

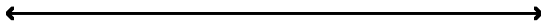
Self-assessment 1010 (Intermediate Algebra)

If you can work these problems using a scientific calculator, you should have sufficient knowledge to demonstrate mastery of Intermediate Algebra and to succeed in a subsequent course.

For the compound inequality, give the solution set in both interval and graph forms.

1) $9x - 6 < 3x$ or $-2x \leq -6$

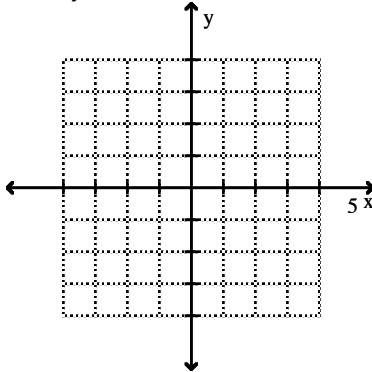
1) _____



Graph the solution.

2) $3x - 2y \geq -6$ and $x - 1 < 0$

2) _____



Solve the given inequality. Write the solution set in interval notation.

3) $|8k + 1| - 5 \geq 1$

3) _____

4) $|2x - 1| - 8 < -12$

4) _____

5) $|5k - 6| - 1 < 7$

5) _____

Solve the equation.

6) $|5x + 4| = |5 - 10x|$

6) _____

Solve the system of equations.

7) $4x + 2y + z = -12$

$2x - 4y - z = -10$

$3x + y + 4z = -23$

7) _____

Solve the problem with three unknowns.

8) A manufacturer makes three models of ceiling fans, models A, B, and C. Production restrictions require it to make 20 more model-C fans than the total of the other models and 3 times as many model-B fans as model-A fans. The manufacturer must produce 740 fans per day. How many model-B fans will be made each day?

8) _____

Solve the formula for the specified variable.

9) $\frac{1}{a} + \frac{1}{b} = c$ for b

9) _____

Solve the system of equations.

10) $2x + 4y + 4z = 60$

$x + 2y + 2z = -10$

$x + y + z = -6$

10) _____

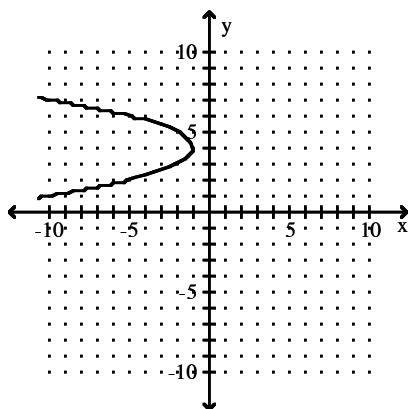
Solve the variation problem.

- 11) The resistance of a wire varies directly as the length of the wire and inversely as the square of the diameter of the wire. A 20 foot length of wire with a diameter of 0.1 inch has a resistance of 3 ohms. What would the resistance be for a 36 foot length, with diameter 0.01 inch, of the same kind of wire ?

11) _____

Decide whether the relation is a function, and give the domain and range.

12)



12) _____

Determine whether the relation defines y as a function of x. Give the domain.

13) $y = \frac{-8}{x+19}$

13) _____

14) $y = \sqrt{3x-2}$

14) _____

Solve the problem.

15) Find $f(\frac{1}{4})$ if $f(x) = 3x^2 - 2x - 3$.

15) _____

For the given pair of functions, find the indicated value or expression.

16) Given $f(x) = 7x + 8$ and $g(x) = x - 6$, find $(f - g)(-4)$.

16) _____

Find $(f \circ g)(x)$ for the given functions $f(x)$ and $g(x)$.

17) $f(x) = 8x + 6$ and $g(x) = x^2 - 5$

17) _____

Evaluate the composition of functions.

18) Let $f(x) = x^2 + 2$ and $g(x) = 3x + 6$. Find $(g \circ f)(5)$.

18) _____

Find the center and radius of the circle.

