



COLLEGE ALGEBRA
FINAL EXAM REVIEW PACKAGE

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1. Write down your student email address that looks like **username@my.tnstate.edu**.
2. Write down your username. For example if your student email address is **johndaw5@my.tnstate.edu** then your username is **johndaw5**.
3. Create an Account in www.moodle.tnstate.edu by using the **SAME** username of step 2 and the **SAME** e-mail address of step 1.
4. Verify your identity by confirming an email send to your e-mail address
5. Once you verify your identity in Step 4 (or if you already have an account in Moodle), you can click in any video icon of this sample package. However, after login into Moodle for the first time, you must answer **Yes** to the question: *You are about to enroll yourself as a member of this course. Are you sure you wish to do this?*
6. Finally, you have to allow pop-ups for moodle.tnstate.edu in your browser (Explorer, Firefox, or Safari).

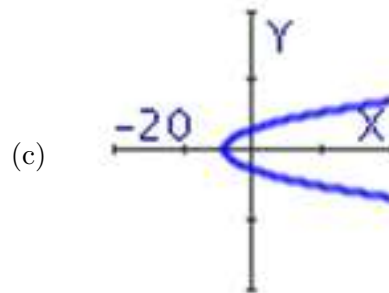
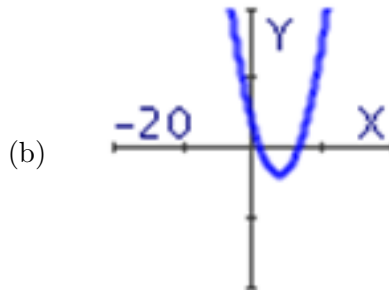
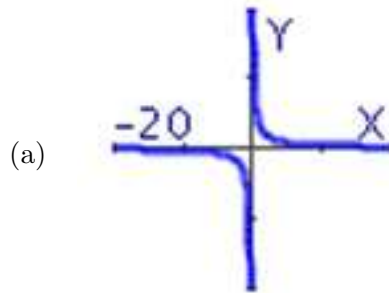
If you have problems login into the system, please drop by 315B-Boswell Science Hall during Office Hours

FINAL EXAM REVIEW PACKAGE

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|---|---------------------------------------|--|------------------------------------|--|-----------------------------------|--|------------------------------|--|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|---------------------|---------------------|---------------------|----------------------|------------------------|-------------------------|------------------------|------------------------|---|-----------------|---------------|---------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|-----------------------------|---------------------------------------|-------------------|--------------|--|
| <ol style="list-style-type: none"> 1. ▶ Let $f(x) = \sqrt{x}$ and $g(x) = x + 1$. Find the composition function $(f \circ g)(x)$. <table border="0" style="margin-left: 20px;"> <tr><td>(a) $(f \circ g)(x) = \sqrt{x} + 1$</td><td></td></tr> <tr><td>(b) $(f \circ g)(x) = \sqrt[4]{x}$</td><td></td></tr> <tr><td>(c) $(f \circ g)(x) = \sqrt{x+1}$</td><td></td></tr> <tr><td>(d) $(f \circ g)(x) = x + 2$</td><td></td></tr> </table> 2. ▶ Find the domain of the rational function $y = \frac{x^2}{x-7}$. <table border="0" style="margin-left: 20px;"> <tr><td>(a) $(-\infty, 1) \cup (1, \infty)$</td><td>(c) $(-\infty, 6) \cup (6, \infty)$</td></tr> <tr><td>(b) $(-\infty, 8) \cup (8, \infty)$</td><td>(d) $(-\infty, 7) \cup (7, \infty)$</td></tr> </table> 3. ▶ Complete the square to make the binomial $x^2 - 8x$ a perfect trinomial. <table border="0" style="margin-left: 20px;"> <tr><td>(a) $x^2 - 4x - 16$</td><td>(c) $x^2 - 8x + 64$</td></tr> <tr><td>(b) $x^2 - 8x + 16$</td><td>(d) $x^2 - 16x + 16$</td></tr> </table> 4. ▶ Find the slope of the line $2x + 15y = 29$. <table border="0" style="margin-left: 20px;"> <tr><td>(a) $m = \frac{2}{15}$</td><td>(c) $m = -\frac{2}{15}$</td></tr> <tr><td>(b) $m = \frac{2}{29}$</td><td>(d) $m = \frac{15}{2}$</td></tr> </table> | (a) $(f \circ g)(x) = \sqrt{x} + 1$ | | (b) $(f \circ g)(x) = \sqrt[4]{x}$ | | (c) $(f \circ g)(x) = \sqrt{x+1}$ | | (d) $(f \circ g)(x) = x + 2$ | | (a) $(-\infty, 1) \cup (1, \infty)$ | (c) $(-\infty, 6) \cup (6, \infty)$ | (b) $(-\infty, 8) \cup (8, \infty)$ | (d) $(-\infty, 7) \cup (7, \infty)$ | (a) $x^2 - 4x - 16$ | (c) $x^2 - 8x + 64$ | (b) $x^2 - 8x + 16$ | (d) $x^2 - 16x + 16$ | (a) $m = \frac{2}{15}$ | (c) $m = -\frac{2}{15}$ | (b) $m = \frac{2}{29}$ | (d) $m = \frac{15}{2}$ | <ol style="list-style-type: none"> 5. ▶ Solve the inequality $x + 3 > 10$. Express the solution set in interval notation <table border="0" style="margin-left: 20px;"> <tr><td>(a) $(-13, -7)$</td><td>(c) $(7, 13)$</td></tr> <tr><td>(b) $(-\infty, -13) \cup (7, \infty)$</td><td>(d) $(-\infty, 7) \cup (13, \infty)$</td></tr> </table> 6. ▶ Write the equation of the line that passes through the point $P(3, 4)$ and is perpendicular to the line $y = -4x + 14$ <table border="0" style="margin-left: 20px;"> <tr><td>(a) $x = \frac{13}{4}y + \frac{1}{4}$</td><td>(c) $y = \frac{1}{4}x + \frac{13}{4}$</td></tr> <tr><td>(b) $y = \frac{1}{4}x + 14$</td><td>(d) $y = \frac{1}{4}x + \frac{19}{4}$</td></tr> </table> 7. ▶ Tell whether the graphs of the lines $y = 5x + 5$ and $y = 5x - 1$ are parallel, perpendicular, or neither. <table border="0" style="margin-left: 20px;"> <tr><td>(a) Perpendicular</td></tr> <tr><td>(b) Parallel</td></tr> <tr><td>(c) Neither parallel nor perpendicular</td></tr> </table> | (a) $(-13, -7)$ | (c) $(7, 13)$ | (b) $(-\infty, -13) \cup (7, \infty)$ | (d) $(-\infty, 7) \cup (13, \infty)$ | (a) $x = \frac{13}{4}y + \frac{1}{4}$ | (c) $y = \frac{1}{4}x + \frac{13}{4}$ | (b) $y = \frac{1}{4}x + 14$ | (d) $y = \frac{1}{4}x + \frac{19}{4}$ | (a) Perpendicular | (b) Parallel | (c) Neither parallel nor perpendicular |
| (a) $(f \circ g)(x) = \sqrt{x} + 1$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (b) $(f \circ g)(x) = \sqrt[4]{x}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (c) $(f \circ g)(x) = \sqrt{x+1}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (d) $(f \circ g)(x) = x + 2$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (a) $(-\infty, 1) \cup (1, \infty)$ | (c) $(-\infty, 6) \cup (6, \infty)$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (b) $(-\infty, 8) \cup (8, \infty)$ | (d) $(-\infty, 7) \cup (7, \infty)$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (a) $x^2 - 4x - 16$ | (c) $x^2 - 8x + 64$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (b) $x^2 - 8x + 16$ | (d) $x^2 - 16x + 16$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (a) $m = \frac{2}{15}$ | (c) $m = -\frac{2}{15}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (b) $m = \frac{2}{29}$ | (d) $m = \frac{15}{2}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (a) $(-13, -7)$ | (c) $(7, 13)$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (b) $(-\infty, -13) \cup (7, \infty)$ | (d) $(-\infty, 7) \cup (13, \infty)$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (a) $x = \frac{13}{4}y + \frac{1}{4}$ | (c) $y = \frac{1}{4}x + \frac{13}{4}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (b) $y = \frac{1}{4}x + 14$ | (d) $y = \frac{1}{4}x + \frac{19}{4}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (a) Perpendicular | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (b) Parallel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (c) Neither parallel nor perpendicular | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

