrt{11}}{2}\}$ | 47. $\{-2, 1, 3, \pm\sqrt{6}\}$ | 49. $\{-2, 2, \frac{1}{2}, \pm i\}$ | | |

14.2

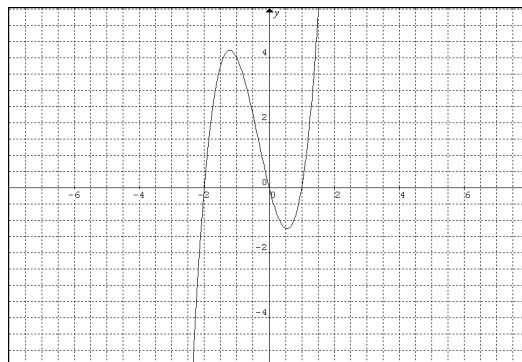
- | | | | |
|--|---|---|---|
| 1. $\pm 1, \pm 2, \pm 3, \pm 6$ | 3. $\pm 1, \pm 3, \pm \frac{1}{2}, \pm \frac{3}{2}$ | 5. $\pm 1, \pm \frac{1}{2}, \pm \frac{1}{4}$ | 7. $\pm 1, \pm \frac{1}{2}, \pm 5, \pm \frac{5}{2}, \pm 25, \pm \frac{25}{2}$ |
| 9. $\pm 1, \pm \frac{1}{3}, \pm 2, \pm \frac{2}{3}, \pm 3, \pm 6, \pm 9, \pm 18$ | 11. $\pm 1, \pm \frac{1}{3}, \pm \frac{1}{9}, \pm 2, \pm \frac{2}{3}, \pm \frac{2}{9}, \pm 3, \pm 4, \pm \frac{4}{3}, \pm \frac{4}{9}, \pm 6, \pm 12$ | 13. $\{1, -3, \frac{1}{2}\}$ | 15. $\{\frac{1}{2}, \pm i\sqrt{3}\}$ |
| 17. $\{2, -1, \pm\sqrt{3}\}$ | 19. $\{0, 3, \frac{-1 \pm i\sqrt{3}}{2}\}$ | 21. $\{1 \pm i\sqrt{2}, \pm\sqrt{7}\}$ | 23. $\{2 \pm i, \pm 3i\}$ |
| 25. $\{1, \pm 2\sqrt{2}, \pm i\}$ | 27. $\{1 \pm \sqrt{2}, 1, -1\}$ | 29. $\{\pm 2i, 1, -2\}$ | 31. $f(x) = x^3 - 4x^2 + 2x + 4$ |
| 33. $f(x) = 3x^4 + 11x^3 - 22x^2 - 66x + 24$ | 35. $f(x) = 3x^4 - x^3 - 20x^2 - 24x - 8$ | 37. $f(x) = 2x^5 - 21x^4 + 72x^3 - 87x^2 + 28x$ | |
| 39. $f(x) = x^6 + 14x^4 + 49x^2 + 36$ | | | |

14.3

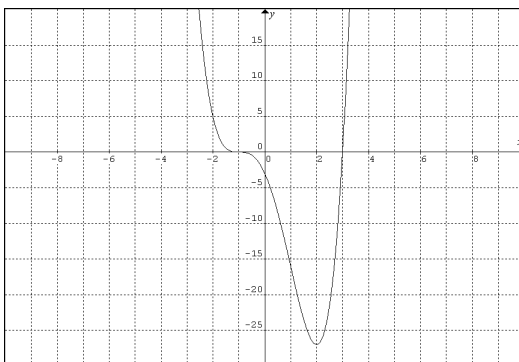
1.