19) $x^2 + y^2 + 12x - 16y + 91 = 0$

19) _____

Perform the indicated operation and express in lowest terms.

$$20) \frac{9s^2 + 6st + t^2}{2s^2 - 9st - 5t^2} \cdot \frac{5s^2 - 26st + 5t^2}{t^2 + 2st - 3s^2} \div \frac{15s^2 + 2st - t^2}{2s^2 + 3st + t^2} \quad 20) \underline{\hspace{2cm}}$$

Express the rational expression in lowest terms.

$$21) \frac{ab + 4a - 3b - 12}{bc - 5b + 4c - 20} \quad 21) \underline{\hspace{2cm}}$$

Perform the indicated operation and express in lowest terms.

$$22) \frac{2ab}{a^2 - b^2} - \frac{b}{a - b} + \frac{6}{2} \quad 22) \underline{\hspace{2cm}}$$

Simplify the complex fraction.

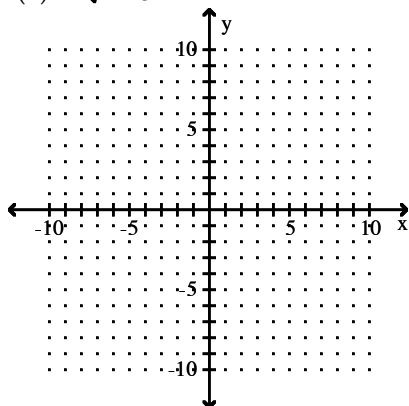
$$23) \frac{\frac{4}{3r - 1} - 4}{\frac{4}{3r - 1} + 4} \quad 23) \underline{\hspace{2cm}}$$

Solve the problem.

- 24) A jet plane traveling at a constant speed goes 1200 miles with the wind, then turns around and travels for 1000 miles against the wind. If the speed of the wind is 50 mph and the total flight took 4 hours, find the speed of the plane. 24)

Graph the given function as a solid line or curve and its inverse as a dashed line or curve on the same set of axes.

$$25) f(x) = \sqrt{x + 5} \quad 25) \underline{\hspace{2cm}}$$



Find the root if it is a real number.

$$26) \sqrt[4]{\frac{81}{256}} \quad 26) \underline{\hspace{2cm}}$$

Evaluate the exponential.

$$27) \left(-\frac{27}{64}\right)^{-4/3} \quad 27) \underline{\hspace{2cm}}$$

Use the rules of exponents to simplify the expression. Write the answer with positive exponents. Assume that all variables represent positive real numbers.

$$28) \left(\frac{t^{-7/6}}{b^{-6/7}} \right)^3 (t^{-1/2} b^{1/2})^{-4} \quad 28) \underline{\hspace{2cm}}$$

Simplify. Assume all variables represent positive real numbers. Give the answer in radical form.

$$29) \sqrt[6]{r} \cdot \sqrt[5]{r^2} \quad 29) \underline{\hspace{2cm}}$$

Simplify. Assume that all variables represent positive real numbers.

$$30) \frac{\sqrt{245}}{7} - \frac{6\sqrt{5}}{7} + \frac{\sqrt{5}}{\sqrt{49}} \quad 30) \underline{\hspace{2cm}}$$

Perform the indicated operations and simplify. Assume that all variables represent positive real numbers.

$$31) 6\sqrt{48x^2} - 3\sqrt{27x^2} - \sqrt{3x^2} \quad 31) \underline{\hspace{2cm}}$$

Simplify. Assume that all variables represent positive real numbers.

$$32) -\sqrt[3]{\frac{6x}{y}} \quad 32) \underline{\hspace{2cm}}$$

Rationalize the denominator. Assume that all variables represent positive real numbers and that the denominator is not zero.

$$33) \frac{\sqrt{x} - \sqrt{y}}{\sqrt{2x} + \sqrt{3y}} \quad 33) \underline{\hspace{2cm}}$$

Solve.

$$34) \sqrt{x+6} + \sqrt{2-x} = 4 \quad 34) \underline{\hspace{2cm}}$$

Write the quotient in the form $a + bi$.

