Lecture 1 Answers

1. $\frac{1}{21}$
2. $\frac{1}{20}$
3. $\frac{1}{2}$
4. $\frac{19}{10}$
5. $\frac{7}{4}$
6. $\frac{39}{175}$
7. $\frac{25}{77}$
8. DNE
9. $5a + 55$
10. $6 \cdot 9^8$
11. -16 , 16
12. whole number
    integer
    rational number
    real number
13. irrational number
    real number
14. 11

    $11, -5, 0$

    $11, -5, 0, -\frac{13}{4}, 5.75$

    $\sqrt{11}, \pi$

    $11, -5, 0, -\frac{13}{4}, 5.75, \sqrt{11}, \pi$

15. 0.7
16. 0.7
17. 0.9
18. 0.72
19. Expression
20. Equation
21. $-\frac{1}{4}$
22. 13 $\frac{2}{3}$ 0
23. $-x + 10$ $7x - 9$

24. $[4,19)$ $[5,\infty)$

Lecture 2 Answers

1. z^{25}
2. $\frac{1}{z^5}$
3. $33 \cdot z^8$
4. $\frac{10}{9d}$
5. $4 \cdot x^1 \cdot y^5$
6. a. 9,-9 b. 9
7. -10
8. DNE
9. $\frac{3}{10}$
10. 5
11. 3
12. $6\sqrt{5}$
13. x^4
14. $k^{10}\sqrt[3]{k^2}$
15. $2\sqrt{3a}$
16. $\sqrt{175x^8y^{11}}$ can be simplified as $5x^4y^5\sqrt{7y}$
17. $-2y^{11}$
18. $\frac{5c^7}{2b^4}$
19. $2xy\sqrt[3]{2xy^2}$
20. $4\sqrt[3]{2}$
21. $-5\sqrt{10}$
22. These are not like terms and cannot be combined
23. $-6\sqrt[3]{3}$
24. $20\sqrt{6} \sim 49.0 \sim 144$
25. $105\sqrt{3}$
26. $\frac{4\sqrt{2}}{5k^3n}$
27. $2\sqrt{15} \sim 15$
28. $\sqrt{6} \sim 6$
29. $-4\sqrt{2}$

30. $\frac{\sqrt{165}}{11}$
31. $\frac{\sqrt{5x}}{x^2}$
32. $\frac{15\sqrt{x}}{x}$
33. 9 ~ 14
34. $\sqrt[4]{x}$
35. $\frac{1}{256}$
36. $\frac{1}{\sqrt[10]{x^7}}$
37. 625
38. $8^{\frac{7}{8}}$

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Lecture 3 Answers

1. $-3x^2 + x - 6$
2. $6x^6 - 15x^5$
3. $4x^4 + x^3 + 9x + 10$
4. $8x^2 + 2x - 2$
5. $2 \cdot x^2 - 12 \cdot x + 10$
6. $49 \cdot x^2 - 70 \cdot x + 25$
7. $18 \cdot r^3 - 84 \cdot r^2 - 144 \cdot r$
8. $-3(2x^8 + x^5 + 3)$
9. $2x^6(7x^3 + 3x^2 + 11)$
10. $(x + 1)(x - 3)$
11. $(z + 8)(z + 9)$
12. $(w^2 + 10)(w - 3)$
13. $(y + 4)(y - 2)$
14. $(6z - 5)(z + 7)$
15. Hint: You first need to take out the greatest common factor of $2w$. Then, you can factor as $2w(w + 5)(w - 9)$.
16. $-\frac{10}{3}, -\frac{7}{5}$
17. 0,8
18. 5,-5
19. $-\frac{2}{9}, -10$
20. $x(x + 2) = 99$, 9,11 , -11,-9
21. 5,-5,4
22. $-4\sqrt{11}, 4\sqrt{11}$, DNE
23. $-2 + 2\sqrt{6}, -2 - 2\sqrt{6}$
24. $ax^2 + bx + c = 0$
25. $1, -\frac{5}{2}$
26. $\frac{5+\sqrt{37}}{6}, \frac{5-\sqrt{37}}{6}$
27. 81 , $(x + 9)^2$
28. 9 , 9
29. $(x + 9)^2 = 4$, -7,-11
30. $\frac{9}{2}, -3$