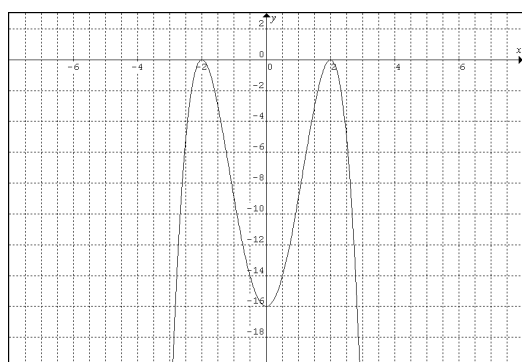
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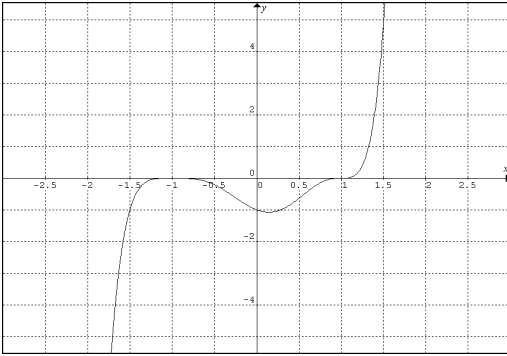
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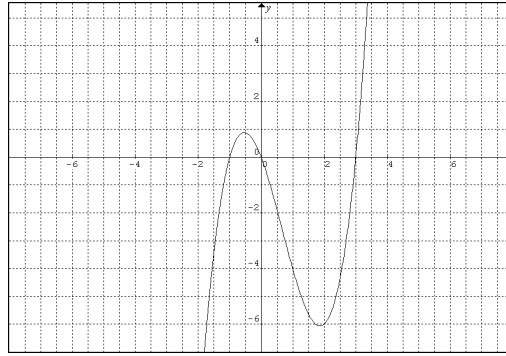
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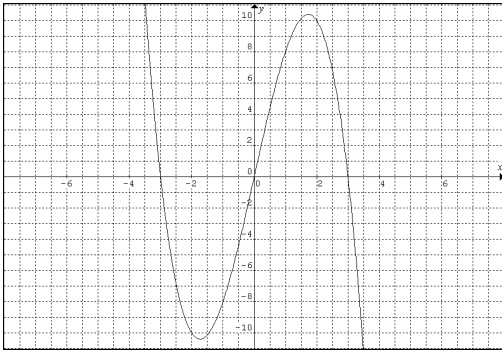
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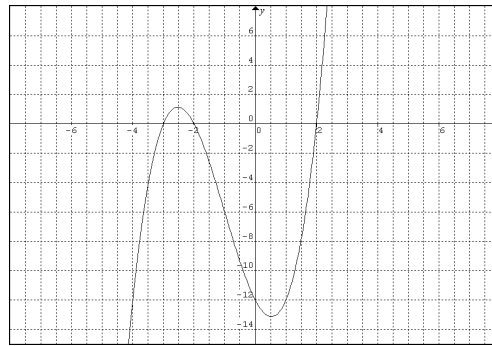
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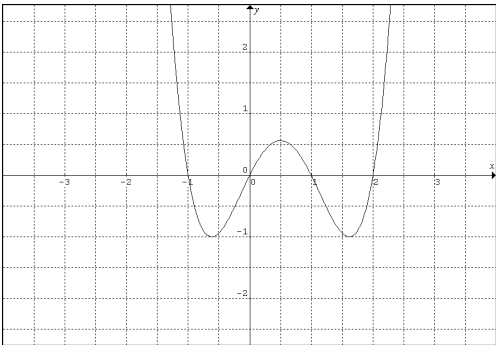
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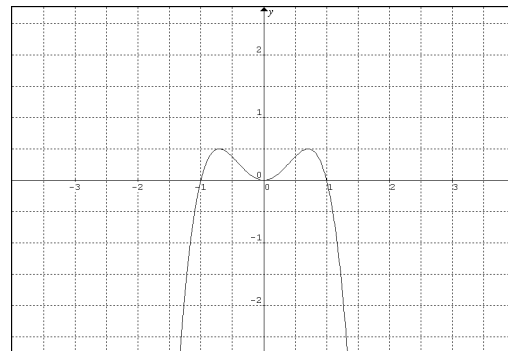
15.



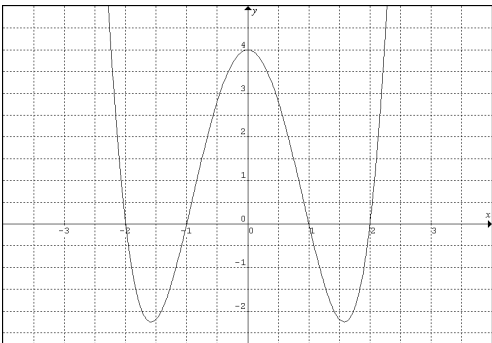
17.



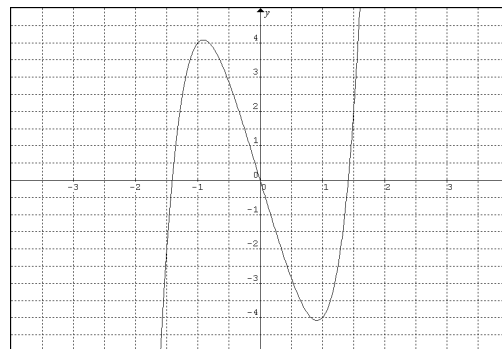
19.