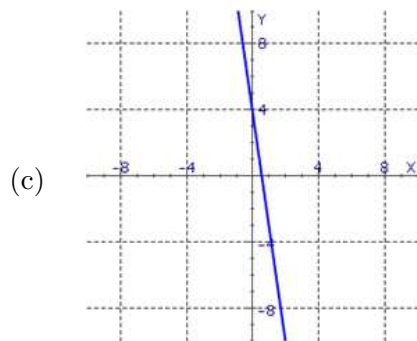
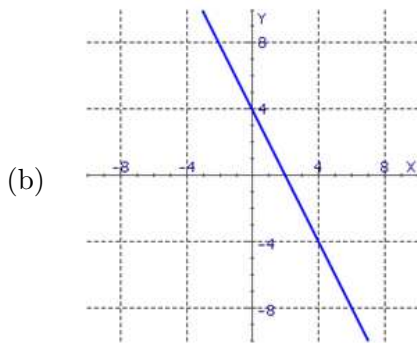
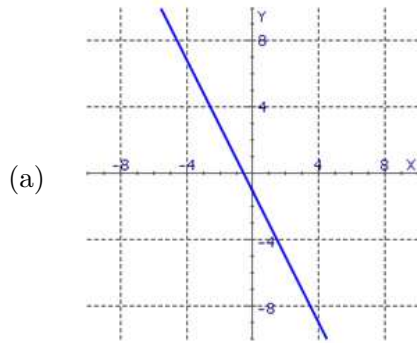
8. ⓐ Solve the inequality $\frac{8}{x} > 2$
- | | |
|--------------|--------------|
| (a) $[0, 4)$ | (c) $(0, 4)$ |
| (b) $(0, 4]$ | (d) $[0, 4]$ |
9. ⓐ Simplify $(4 + \sqrt{-16})(4 - \sqrt{-9})$ and express it in the $a + bi$ form.
- | | |
|----------------|---------------|
| (a) $-4 + 4i$ | (c) $28 - 4i$ |
| (b) $-28 + 4i$ | (d) $28 + 4i$ |
10. ⓐ A printer charges a fixed setup cost, plus \$0.40 for every 40 copies. If 320 copies cost \$43.20, how much will it cost to print 1200 copies?
- | | |
|------------|-----------|
| (a) \$160 | (c) \$128 |
| (b) \$48.8 | (d) \$52 |
11. ⓐ Let $f(x) = 3x^2 - 2$ and $g(x) = 4x + 4$. Find the value of the function $(g \circ g)(-2)$.
- | | |
|-----------------------------|-----------------------------|
| (a) $(g \circ g)(-2) = -11$ | (c) $(g \circ g)(-2) = -13$ |
| (b) $(g \circ g)(-2) = -10$ | (d) $(g \circ g)(-2) = -12$ |
12. ⓐ Find the real solutions of $\sqrt{x^2 + 144} = x + 6$
- | | |
|---------------|---------------|
| (a) $x = 144$ | (c) $x = 9$ |
| (b) $x = 0$ | (d) $x = -18$ |
13. ⓐ Simplify $\frac{5}{i^{27}}$ and express it in the form $a + bi$
- | | |
|-----------|----------|
| (a) $-5i$ | (c) 5 |
| (b) -5 | (d) $5i$ |
14. ⓐ Solve the inequality $2x - 15 \leq -3$
- | | |
|--------------------|--------------------|
| (a) $(6, \infty)$ | (c) $(-\infty, 6)$ |
| (b) $(-\infty, 6]$ | (d) $[6, \infty)$ |
15. ⓐ Find the slope of the line passing through the points $P(15, \sqrt{7})$ and $Q(\sqrt{7}, 15)$
- | | |
|-------------|--------------|
| (a) $m = 2$ | (c) $m = -1$ |
| (b) $m = 1$ | (d) $m = 15$ |

16. ⓐ Let $f(x) = 2x - 1$ and $g(x) = 3x - 2$. Find the domain of the function $(f \cdot g)(x)$
- | | |
|--------------------|-------------------------|
| (a) $[0, \infty)$ | (d) $(0, \infty)$ |
| (b) $(-\infty, 0)$ | (e) $(-\infty, \infty)$ |
| (c) $(-\infty, 0]$ | |
17. ⓐ Select each graph that represents a function



18. ⓐ Solve the inequality $\frac{6(x-2)}{5} \geq \frac{3(x+1)}{4}$
- | | |
|--------------------|--------------------|
| (a) $(7, \infty)$ | (c) $(-7, \infty)$ |
| (b) $[-7, \infty)$ | (d) $[7, \infty)$ |

19. Find the graph of the equation $2x + y = 4$



20. Solve the equation $2 \log_2(x) = 1 + \log_2(x + 112)$

- | | |
|--------------|---------------|
| (a) $x = 14$ | (c) $x = -14$ |
| (b) $x = 18$ | (d) $x = 16$ |

21. Use the quadratic formula to solve the equation $2x(x + 7) = -5$

- | | |
|--------------------------------------|--------------------------------------|
| (a) $x = \frac{-7 \pm \sqrt{11}}{2}$ | (c) $x = \frac{-7 \pm \sqrt{39}}{2}$ |
| (b) $x = \frac{-7 \pm \sqrt{11}}{4}$ | (d) $x = \frac{-7 \pm \sqrt{39}}{4}$ |

22. Find the values of x and y from the complex number $x + 76i = y - yi$

- (a) $x = 76$ and $y = 76$
 (b) $x = 76$ and $y = -76$
 (c) $x = -76$ and $y = 76$
 (d) $x = -76$ and $y = -76$