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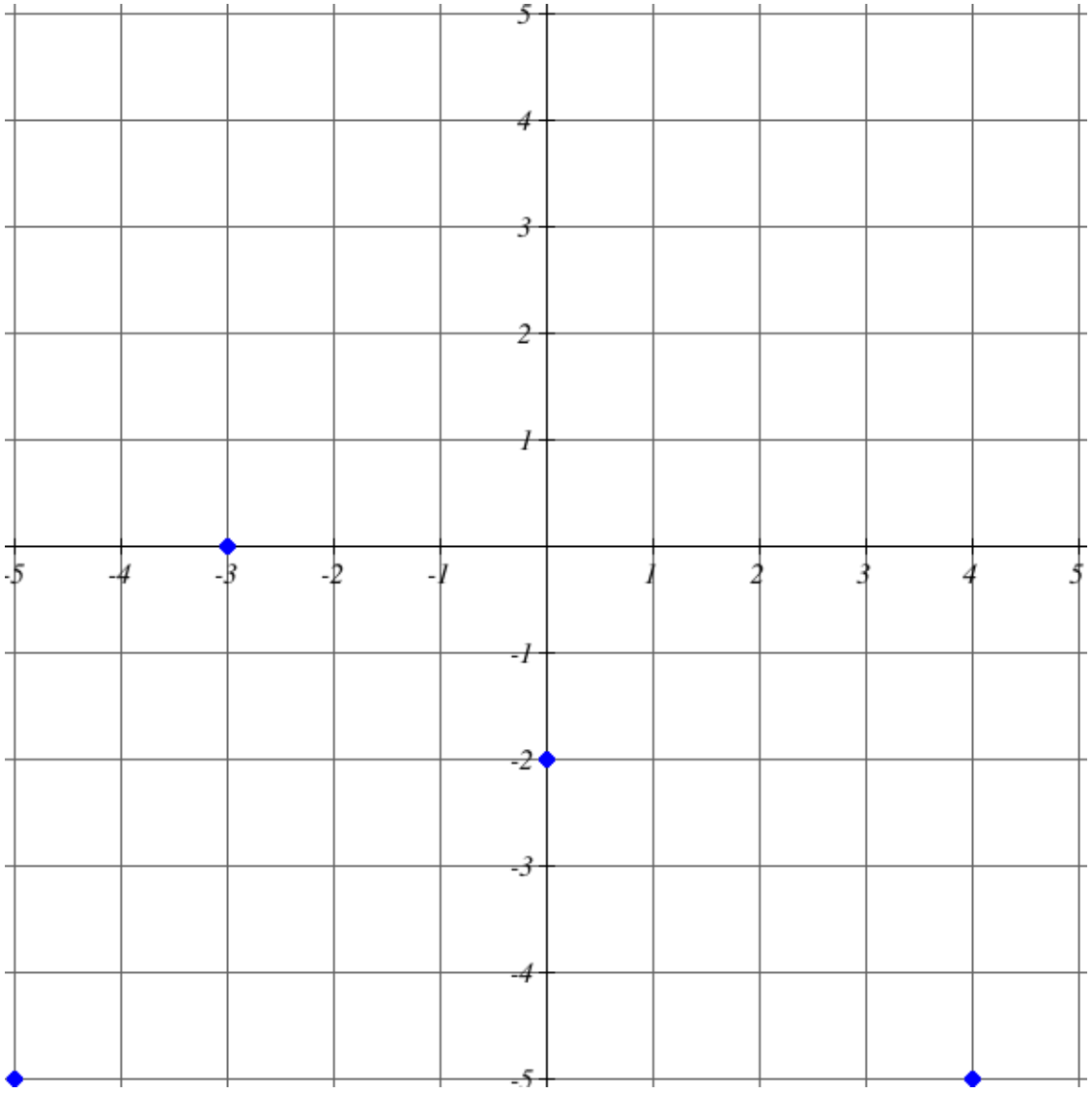
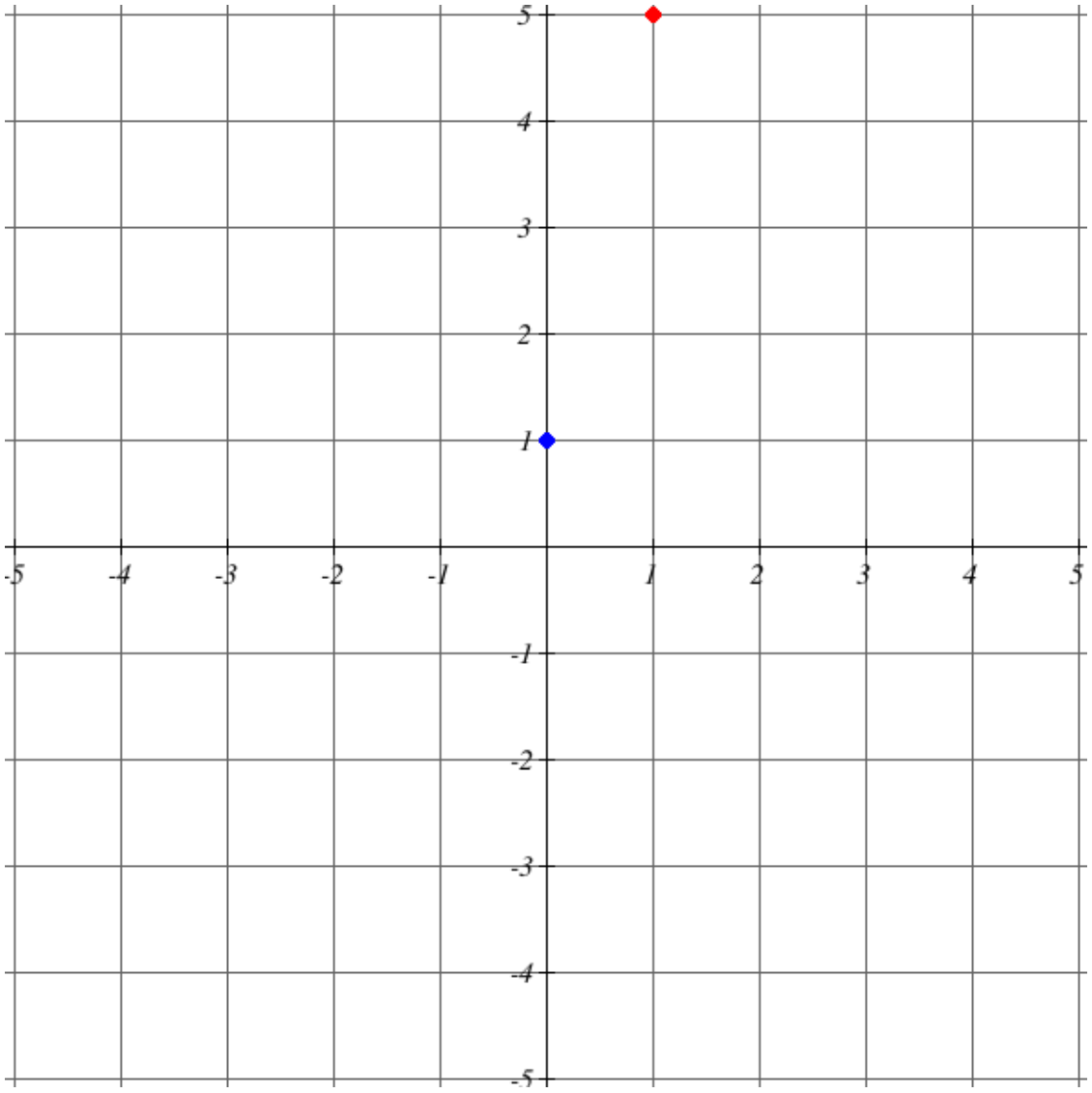
Lecture 4 Answers