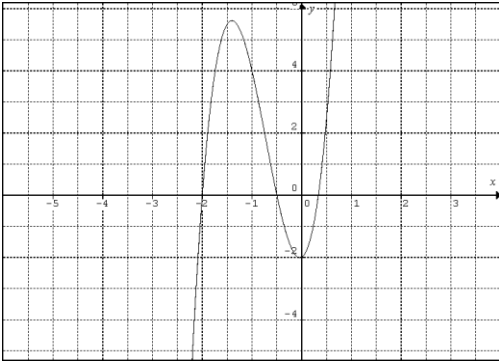
21.



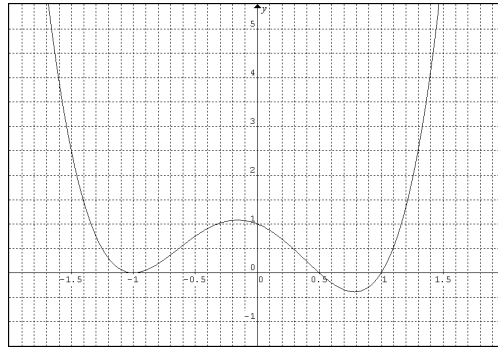
23.



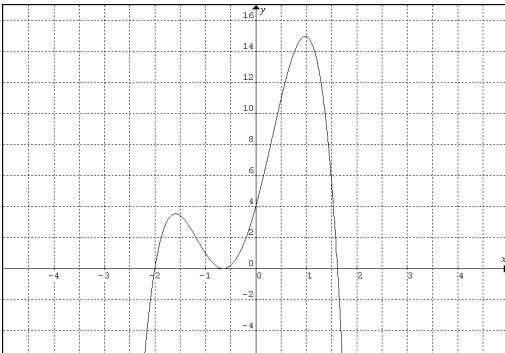
25.



27.

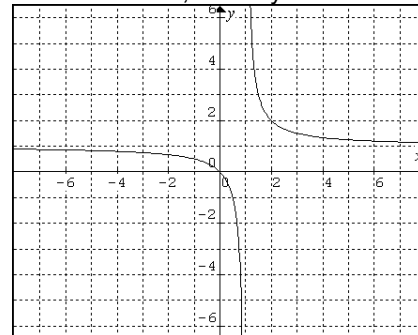
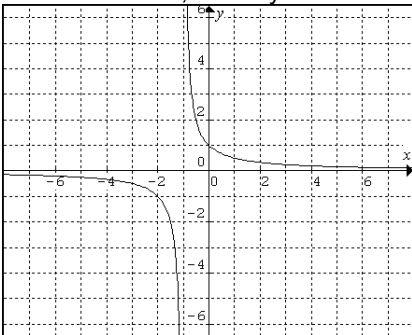


29.

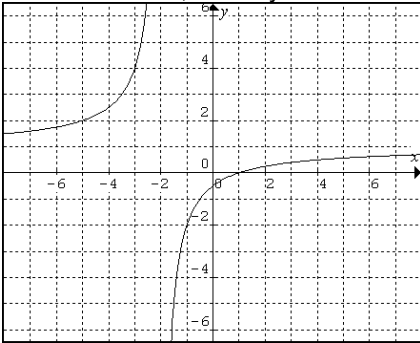


14.4

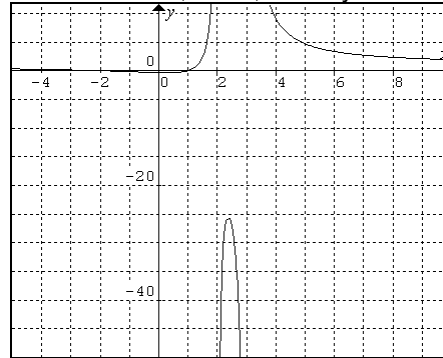
- | | |
|--|--|
| 1. vertical: $x = 1$, horizontal: $y = 0$ | 3. vertical: $x = 1/3$, horizontal: $y = 2/3$ |
| 5. vertical: $x = -1$, $x = 2$, horizontal: $y = 0$ | 7. vertical: $x = 4$, $x = -2$, horizontal: $y = 0$ |
| 9. vertical: $x = -3/2$, $x = 4$, horizontal: none | 11. vertical: $x = 0$, $x = 2$, horizontal: none |
| 13. vertical: $x = -1$, $x = 1$, horizontal: $y = 0$ | 15. vertical: $x = -1$, $x = 0$, horizontal: none |
| 17. x-int: none, y-int: $-2/3$ | 19. x-int: 1, y-int: -1 |
| 23. x-int: -2, 2, y-int: $4/5$ | 21. x-int: 0, 1, y-int: 0 |
| 29. x-int: 0, -2, 10, y-int: 0 | 25. x-int: 0, y-int: 0 |
| | 27. x-int: -5, 5, -2, 2, y-int: none |
| 31. x-int: none, y-int: 1
vert: $x = -1$, horiz: $y = 0$ | 33. x-int: 0, y-int: 0
vert: $x = 1$, horiz: $y = 1$ |