23. Simplify the expression i^{37}

- | | |
|----------|----------|
| (a) $-i$ | (c) -1 |
| (b) i | (d) 1 |

24. Find the slope of the line $13(y + x) = 13(x - 4)$

- | | |
|--------------|--------------|
| (a) $m = -1$ | (c) $m = 17$ |
| (b) $m = 0$ | (d) $m = 1$ |

25. Find the vertex of the parabola $y = 7(x - 9)^2 + 8$

- | | |
|---------------|--------------|
| (a) $(81, 8)$ | (c) $(9, 7)$ |
| (b) $(9, 8)$ | (d) $(8, 9)$ |

26. Find the slope of the line passing through the pair of points $P(-14, 6)$ and $Q(11, 11)$

- | | |
|------------------------|-----------------------|
| (a) $m = -\frac{1}{5}$ | (c) $m = \frac{1}{5}$ |
| (b) $m = 5$ | (d) $m = -5$ |

27. The ratio of women to men in a mathematics class is 13 to 4. How many women are in the class if there are 20 men?

- | | |
|--------|--------|
| (a) 65 | (c) 4 |
| (b) 13 | (d) 20 |

28. Solve the proportion $\frac{x}{21} = \frac{2}{x + 1}$

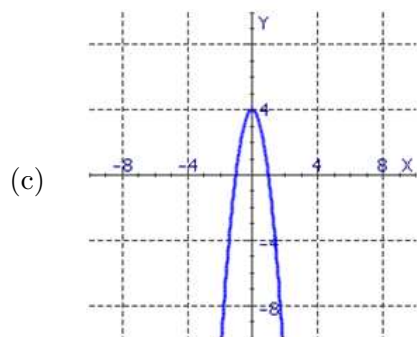
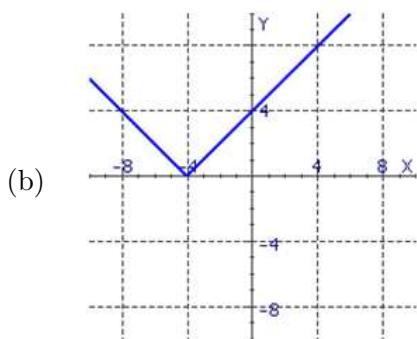
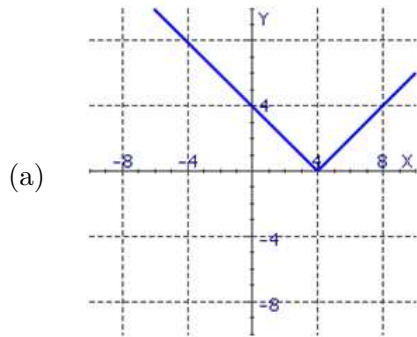
- (a) $x_1 = 7$ and $x_2 = 6$
 (b) $x_1 = 7$ and $x_2 = -6$
 (c) $x_1 = -7$ and $x_2 = 6$
 (d) No solutions

29. Solve the proportion $\frac{x}{12} = \frac{2}{x + 2}$

- (a) $x_1 = -6$ and $x_2 = 4$
 (b) $x_1 = 6$ and $x_2 = -4$
 (c) $x_1 = 6$ and $x_2 = 4$
 (d) No solutions

30. Ⓛ Simplify $(6 - \sqrt{-49}) - (7i - 4)$ and express it in the form $a + bi$
- | | |
|-----------------|----------------|
| (a) $-10 - 14i$ | (c) $10 - 14i$ |
| (b) $-10 + 14i$ | (d) $10 + 14i$ |
31. Ⓛ Let $f(x) = \frac{31}{x^2 + 28}$. Find $f(5)$.
- | | |
|----------------------------|----------------------------|
| (a) $f(5) = \frac{31}{53}$ | (c) $f(5) = \frac{31}{56}$ |
| (b) $f(5) = \frac{31}{51}$ | |
32. Ⓛ Solve the equation $x^3 - 8x^2 + 15x = 0$ for the real values of the variable x by factoring.
- | | |
|-------------|-------------|
| (a) $x = 0$ | (c) $x = 8$ |
| (b) $x = 5$ | (d) $x = 3$ |
33. Ⓛ Solve the equation $z^{\frac{3}{2}} - 7z^{\frac{1}{2}} = 0$ for the real variable z by factoring.
- | | |
|---------------|--------------|
| (a) $z = -49$ | (d) $z = -7$ |
| (b) $z = 0$ | |
| (c) $z = 49$ | (e) $z = 7$ |
34. Ⓛ Find all the real solutions of the equation $\sqrt{5x + 6} = \sqrt{3x + 14}$
- | | |
|-------------|--------------|
| (a) $x = 4$ | (c) $x = -4$ |
| (b) $x = 0$ | (d) $x = 14$ |
35. Ⓛ Find the distance between the point $P(4, 6)$ and $Q(6, 5)$
- | | |
|-----------------|-----------------|
| (a) $\sqrt{12}$ | (c) $\sqrt{17}$ |
| (b) $\sqrt{8}$ | (d) $\sqrt{5}$ |
36. Ⓛ Find the value of x if $\log_x(27) = 3$
- | | |
|--------------|-----------------|
| (a) $x = 27$ | (c) $x = -3$ |
| (b) $x = 3$ | (d) No solution |
37. Ⓛ Find the inverse of $f(x) = 2x + 7$
- | | |
|-----------------------------------|-----------------------------------|
| (a) $f^{-1}(x) = \frac{x - 7}{2}$ | (c) $f^{-1}(x) = \frac{x + 2}{7}$ |
| (b) $f^{-1}(x) = \frac{x - 2}{7}$ | |
38. Ⓛ Solve the inequality $14 \geq \frac{x - 2}{3} > 4$
- | | |
|---------------------------------------|---------------------------------------|
| (a) $(-\infty, 14) \cup [44, \infty)$ | (c) $(-\infty, 14] \cup [44, \infty)$ |
| (b) $(14, 44]$ | (d) $(-\infty, 14] \cup (44, \infty)$ |
39. Ⓛ Find the equation in general form of the circle with center at $(2, 2)$ and $r = 9$
- | | |
|------------------------------------|--|
| (a) $x^2 + y^2 - 4x - 4y - 73 = 0$ | |
| (b) $x^2 + y^2 + 4x + 4y - 73 = 0$ | |
| (c) $x^2 + y^2 + 4x + 4y - 89 = 0$ | |
| (d) $x^2 + y^2 - 4x - 4y - 89 = 0$ | |
40. Ⓛ Determine whether the lines with the slopes $m_1 = 10$ and $m_2 = \frac{1}{10}$ are parallel, perpendicular, or neither.
- | | |
|-------------------|--------------|
| (a) Perpendicular | (c) Parallel |
| (b) Neither | |
41. Ⓛ If a and h are real numbers and $f(x) = 7x - 8$. Find the difference quotient $\frac{f(a + h) - f(a)}{h}$ for $h \neq 0$.
- | | |
|-----------|---------|
| (a) $7x$ | (c) 8 |
| (b) $-7x$ | (d) 7 |
42. Ⓛ If $f(x) = 11 - 10x^2$. Find $f(8)$.
- | | |
|------------|------------|
| (a) -652 | (c) -629 |
| (b) 617 | |
43. Ⓛ Solve the equation $8x^2 - 16x - 120 = 0$
- | | |
|---------------------------|--|
| (a) $x = 3$ and $x = 8$ | |
| (b) $x = 8$ and $x = 120$ | |
| (c) $x = -4$ and $x = 5$ | |
| (d) $x = -3$ and $x = 5$ | |
44. Ⓛ Given that P varies jointly with r and s . If $P = 7$ when $r = 3$ and $s = 6$, find P when $r = 9$ and $s = 24$.
- | | |
|--------------|--------------|
| (a) $P = 9$ | (c) $P = 3$ |
| (b) $P = 24$ | (d) $P = 84$ |