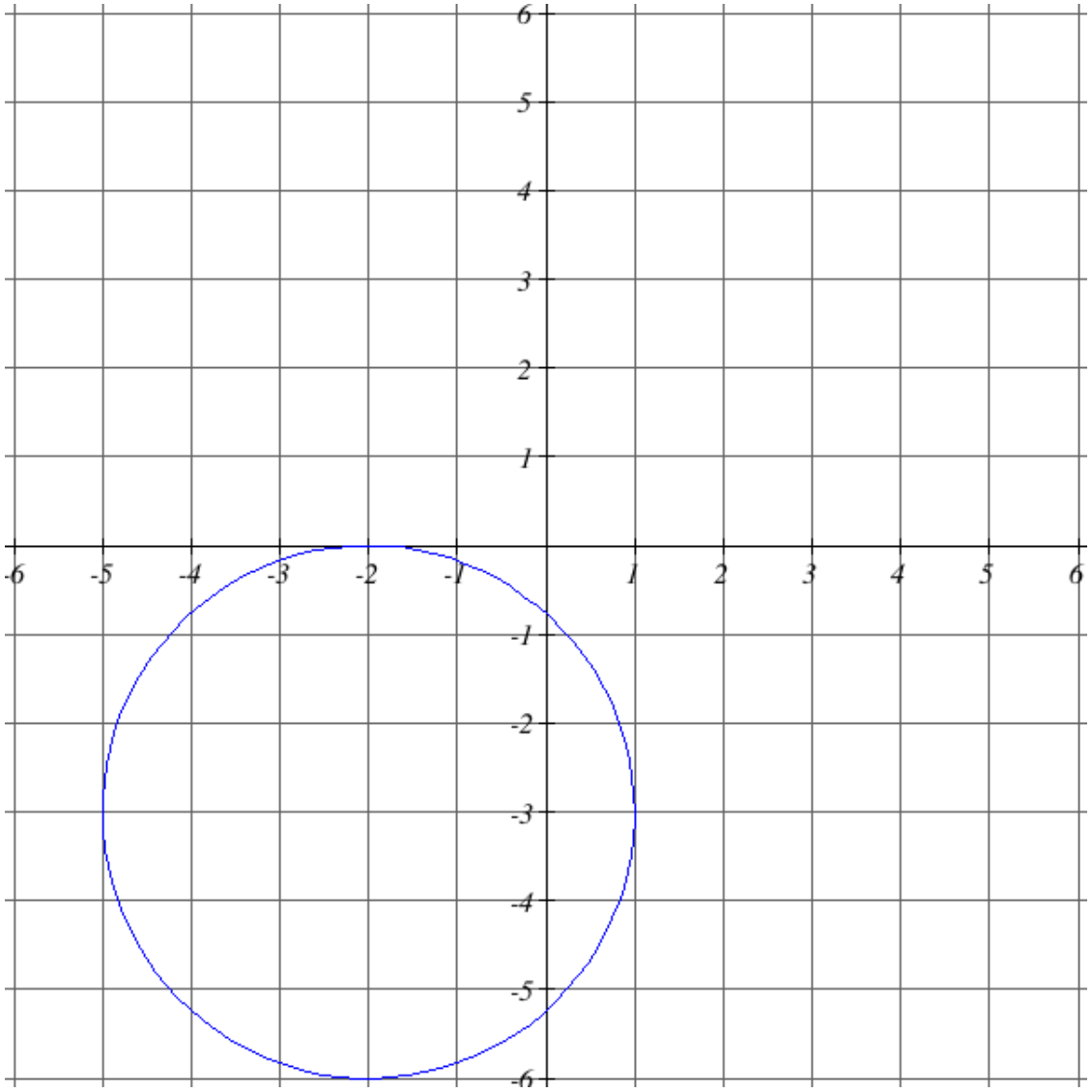
1. 

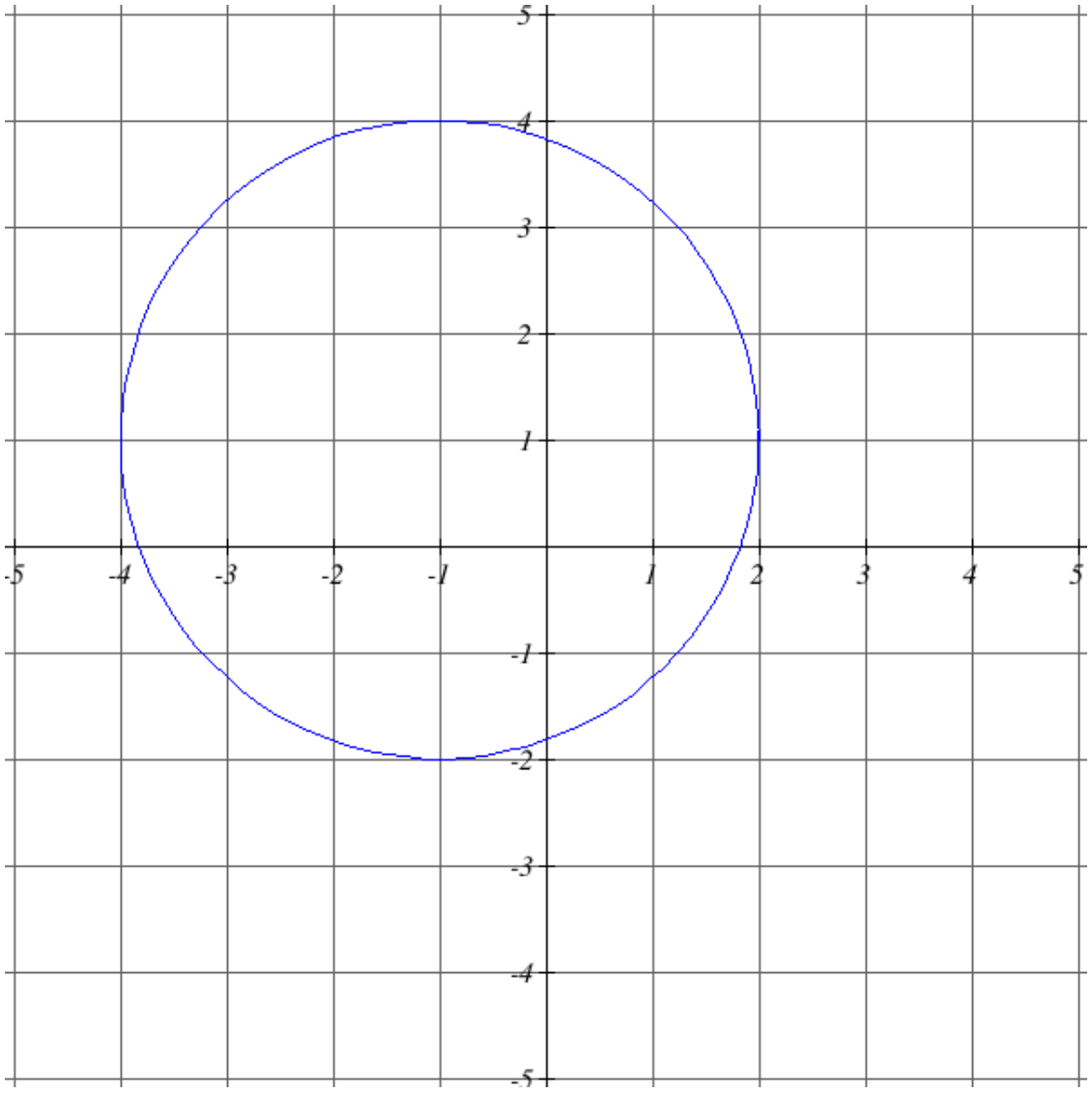
2. 