$$35) \frac{6+2i}{9-3i} \quad 35) \underline{\hspace{2cm}}$$

Multiply or divide as indicated.

$$36) \sqrt{-36} \cdot \sqrt{-64} \quad 36) \underline{\hspace{2cm}}$$

Solve

$$37) (9t - 9)^2 = -10 \quad 37) \underline{\hspace{2cm}}$$

Solve the equation by completing the square.

$$38) 7x^2 + 3x - 4 = 0 \quad 38) \underline{\hspace{2cm}}$$

Use the quadratic formula to solve the given equation.

$$39) 3x(x - 3) = 10 \quad 39) \underline{\hspace{2cm}}$$

Solve the equation.

40) $(m - 3)^{2/3} + 3(m - 3)^{1/3} - 10 = 0$ 40) _____

41) $2 + \frac{5}{3z - 1} = \frac{-2}{(3z - 1)^2}$ 41) _____

Solve the problem. Round to the nearest tenth, if necessary.

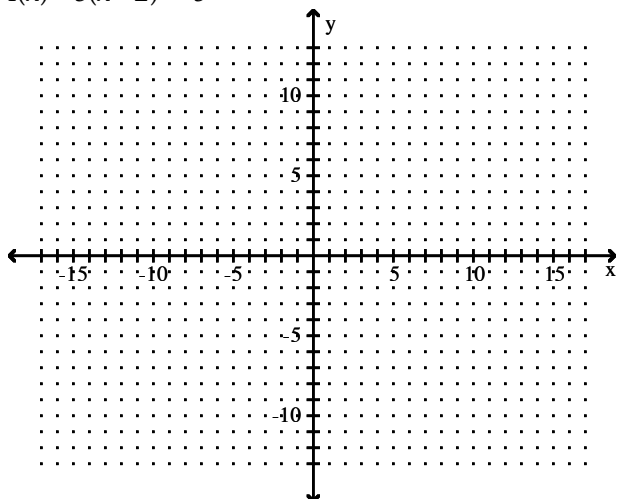
42) Ron takes two hr more time than Paul to mow the lawn. Working together they can mow the lawn in 5 hr. How long does it take each of them working alone? 42) _____

Solve the problem. Round answer to the nearest tenth, if necessary.

43) A toy rocket is shot vertically upward from the ground. Its distance in feet from the ground in t seconds is given by $s(t) = -16t^2 + 142t$. At what times will the ball be 222 ft from the ground? 43) _____

Graph.

44) $f(x) = 3(x - 2)^2 + 5$ 44) _____



Find the vertex of the given parabola.

45) $f(x) = -4x^2 + 8x - 9$ 45) _____

Find the axis, domain, and range of the parabola.

46) $x = -\frac{1}{4}y^2 + 2y + 3$ 46) _____

Approximate to the nearest thousandth . Use the change-of-base rule.

47) $\log_{6.6} 4.1$ 47) _____

Solve the problem.

48) Find the amount of money in an account after 10 years if \$3500 is deposited at 6% annual interest compounded monthly. 48) _____

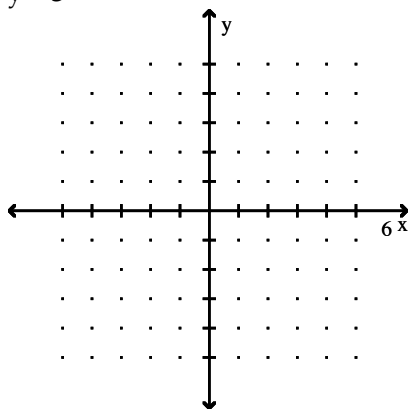
49) A projectile is thrown upward so that its distance (in feet) above the ground after t seconds is $h(t) = -10t^2 + 420t$. What is its maximum height?

49) _____

Graph the exponential function.

50) $y = 3^x$

50) _____



Solve the problem.

51) How long will it take a sample of radioactive substance to decay to half of its original amount, if it decays according to the function $A(t) = 450e^{-0.153t}$, where t is the time in years? Round to the nearest hundredth year.