45. Find the graph of $f(x) = |x - 4|$



46. Solve the equation $\left| \frac{8x - 2}{x} \right| = 7$.

- (a) $x = -30$ and $x = -2$
- (b) $x = \frac{2}{15}$ and $x = 2$
- (c) $x = -2$ and $x = \frac{2}{15}$
- (d) $x = 2$ and $x = 30$

47. Solve the inequality $\frac{6}{x - 2} \leq 2$

- | | |
|-------------------------------------|-------------------------------------|
| (a) $(-\infty, 5) \cup [8, \infty)$ | (d) $(-\infty, 5] \cup (8, \infty)$ |
| (b) $(-\infty, 5] \cup [8, \infty)$ | (e) $(-\infty, 5) \cup (8, \infty)$ |
| (c) $(5, 8]$ | |

48. The function $f(x) = \frac{5}{x^2}$ is one-to-one on the domain $(0, \infty)$. Find $f^{-1}(x)$.

- | | |
|--------------------------------------|--------------------------------------|
| (a) $f^{-1}(x) = \sqrt{\frac{x}{5}}$ | (c) $f^{-1}(x) = \frac{\sqrt{x}}{5}$ |
| (b) $f^{-1}(x) = \frac{x^2}{5}$ | (d) $f^{-1}(x) = \sqrt{\frac{5}{x}}$ |

49. An account now contains \$9300 and has been accumulating interest at a 10% annual rate, compounded continuously, for 12 years. Find the initial deposit.

- | | |
|----------------|----------------|
| (a) \$2,860.11 | (d) \$2,801.11 |
| (b) \$2,748.11 | (e) \$2,888.11 |
| (c) \$2,833.11 | |

50. Let $f(x) = x^2 + x$ and $g(x) = x^2 - 1$. Find $(f + g)(x)$

- (a) $(f + g)(x) = x^4 + x^3 - x^2 - x$
- (b) $(f + g)(x) = 2x^2 + x - 1$
- (c) $(f + g)(x) = x + 1$
- (d) $(f + g)(x) = \frac{x}{x - 1}$

51. Tell whether the graphs of $y = 5x + 4$ and $y = 5x - 6$ are parallel, perpendicular, or neither

- (a) Perpendicular
- (b) Neither parallel nor perpendicular
- (c) Parallel

52. Let $f(x) = \sqrt{x}$ and $g(x) = x + 1$. Find the domain of the composition function $(f \circ g)(x)$

- | | |
|--------------------|--------------------|
| (a) $(0, \infty)$ | (d) $[0, \infty)$ |
| (b) $[0, \infty]$ | (e) $(-\infty, 0]$ |
| (c) $(-\infty, 0)$ | |

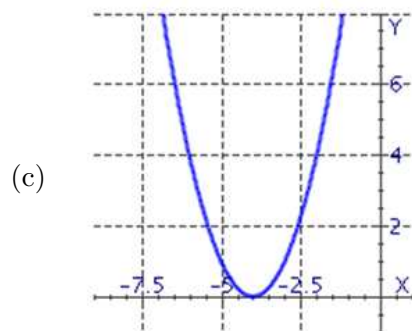
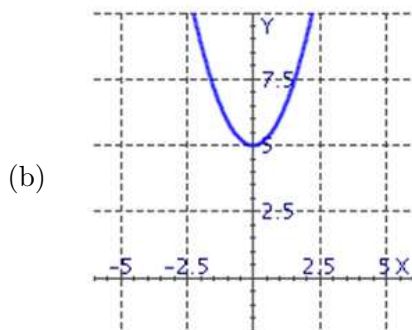
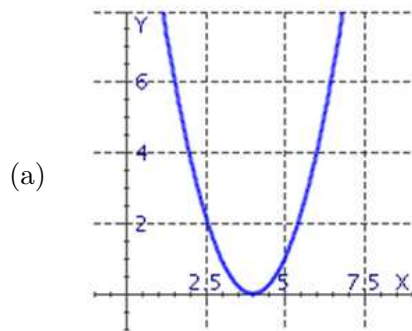
53. Solve the equation $\log(x - 17) - \log(5) = \log(x - 8) - \log(x)$

- | | |
|--------------|--------------|
| (a) $x = 2$ | (c) $x = 20$ |
| (b) $x = 22$ | (d) $x = 24$ |

54. What is the degree of the polynomial $f(x) = x^8 - 9$

- | | |
|-------|--------|
| (a) 0 | (c) 17 |
| (b) 9 | (d) 8 |

55. Find the graph of the function $g(x) = (x + 4)^2$

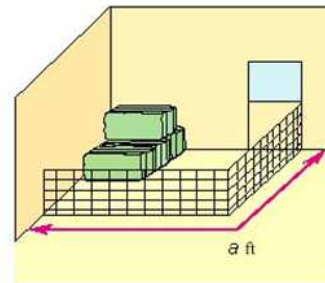


56. Given that m varies jointly with the square of n and the square root of q . If $m = 30$ when $n = 3$ and $q = 8$, find m when $n = 15$ and $q = 32$.

- | | |
|--------------|-----------------|
| (a) $m = 3$ | (c) $m = 1,500$ |
| (b) $m = 30$ | (d) $m = 8$ |

57. A farmer wants to partition a rectangular feed storage area in a corner of his barn. The

barn walls form two sides of the stall, and the farmer has 58 feet of partition for the remaining two sides. If $a = 58$ in the picture below



What dimensions will maximize the area of the partition?