3. Quadrant II , Y-Axis , X-Axis , Y-Axis , Quadrant III , Quadrant IV
4. $(0.5,1)$
5. $\left(0,-\frac{5}{8}\right)$
6. 5
7. $\sqrt{34}$
8. $\sqrt{20}$
9. $10\sqrt{5}$
10. $3\sqrt{137}$
11. $x^2+(y-8)^2=12^2$
12. -1 , -9 , $\sqrt{26}$
13. 0.5 , -3 , $\frac{\sqrt{117}}{2}$
14. $(x+3)^2+(y-4)^2=9$

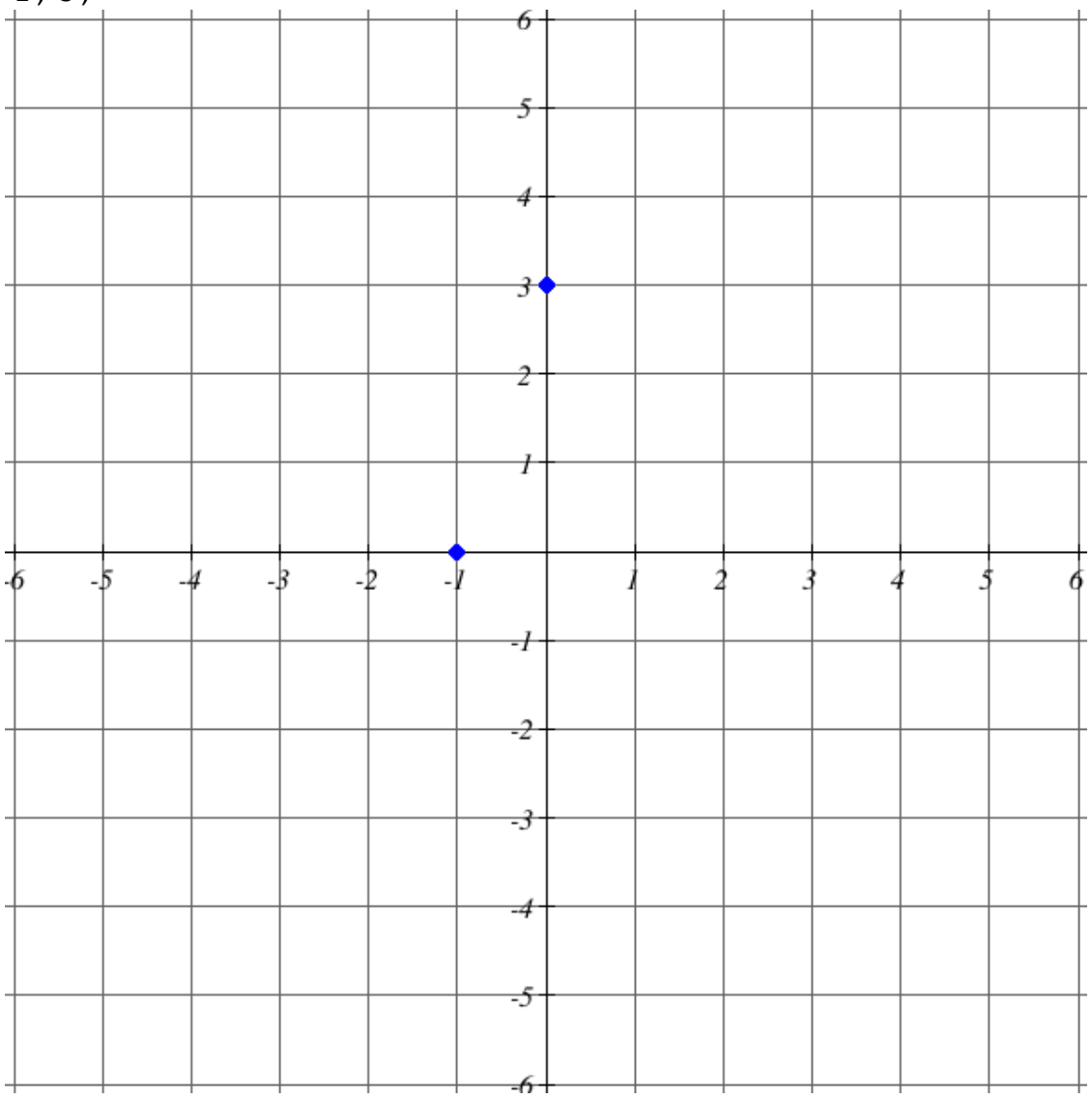
15. $x^2 + (y-4)^2 = 9$

16.



17. 

18. -1 , 3 ,



19. $(7,0), (-4,0)$
20. $(0,-10), (0,5)$
21. $\left(-\frac{1}{6}, 0\right)$
22. $(0,-4)$
23. $(12,-2)$
24. $(8,-3)$
25. $(-7,9)$
26. symmetry about the origin
27. symmetry about the x -axis
28. symmetry about the y -axis

29.

symmetry about the x -axis
symmetry about the y -axis
symmetry about the origin

30.