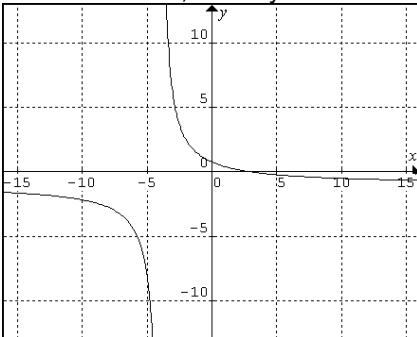
35. x-int: 1, y-int: -1/2
vert: $x = -2$, horiz: $y = 1$



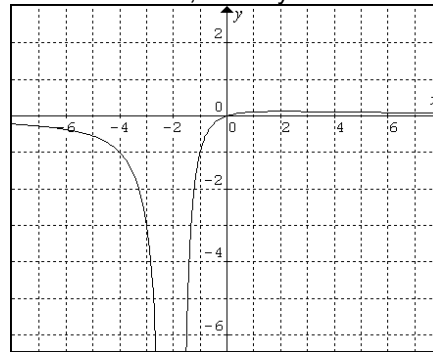
43. x-int: 1, -2, y-int: -1/3
vert: $x = 2$, $x = 3$, horiz: $y = 1$



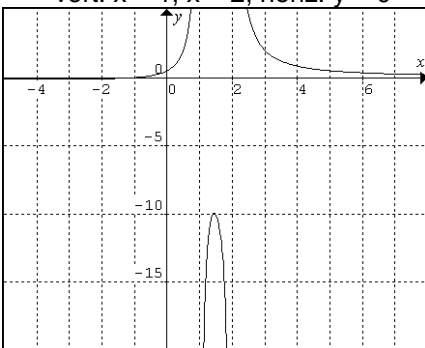
37. x-int: 3, y-int: 3/4
vert: $x = -4$, horiz: $y = -1$



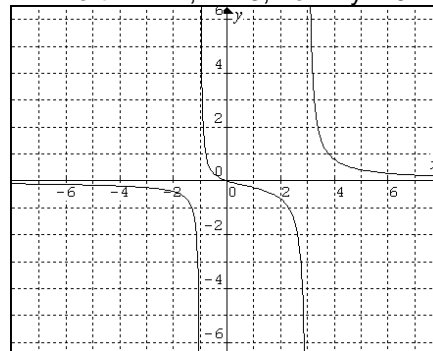
45. x-int: 0, y-int: 0
vert: $x = -2$, horiz: $y = 0$



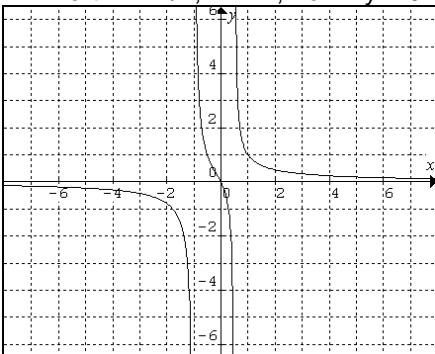
39. x-int: -1, y-int: 1/2
vert: $x = 1$, $x = 2$, horiz: $y = 0$



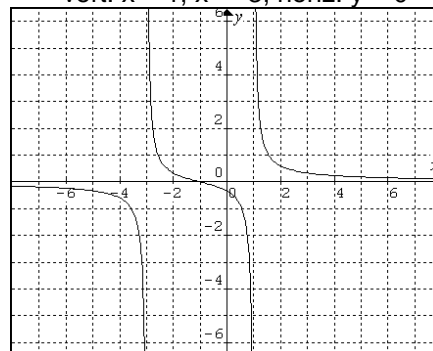
47. x-int: 0, y-int: 0
vert: $x = -1$, $x = 3$, horiz: $y = 0$