- | | |
|----------------------|----------------------|
| (a) 14.5ft by 43.5ft | (c) 11.6ft by 46.4ft |
| (b) 23.2ft by 34.8ft | (d) 29ft by 29ft |

58. Find the value of x if $\log_4(x) = -2$.

- | | |
|------------------------|-----------------|
| (a) $x = 16$ | (d) $x = 4$ |
| (b) $x = 2$ | (e) No solution |
| (c) $x = \frac{1}{16}$ | |

59. Find the range of $f(x) = 2 - x^2$

- | | |
|-----------------------------|-----------------------------|
| (a) $f(x) \in (2, \infty)$ | (c) $f(x) \in (-\infty, 2]$ |
| (b) $f(x) \in (-\infty, 2)$ | |

60. Let $f(x) = 3x$ and $g(x) = x + 1$. Find the composition function $(f \circ g)(x)$

- | | |
|-------------------------------|-------------------------------|
| (a) $(f \circ g)(x) = x + 3$ | (c) $(f \circ g)(x) = 3x + 1$ |
| (b) $(f \circ g)(x) = 3x + 3$ | (d) $(f \circ g)(x) = 9x$ |

61. Find the range of $f(x) = \frac{4x}{x-3}$. *Hint: Find the domain of $f^{-1}(x)$*

- | | |
|-------------------------------------|-------------------------------------|
| (a) $(-\infty, 3) \cup (3, \infty)$ | (d) $(-\infty, 4) \cup (4, \infty)$ |
| (b) $(0, \infty)$ | |
| (c) $(-\infty, 0) \cup (0, \infty)$ | (e) $(-\infty, \infty)$ |

62. Solve the equation $\log\left(\frac{7x+9}{2x+29}\right) = 0$

- | | |
|-------------|-------------|
| (a) $x = 4$ | (c) $x = 7$ |
| (b) $x = 5$ | (d) $x = 1$ |

63. Solve the inequality $7 + x \geq 3x - 9 > 5x + 15$

- | | |
|-------------------|----------------------|
| (a) $(-12, 8]$ | (c) $[-12, 8)$ |
| (b) $[8, \infty)$ | (d) $(-\infty, -12)$ |

64. Find the inverse function of $f(x) = 3x^3 - 5$

- (a) $f^{-1}(x) = \sqrt[3]{\frac{3+x}{5}}$
- (b) $f^{-1}(x) = \sqrt[3]{\frac{5+x}{11}}$
- (c) $f^{-1}(x) = \sqrt[3]{\frac{5+x}{3}}$
- (d) $f^{-1}(x) = \sqrt[3]{\frac{11+x}{3}}$

65. Find all the real solutions for the equation $\sqrt{x-9} = 3$

- | | |
|---------------|-----------------|
| (a) $x = 0$ | (c) $x = 18$ |
| (b) $x = -18$ | (d) No solution |

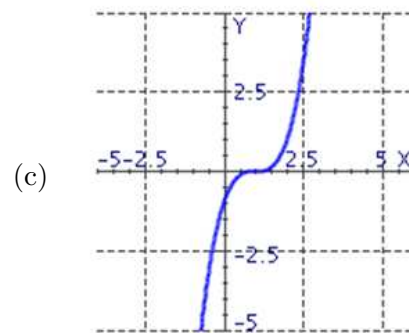
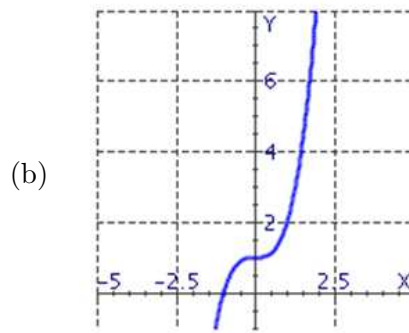
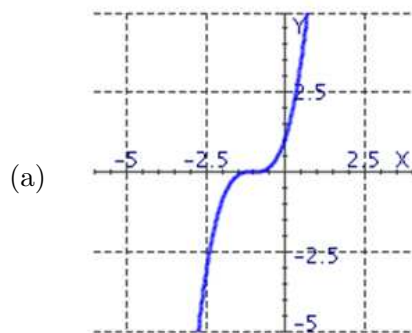
66. Simplify i^{-30}

- | | |
|----------|----------|
| (a) 1 | (c) i |
| (b) -1 | (d) $-i$ |

67. R is inversely proportional to the square of I . If $I = 12$ when $R = 60$. Find the constant of proportionality.

- | | |
|---------------|----------------|
| (a) $k = 12$ | (c) $k = 8640$ |
| (b) $k = 720$ | (d) $k = 60$ |

68. Find the graph of the function $g(x) = (x-1)^3$.



69. Find the vertical and horizontal asymptotes of $f(x) = \frac{x+9}{x+5}$

- (a) Horizontal $y = 9$ and Vertical $x = 5$.
- (b) Horizontal $y = 1$ and Vertical $x = -14$.
- (c) Horizontal $y = 1$ and Vertical $x = -5$.
- (d) Horizontal $y = -5$ and Vertical $x = -9$.

70. Solve the inequality $-2x - 15 > -5$

- | | |
|---------------------|--------------------|
| (a) $(-\infty, -5)$ | (c) $[5, \infty)$ |
| (b) $(-\infty, 5]$ | (d) $(-\infty, 5)$ |

71. If a and h are real numbers and $f(x) = x^2 - x + 2$, find $f(a) + f(h)$.

- (a) $f(a) + f(h) = a^2 + h^2 + a + h$
- (b) $f(a) + f(h) = a^2 + h^2 - a - h - 4$
- (c) $f(a) + f(h) = a^2 + h^2 - a - h$
- (d) $f(a) + f(h) = a^2 + h^2 + a + h + 4$

72. Find the inverse function of $f(x) = 9x + 8$

- | | |
|---------------------------------|---------------------------------|
| (a) $f^{-1}(x) = \frac{x-8}{9}$ | (c) $f^{-1}(x) = \frac{9}{x-8}$ |
| (b) $f^{-1}(x) = \frac{x-9}{8}$ | (d) $f^{-1}(x) = \frac{x+8}{9}$ |

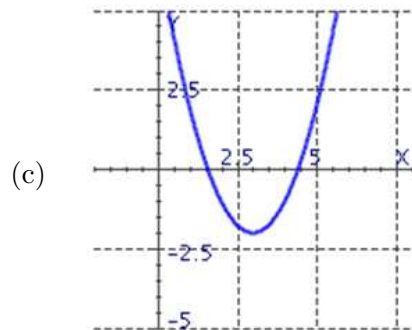
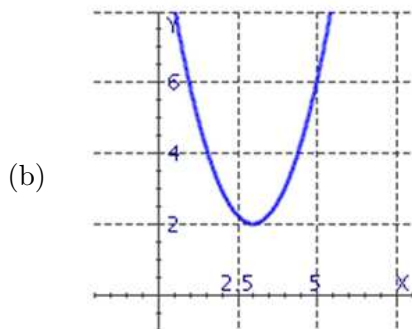
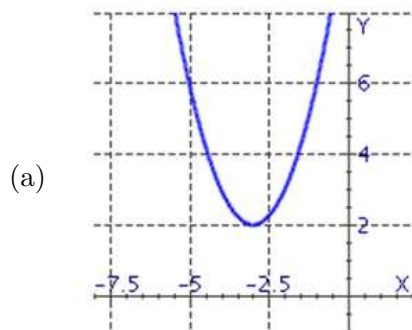
73. Simplify $(8 + 6i)^2$ in the form $a + bi$.