no symmetry

31. -2 , -1 , 0 , -1 , -2 ,

32. -0 , -1 , $-\sqrt{2}$

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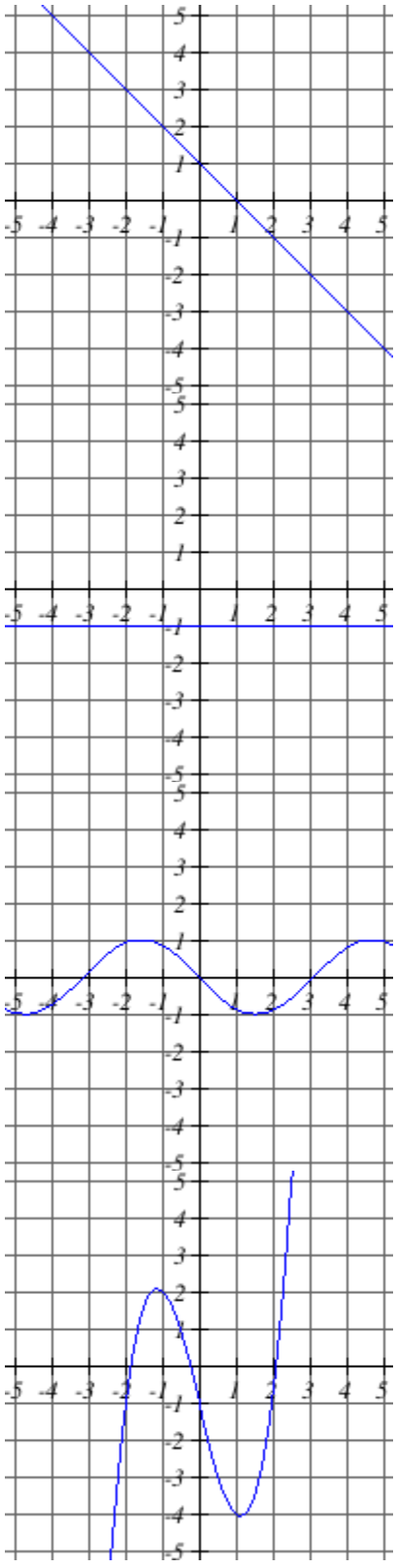
Lecture 5 Answers

1. 10,-21,-14,24 , -18,-21,19,-29
2. 1,-4,-1,-3,4 , -5,5,0,2,-3
3. -18,-20,7,-3,-7 , 12,-18,-9,16,-8 , Yes
4. 6
5. oo
6. $-4 < x \leq 1$, $-4 < y \leq 5$
7. -2 , 2 , 0 , 2
8. All real numbers , y ≥ 2
9. x ≤ 1 , y ≥ 3
10. $-6 \leq x \leq 0$, $-2 \leq y \leq 1$
11. 0
12. $\frac{27}{5}$
13. All real numbers
14. $(-7, -8)$
15. 39 , 15 , 3 , 3 , 15
16. There are an infinite number of possible correct answers based on the inputs you choose. Here is one: $g(1) = 4, (1,4)$
17. $(x - 17)^2$
18. $-\frac{14}{17}$
19. -6 , 9
20. -79 , 5,1
21. There are an infinite number of possible correct answers based on how you construct the function. Here is one:

x	-8	-5	2	3
$f(x)$	4	7	10	0

22. There are an infinite number of possible correct answers based on the function you create. Here is one: $f(x) = x^2 - 6$
23. -3
24. 1
25. 4 , -2
26. $11 \cdot x - 20$
27. 8 is added to n and the result is squared
28. x is squared and 5 is added to the result
29. 85.5 , $T(29)$ is the estimated high temperature on April 30

30. $f(45) = 5$
31. $f(x) = 5x + 7$
32.



33.

x	y
-2	-4
3	2
6	5
7	8
14	15

x	y
0	-1
1	2
4	2
8	9
11	10

34. 78 , 1
35. -66 , -48
36. {x | x ≠ -10 and x ≠ 1}
37. [-5,3]
38. -1 , 2 , 6
39. [-5,-3] , (-3,2] , (2,6]

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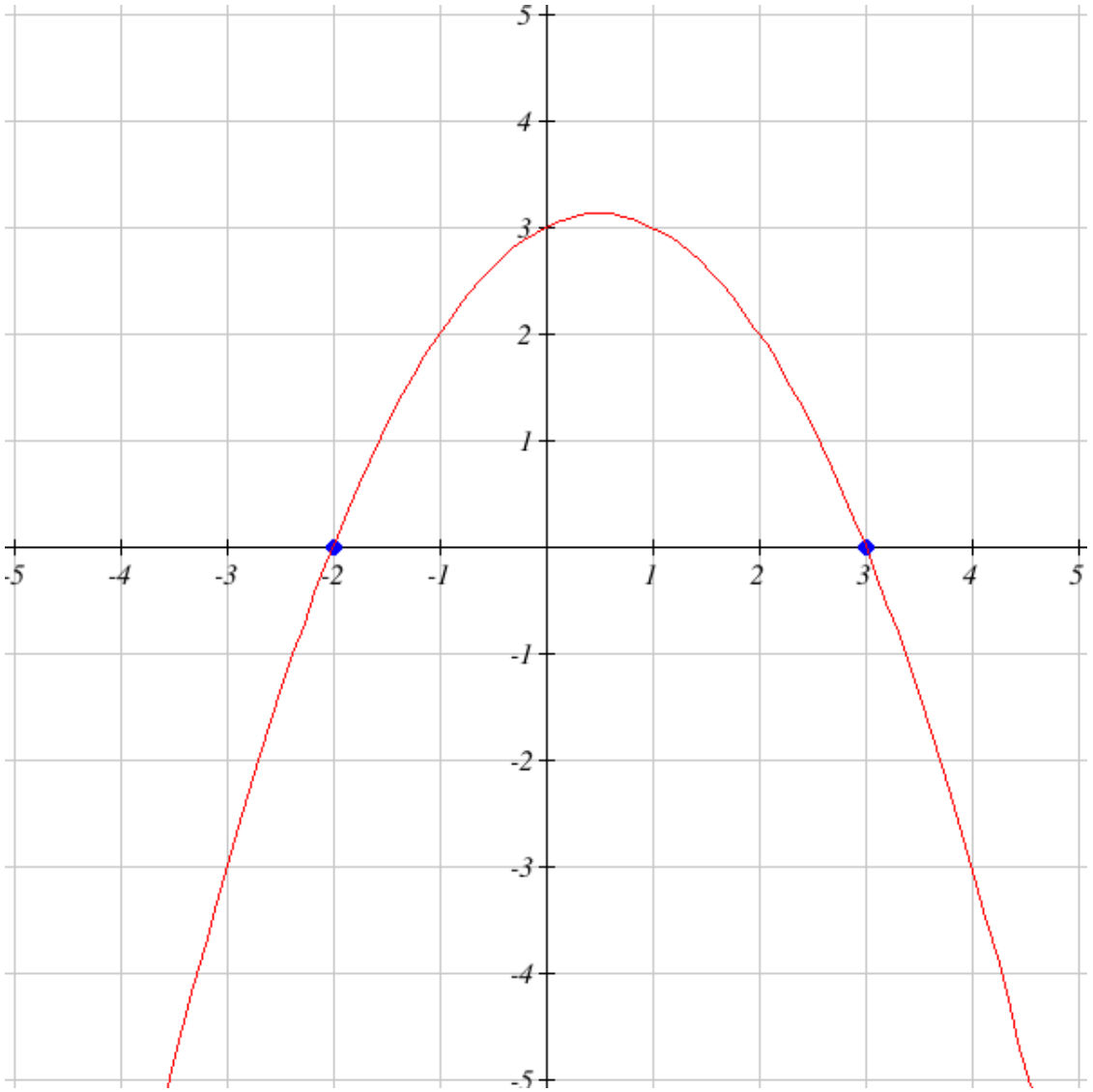
Lecture 6 Answers

1. 