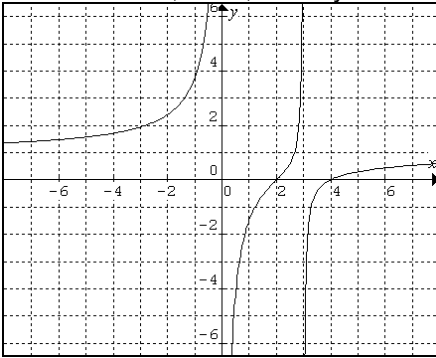
41. x-int: 0, y-int: 0
vert: $x = 1/2$, $x = -1$, horiz: $y = 0$



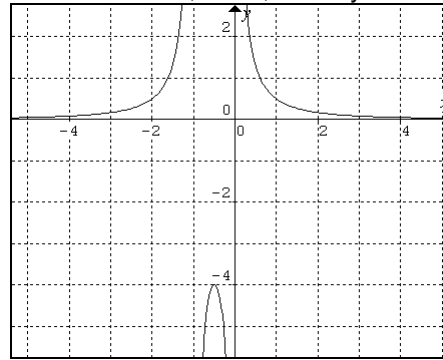
49. x-int: -1, y-int: -1/3
vert: $x = 1$, $x = -3$, horiz: $y = 0$



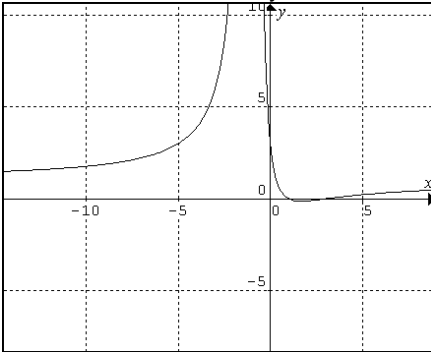
51. x-int: 2, 4, y-int: none
 vert: $x = 0$, $x = 3$, horiz: $y = 1$



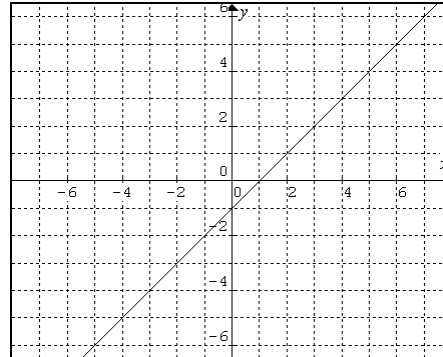
59. x-int: none, y-int: none
 vert: $x = -1$, $x = 0$, horiz: $y = 0$



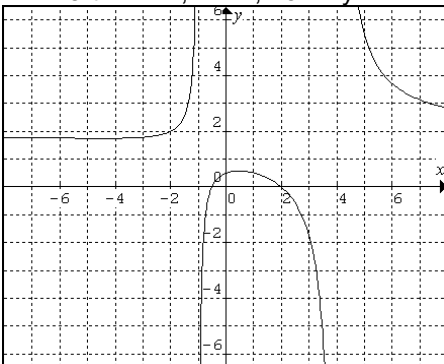
53. x-int: 3, 1, y-int: 2
 vert: $x = -1$, horiz: $y = 1$



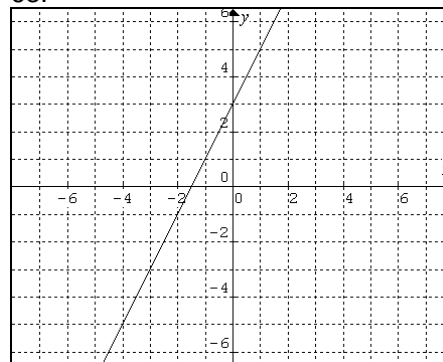
61.



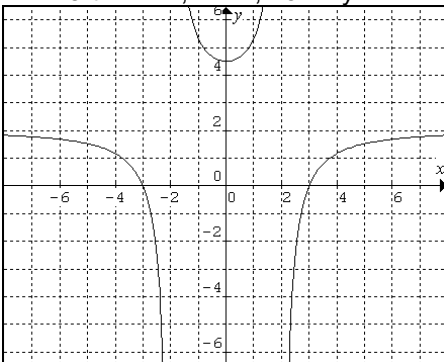
55. x-int: $-1/2$, 2, y-int: $1/2$
 vert: $x = -1$, $x = 4$, horiz: $y = 2$



63.



57. x-int: -3, 3, y-int: $9/2$
 vert: $x = -2$, $x = 2$, horiz: $y = 2$



65.