- | | |
|----------------|----------------|
| (a) $28 + 96i$ | (c) $-28 - 6i$ |
| (b) $28 - 8i$ | (d) $-8 + 96i$ |

74. Let $f(x) = x^2 - 1$ and $g(x) = 3x - 2$. Find $(f + g)(7)$

- | | |
|-----------------------|-----------------------|
| (a) $(f + g)(7) = 66$ | (c) $(f + g)(7) = 67$ |
| (b) $(f + g)(7) = 65$ | (d) $(f + g)(7) = 68$ |

75. Find the graph of the function $g(x) = (x+3)^2 + 2$



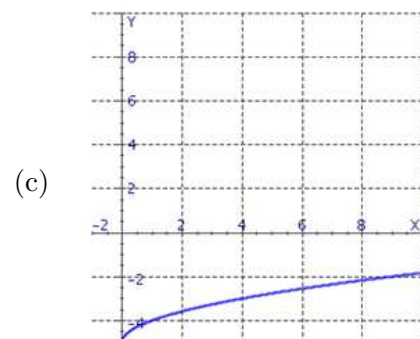
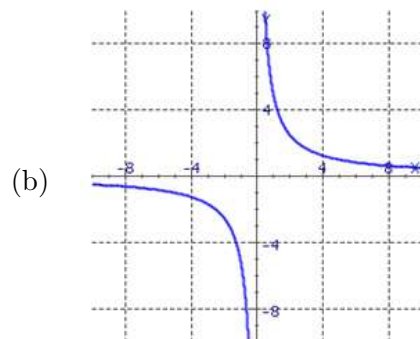
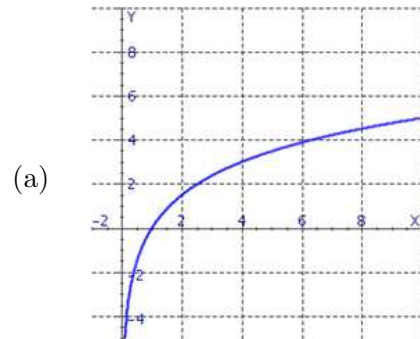
76. Solve the inequality $2x - 13 \geq -1$

- | | |
|--------------------|--------------------|
| (a) $(6, \infty)$ | (c) $(-\infty, 6]$ |
| (b) $(-\infty, 6)$ | (d) $[6, \infty)$ |

77. Find the line that passes through the points $P(5, 5)$ and $Q(-3, -3)$.

- | | |
|--------------|--------------|
| (a) $y = 5x$ | (c) $y = 5$ |
| (b) $y = x$ | (d) $x = -3$ |

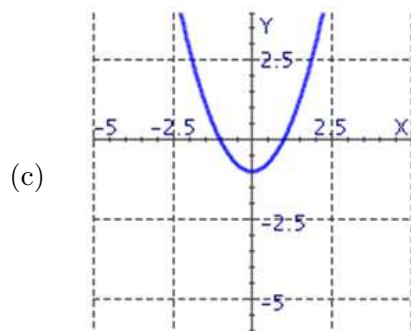
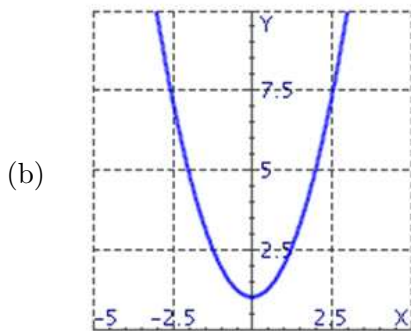
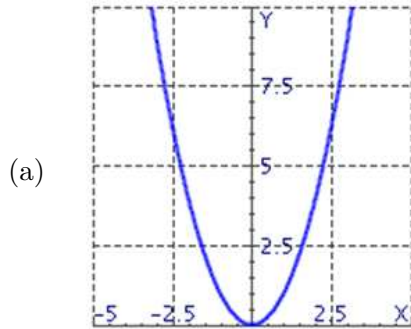
78. Find the graph of $f(x) = \sqrt{x} - 5$



79. Tell whether the graphs of $y = 6x + 1$ and $2y = 4x - 8$ are parallel, perpendicular, or neither.

- | | |
|-------------------|--|
| (a) Perpendicular | (c) Neither parallel nor perpendicular |
| (b) Parallel | |

80. Find the graph of the function $g(x) = x^2 + 1$



81. Find the midpoint of the line segment obtained by joining the points $P(8, 5)$ and $Q(6, 5)$

- | | |
|---------------|----------------|
| (a) $M(7, 5)$ | (c) $M(9, 5)$ |
| (b) $M(7, 4)$ | (d) $M(12, 8)$ |

82. Simplify the expression $(5 - \sqrt{-49}) + (4 - \sqrt{-25})$ in the form $a + bi$.

- | | |
|---------------|---------------|
| (a) $-9 - 2i$ | (c) $-9 + 2i$ |
| (b) $9 + 2i$ | (d) $9 - 2i$ |

83. Solve the equation $|2x + 1| = 3$

- (a) $x = 1$ and $x = 2$

- (b) $x = 1$
 (c) $x = -2$ and $x = 1$
 (d) $x = -2$ and $x = -1$

84. Solve the equation $\frac{8}{x+30} - \frac{1}{5} = \frac{1}{x+30}$

- | | |
|--------------|-------------|
| (a) $x = 2$ | (c) $x = 0$ |
| (b) $x = -3$ | (d) $x = 5$ |

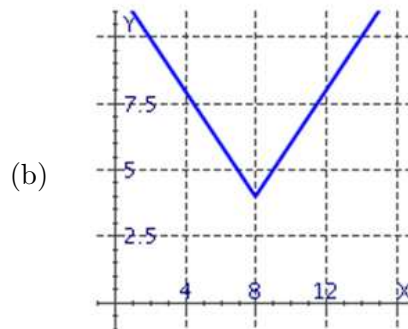
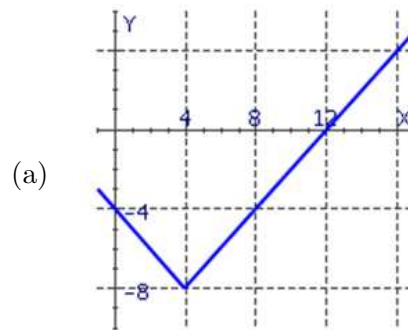
85. Solve the equation $x^2 - 2x - 8 = 0$ by completing the square.

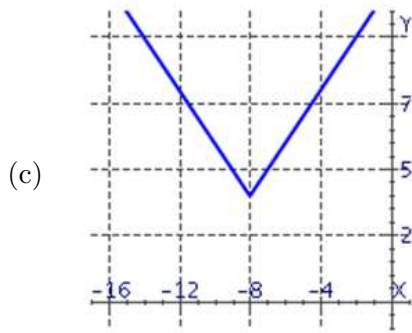
- (a) $x = -2$ and $x = 1$
 (b) $x = -2$ and $x = 4$
 (c) $x = 3$ and $x = 4$
 (d) $x = 1$ and $x = 5$

86. Find the equation of the circle with center at $(1, 2)$ and passing through the origin

- (a) $x^2 + y^2 + 2x + 4y - 5 = 0$
 (b) $x^2 + y^2 - 2x - 4y = 0$
 (c) $x^2 + y^2 - 2x - 4y - 5 = 0$
 (d) $x^2 + y^2 + 2x + 4y = 0$

87. Find the graph of $f(x) = |x - 8| + 4$





88. If $f(x) = x^2$ and $g(x) = 2x$. Find the composite function $(f \circ f)(x)$

- | | |
|-----------------------------|-----------------------------|
| (a) $(f \circ f)(x) = 4x^2$ | (c) $(f \circ f)(x) = 4x$ |
| (b) $(f \circ f)(x) = x^4$ | (d) $(f \circ f)(x) = 2x^2$ |