, -2,3
2. $(-2,0),(4,0)$, -2,4
3. $-2,1,2$, $(-2,1) \cup (2,\infty)$, $(-\infty,-2) \cup (1,2)$
4. $-3,-2,1$, $(-\infty,-3) \cup (-2,1)$, $(-3,-2) \cup (1,\infty)$
5. -3 , $(-\infty,-3) \cup (-3,\infty)$, DNE
6. $\frac{339-297}{2000-1999} = 42$, $\frac{339-297}{2006-1999} = 6$
7. -0.43301270189222
8. -14
9. $4t + 20$
10. $(-2.5,1)$, $(-\infty,-2.5) \cup (1,\infty)$
11. minimum , -2 , 2 , $(2,\infty)$, $(-\infty,2)$
12. -1 , 2.5
13. $(0,1) \cup (6,\infty)$
14. $(-\infty,-3)$, $(3,\infty)$, $(-3,3)$, $(-\infty,\infty)$, $(-\infty,3]$
15. 0 , -7 , -8 , 1 , $(-\infty,-7) \cup (1,\infty)$, $(-7,1)$, $(-\infty,\infty)$, $(-\infty,\infty)$

16. $(0,4)$, $(3,-5)$
17. $(-3,-2.25), (-0.5,0.35416666666667)$
18. 7 , 3 , 4 , 0 , $(0,3)$, $(-\infty,0) \cup (3,\infty)$, $(-\infty,\infty)$, $(-\infty,\infty)$
19. minimum , -4 , -1 , $(-1,\infty)$, $(-\infty,-1)$, $(-\infty,\infty)$, $[-4,\infty)$
20. Decreasing , Concave up
21. (-oo,3) , (3,oo) , $(3,-2)$
22. (-oo,-1) , (-1,oo) , $(-1,4)$
23. $-2,0$
24. $1,3$
25. $-2,0$
26. DNE , $(-\infty,\infty)$, DNE , $(-\infty,\infty)$, DNE , $(-\infty,\infty)$, DNE
27. DNE , $(-\infty,\infty)$, DNE , DNE , $(-\infty,\infty)$, $(-\infty,\infty)$, DNE

28 – 34. Answers are not unique. There are an infinite number of possible correct answers.

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Lecture 7 Answers

1. 0 , 27 , 36 , 2
2. 36 , 44 , -160 , -10
3. $f(2) = -4$, $f(4) = -1$, $g(3) = -1$, $g(4) = 9$, $(f-g)(-1) = -6$, $(f-g)(2) = -5$, $(f+g)(1) = -5$, $(f+g)(3) = -6$
4. False
5. $2 \cdot x^2 + 4 \cdot x + 4$
6. $6x^3 + 12x^2 + 6x$
7. 2 , 0 , 2 , 4 , -2 , 6 , 4 , 2 , -2 , 0 , 2 , 0
8. 4 , 4 , 3 , -2
9. $x^2 + 3x - 28$, $x^2 + 1x - 20$, $x^3 - 2x^2 - 32x + 96$, $x + 6$
10. False
11. True
12. $x + 5$, 4
13. $x \neq -5,8$
14. 9 , 7 , 8 , 1
15. $(f \circ g)(-5) = -10$, $(g \circ f)(-10) = 12$, $(f \circ f)(-3) = -3$, $(g \circ g)(12) = 6$
16. 0 , 1 , 3 , 2
17. 10 , 30 , 8 , 7
18. Evaluate $C\big(D(7)\big)$
19. 10 , -55
20. $-48x - 11$, $-48x + 17$, $64x - 27$, $36x + 5$
21. $-50x^2 + 145x - 102$, $10x^2 + 25x + 6$, $-8x^4 - 40x^3 - 40x^2 + 25x$, $25x - 24$
22. $-32x^2 - 116x - 93$, $-8x^2 - 20x + 42$
23. $9x^2 + 6x + 3$
24. $x^4 + 10x^3 + 30x^2 + 25x$
25. $(0,2)U(2,\infty)$, $(-\infty,-2)U(2,\infty)$, $(0,\infty)$
26. $x^2 + 2xh + h^2 + 4x + 4h + 5$, $2xh + h^2 + 4h$
27. $64x + 63$
28. $\left(\sqrt{x} - 2\right)^4 + 2$
29. $\left(\sqrt{x} - 3\right)^4 + 8$
30. $x + 8$
31. $\frac{1}{x}$
32. There are many possible correct answers