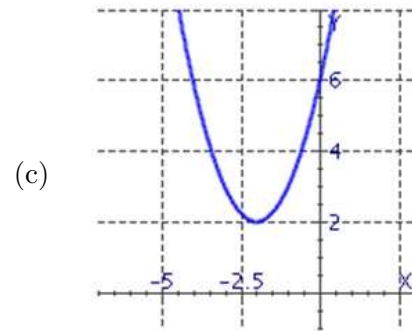
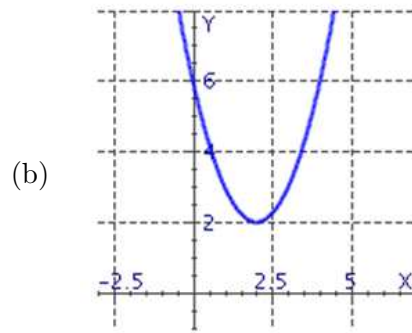
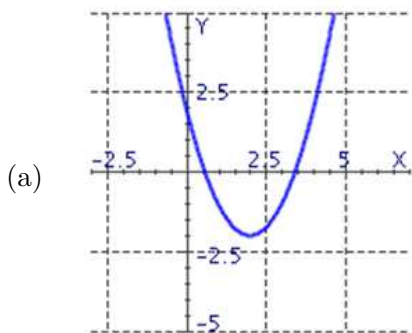
89. Let y be directly proportional to x . If $x = 8$ when $y = 72$; Find the constant of proportionality.

- | | |
|--------------|--------------|
| (a) $k = -9$ | (c) $k = 72$ |
| (b) $k = 8$ | (d) $k = 9$ |

90. Solve the equation $\log(9x - 6) = \log(4x + 24)$

- | | |
|-------------|-------------|
| (a) $x = 6$ | (c) $x = 9$ |
| (b) $x = 4$ | (d) $x = 5$ |

91. Find the graph of $g(x) = (x + 2)^2 + 2$



92. Find the vertex of the parabola $y = x^2 - 8x + 16$

- | | |
|--------------|---------------|
| (a) $(0, 4)$ | (c) $(-8, 0)$ |
| (b) $(4, 0)$ | (d) $(16, 0)$ |

93. Find the y -intercept of the function $2x + 4y = 4$

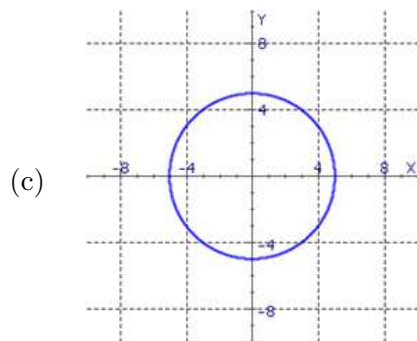
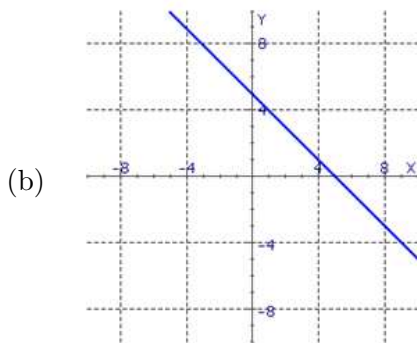
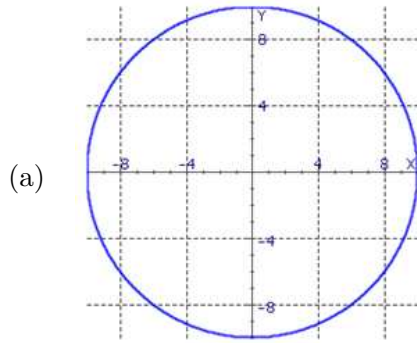
- | | |
|---------------|--------------|
| (a) $(0, -4)$ | (c) $(0, 1)$ |
| (b) $(0, -1)$ | (d) $(0, 4)$ |

94. Find the line that passes through the point $P(0, 0)$ and is perpendicular to the line $y = -10x + 5$

- | | |
|-------------------------|------------------------------|
| (a) $y = 10x$ | (c) $y = \frac{1}{10}x$ |
| (b) $y = -\frac{1}{5}x$ | (d) $y = -\frac{1}{10}x + 5$ |

95. Find the slope of the line $y = 2x + 6$
- | | |
|--------------|-------------|
| (a) $m = -2$ | (d) $m = 6$ |
| (b) $m = -1$ | |
| (c) $m = 3$ | (e) $m = 2$ |
96. Let $f(x) = x^3 - 4$. After simplifying the quotient $\frac{f(x) - f(a)}{x - a}$ (for $x \neq a$) one obtains
- | | |
|---|--|
| (a) $\frac{f(x) - f(a)}{x - a} = x^2 + 2ax + a^2$ | |
| (b) $\frac{f(x) - f(a)}{x - a} = x^2 + ax + a^2$ | |
| (c) $\frac{f(x) - f(a)}{x - a} = x^2 - 2ax + a^2$ | |
| (d) $\frac{f(x) - f(a)}{x - a} = x^2 - a^2$ | |
97. Let x , y , and d be positive numbers. Use the properties of logarithms to write the expression $\log_d(\sqrt{xy})$ in terms of logarithms of x and y .
- | | |
|---|--|
| (a) $\log_b(x) + \log_b(y)$ | |
| (b) $\frac{1}{2} \log_b(x) + \frac{1}{2} \log_b(y)$ | |
| (c) $2 \log_b(x) + 2 \log_b(y)$ | |
| (d) $\frac{1}{2} \log_b(x) + \log_b(y)$ | |
98. Let $f(x) = 11x - 89$. Find $f(10)$
- | | |
|------------------|------------------|
| (a) $f(10) = 21$ | (c) $f(10) = 34$ |
| (b) $f(10) = 92$ | |
99. Let $f(x) = 10x - 3$. Find the difference quotient $\frac{f(x+h) - f(x)}{h}$ for $h \neq 0$.
- | | |
|---------------|--------|
| (a) $10x + 3$ | (c) 10 |
| (b) -3 | |
100. Find the solution of the inequality $|9x - 2| < 11$
- | | |
|--|--|
| (a) $(9, 13)$ | |
| (b) $(-\infty, -\frac{13}{9}) \cup (-1, \infty)$ | |
| (c) $(-1, \frac{13}{9})$ | |
| (d) $(1, \frac{13}{9})$ | |
101. Find where the function $f(x) = 16 - x^2$ is increasing.
- | | |
|-----------------------------|--|
| (a) $(0, \infty)$ | |
| (b) It is always constant | |
| (c) It is always decreasing | |
| (d) $(-\infty, 0)$ | |
102. Find the domain of $f(x) = \sqrt{6x + 18}$
- | | |
|--------------------|--|
| (a) $(-\infty, 6)$ | |
| (b) $[-3, \infty)$ | |
| (c) $(3, \infty)$ | |
| (d) $[3, \infty)$ | |
103. Assume that x , y and c are positive numbers. Use the properties of logarithms to write the expression $\log_c(x^5y^9)$ in terms of the logarithms of x and y .
- | | |
|----------------------------------|--|
| (a) $45 \log_c(x) + 9 \log_c(y)$ | |
| (b) $5 \log_c(x) + 45 \log_c(y)$ | |
| (c) $5 \log_c(x) + 9 \log_c(y)$ | |
| (d) $5 \log_c(x) + 5 \log_c(y)$ | |

104. Find the graph of the equation $x^2 + y^2 - 100 = 0$



105. Solve for x the equation $f = \frac{k - x}{q}$.

- | | |
|------------------|------------------|
| (a) $x = f - kq$ | (c) $x = fq - k$ |
| (b) $x = k - fq$ | (d) $x = kq - f$ |

106. Solve the equation $x(x - 5) - 23 = (x - 1)^2$

- | | |
|---------------|--------------|
| (a) $x = -3$ | (c) $x = -8$ |
| (b) $x = -17$ | (d) $x = -1$ |

107. Solve the equation $\frac{9}{x + 70} - \frac{1}{9} = \frac{1}{x + 70}$

- | | |
|--------------|--------------|
| (a) $x = -3$ | (c) $x = -6$ |
| (b) $x = -1$ | (d) $x = 2$ |

108. Find the inverse function of $f(x) = 3x + 7$

- | | |
|-----------------------------------|-----------------------------------|
| (a) $f^{-1}(x) = \frac{x + 7}{3}$ | (c) $f^{-1}(x) = \frac{x - 7}{3}$ |
| (b) $f^{-1}(x) = \frac{3}{x - 7}$ | (d) $f^{-1}(x) = \frac{x - 3}{7}$ |

109. The ratio of women to men in a mathematics class is 5 to 8. How many women are in the class if there are 48 men?

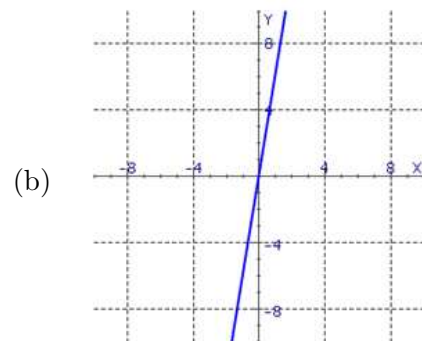
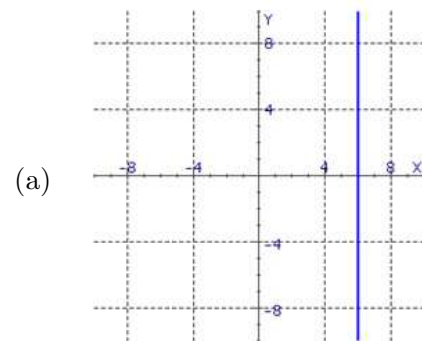
- | | |
|--------|-------|
| (a) 48 | (c) 8 |
| (b) 30 | (d) 5 |

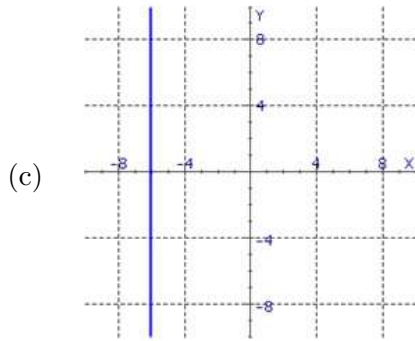
110. Let x , y , and z be positive numbers. Use the properties of the logarithms to write the expression

$-2 \log_b(x) - 6 \log_b(y) + \frac{1}{7} \log_b(z)$ as the logarithm of one expression.

- | | |
|---|---|
| (a) $\log_b \left(\frac{z^{\frac{1}{7}}}{x^2 y^6} \right)$ | (c) $\log_b \left(\frac{z^{\frac{1}{7}}}{x^6 y^2} \right)$ |
| (b) $\log_b \left(\frac{z^{\frac{1}{6}}}{x^2 y^7} \right)$ | (d) $\log_b \left(\frac{z^{\frac{1}{2}}}{x^7 y^6} \right)$ |

111. Find the graph of the equation $x = 6$

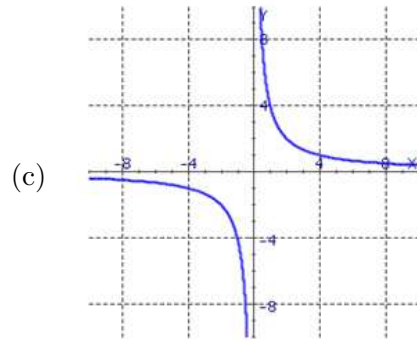
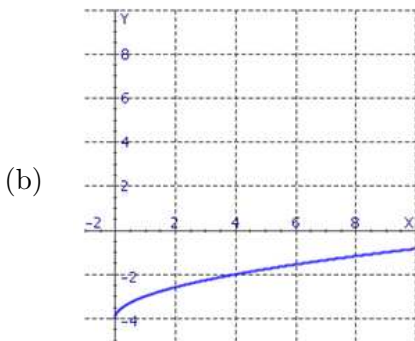
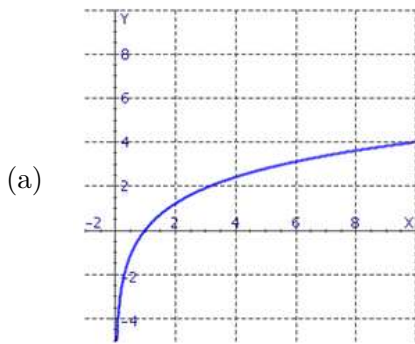




112. Solve the equation $\log(10x - 10) = \log(5x + 20)$

- | | |
|-------------|-------------|
| (a) $x = 9$ | (c) $x = 5$ |
| (b) $x = 6$ | (d) $x = 4$ |

113. Find the graph of the function $f(x) = \sqrt{x} - 4$



114. Find the domain of the function $f(x) = \frac{x^2}{x - 5}$

- | | |
|-------------------------------------|-------------------------------------|
| (a) $(-\infty, 4) \cup (4, \infty)$ | (c) $(-\infty, 5) \cup (5, \infty)$ |
| (b) $(-\infty, 1) \cup (1, \infty)$ | (d) $(-\infty, 6) \cup (6, \infty)$ |

115. Let $f(x) = 2x + 1$ and $g(x) = 3x - 2$. Find $(f - g)(x)$

- | |
|--|
| (a) $(f - g)(x) = \frac{2x + 1}{3x - 2}$ |
| (b) $(f - g)(x) = 5x - 1$ |
| (c) $(f - g)(x) = 6x^2 - x - 2$ |
| (d) $(f - g)(x) = 3 - x$ |

116. The ratio of lime to sand in a mortar is 7 to 4. How much lime must be mixed with 32 bags of sand to make mortar?

- | | |
|------------|-------------|
| (a) 7 bags | (c) 56 bags |
| (b) 4 bags | (d) 32 bags |