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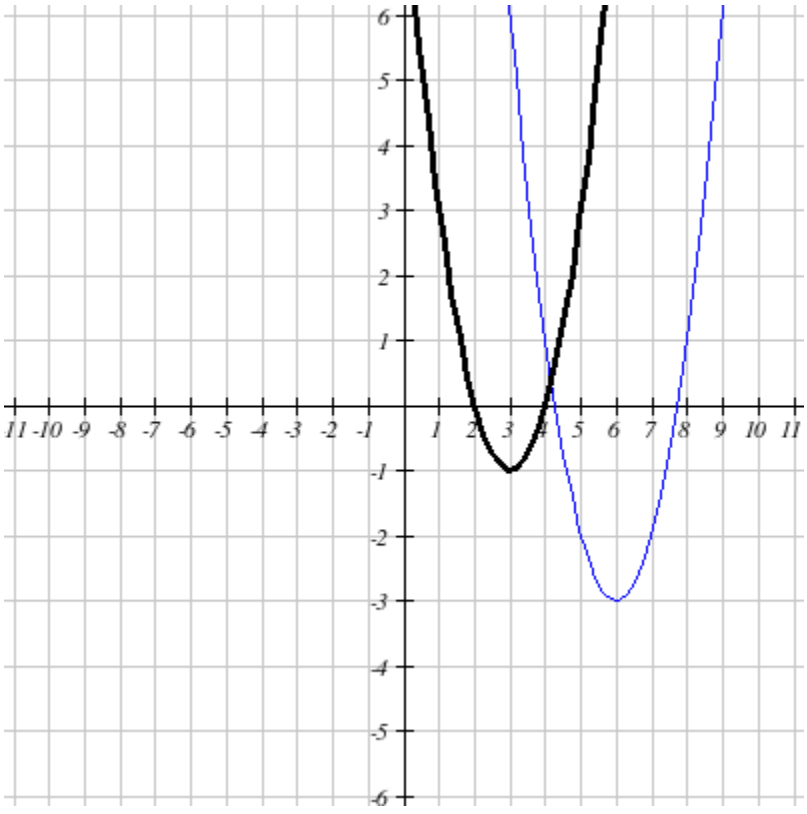
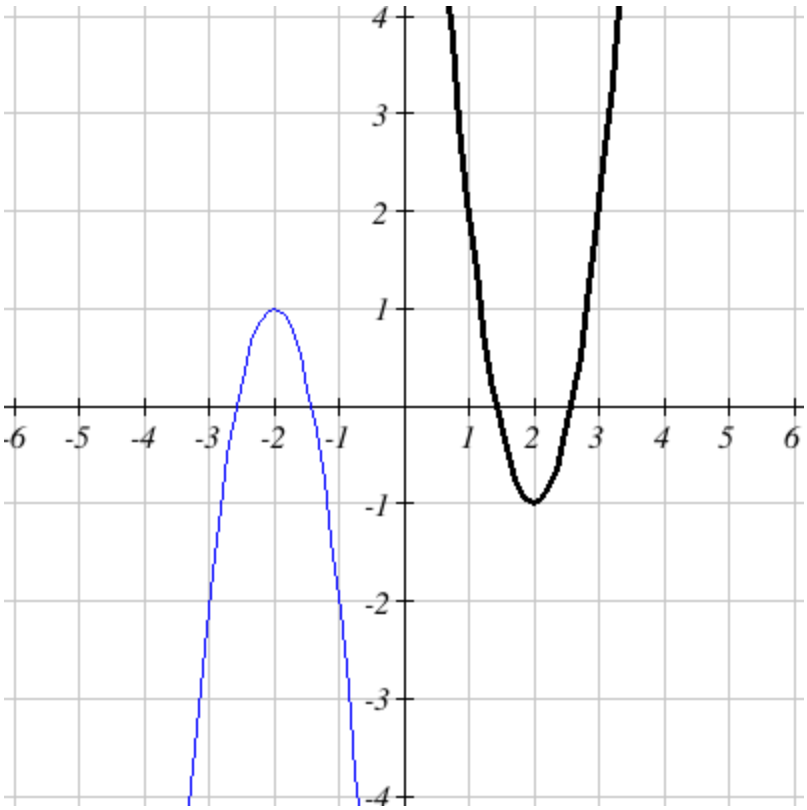
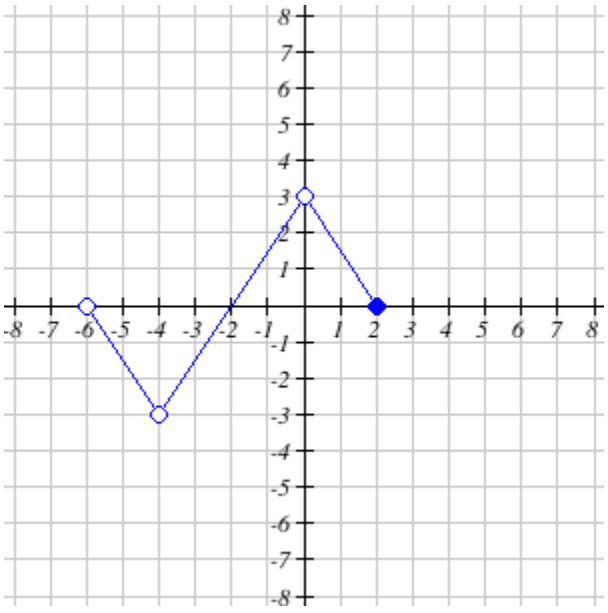
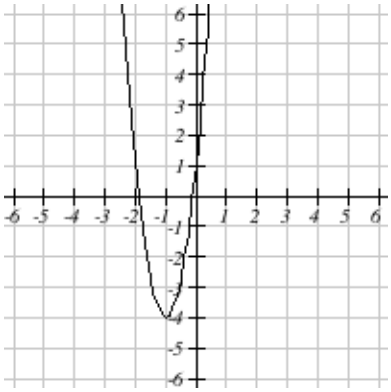
Lecture 8 Answers

1. c d e a b
2. f c b d a e
3. 6 , -8
4. shifting the graph of $f(x)$ to the left 98 units
5. $4 \cdot \sqrt{x-3} + 6$
6. $f(x-1)$, $f(x) - 1$
7. $f(x) - 1$
8. $x^3 + 4$
9. $(x+2)^4$
10. $3 \cdot \sqrt{x-5} + 6$
11. $(x-95)^2 + 32$
12. $x^2 + \frac{7}{3}x - 1$
13. $15x^2 - 3x - 30$
14. $4x^2 + 2x - 1$
15. $-2x^2 + 4x + 4$
16. $4^x + 6$, 4^{x-9} , 4^{-x}
17. horizontally stretching the graph of $f(x)$ by a factor 8
18. 9 , -2 , 2
19. $-\sqrt{x}$, $\sqrt{-x}$
20. a c b
21. $-(x+2)^2 - 3$
22. $-|x+1| + 2$
23.  , $(6,-3)$, $(x-6)^2 - 3$

24.  , $(-2,1)$, $-3 \cdot (x+2)^2 + 1$
25. $|x-3|-3$
26. 
27. $y = \sqrt[3]{x}$, No reflections , Vertical stretch by a factor of 5 , No vertical shift , Horizontal shift left 7 units
28. $y = \sqrt[3]{x}$, No reflections , Vertical compression by a factor of 3/4 , Vertical shift down 6 units , Horizontal shift left 8 units
29. $y = \sqrt[3]{x}$, Reflection across the y-axis , Vertical stretch by a factor of 8 , Vertical shift down 2 units , No horizontal shift
30. $y = |x+3|-1$
31. $|x+1|+1$

32. 
33. 2 , 1

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Lecture 9 Answers

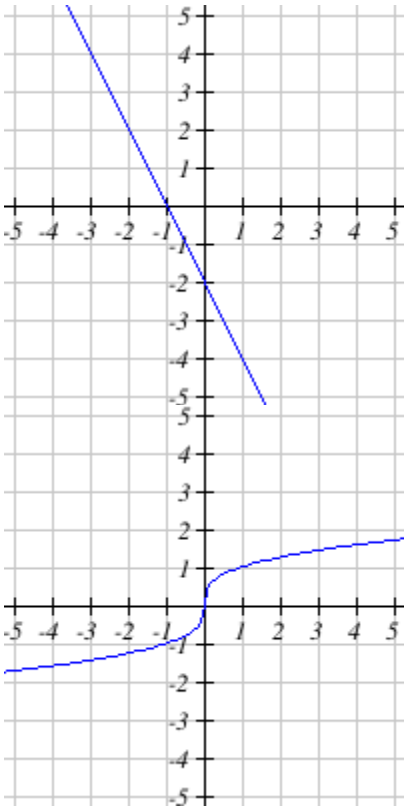
1.

$$R = \{(-3,0), (1,3), (4,6), (9,7), (11,13), (15,16)\}$$
$$S = \{(-5,0), (2,-6), (9,1), (-2,-7), (-3,-8), (8,4)\}$$
$$F = \{(-3,-2), (0,0), (1,3), (6,5), (9,7), (16,13)\}$$

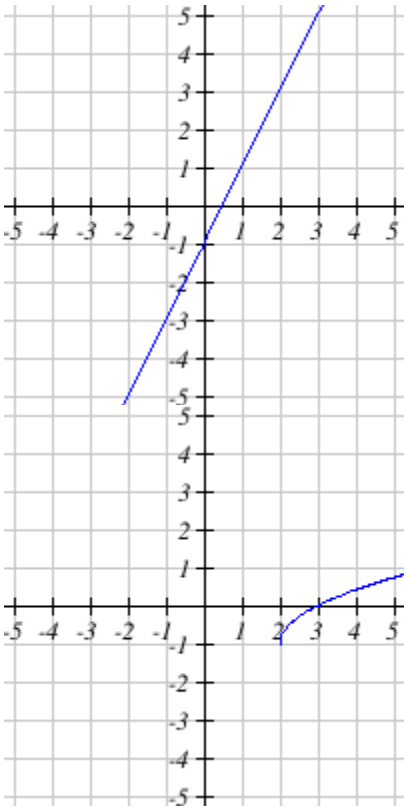
2.

x	5	6	13
y	2	8	11

3. True
4. When a horizontal line intersects the graph of a function more than once, it indicates that for that output there is more than one input, which means the function is not one-to-one.
5.



6.

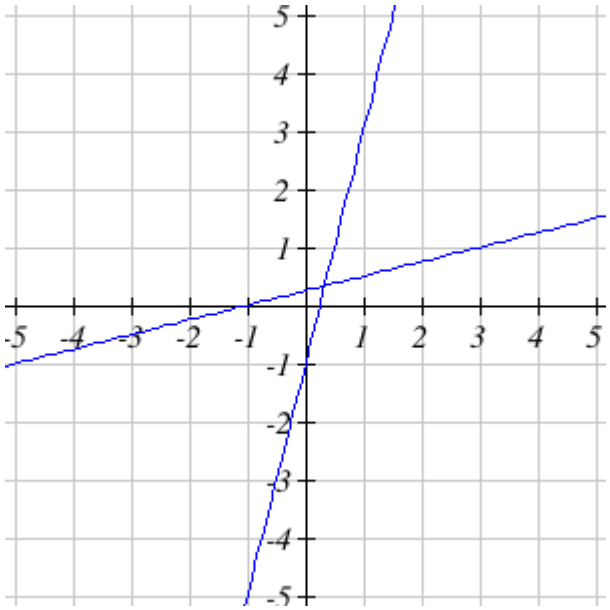


7. This relation is a one-to-one function
8. This relation is not a one-to-one function
9. False
10. False
11. -5 , $\frac{1}{6}$
12. 6 , -4
13. 6 , 4 , 5 , 8

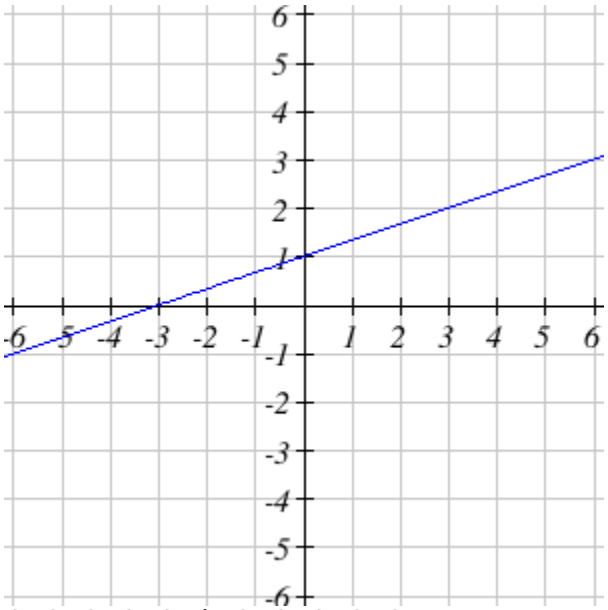
14. x	3	5	8	12	15
y	1	4	9	11	16

15. 2 , 4 , 4 , 2
16. x , x , inverse
17. No, they are not inverses
18. No, they are not inverses
19. Yes, they are inverse
20. $9 - x$
21. $\frac{x-2}{3}$
22. $(x-4)^3$
23. $(x-6)^3$
24. $\frac{x+6}{9}$, x
25. $\sqrt[8]{x}$ or $x^{1/8}$
26. $\sqrt[3]{x}$ or $x^{1/3}$
27. $4\,x$

28. $\sqrt[9]{\frac{x+2}{5}}$ or $\left(\frac{x+2}{5}\right)^{1/9}$
29. $[8, \infty)$, $\sqrt{x} + 8$
30. $\sqrt{\frac{x}{-5}}$, $x \leq 0$
31. $\frac{x+1}{4}$,



32.



33.