51) _____

52) $4^{(5-3x)} = \frac{1}{256}$

52) _____

Solve the equation.

53) $6^{3x} = 8^{x+1}$ (Round to the nearest thousandth.)

53) _____

Solve the given equation. Give an exact solution.

54) $\log(2+x) - \log(x-4) = \log 3$

54) _____

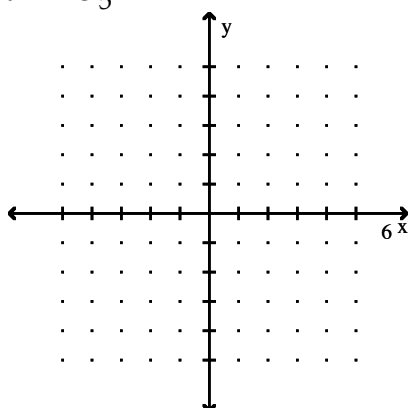
55) $\log_2(5x+7) = \log_2(5x+4)$

55) _____

Graph the given logarithmic function.

56) $y = \log_5 x$

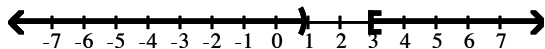
56) _____



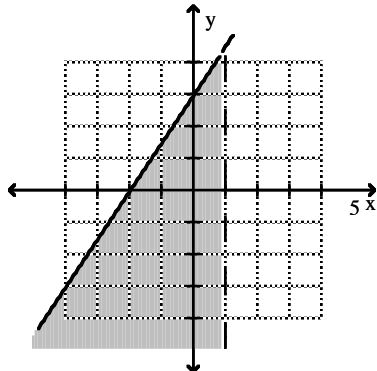
Answer Key

Testname: SELF-ASSESSMENT 1010

1) $(-\infty, 1) \cup [3, \infty)$



2)



3) $\left(-\infty, -\frac{7}{8}\right] \cup \left[\frac{5}{8}, \infty\right)$

4) $\emptyset$

5) $\left(-\frac{2}{5}, \frac{14}{5}\right)$

6) $\left\{\frac{1}{15}, \frac{9}{5}\right\}$

7) $\{(-3, 2, -4)\}$

8) 270

9) $b = \frac{a}{ac - 1}$

10) $\emptyset$

11) 540 ohms

12) Not a function; domain: $(-\infty, -1]$; range: $(-\infty, \infty)$

13) Function; domain: $(-\infty, -19) \cup (-19, \infty)$

14) Function; domain: $\left[\frac{2}{3}, \infty\right)$

15) $-\frac{53}{16}$

16) -10

17) $8x^2 - 34$

18) 87

19) $(-6, 8)$; $r = 3$

20) $\frac{t+s}{t-s}$

21) $\frac{a-3}{c-5}$

22) $\frac{3a+4b}{a+b}$

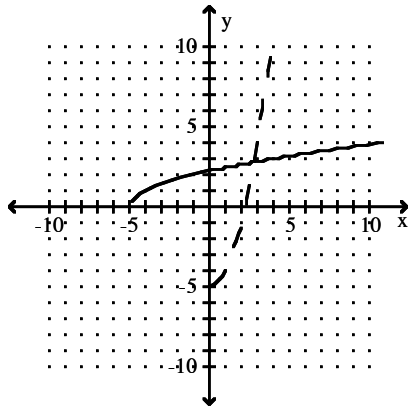
Answer Key

Testname: SELF-ASSESSMENT 1010

23) $\frac{2-3r}{3r}$

24) 550 mph

25)



26) $\frac{3}{4}$

27) $\frac{256}{81}$

28) $\frac{b^{4/7}}{t^{3/2}}$

29) $\sqrt[30]{r^{17}}$

30) $\frac{2\sqrt{5}}{7}$

31) $14x\sqrt{3}$

32) $-\frac{\sqrt[3]{6xy^2}}{y}$

33) $\frac{x\sqrt{2}-\sqrt{3xy}-\sqrt{2xy}+y\sqrt{3}}{2x-3y}$

34) $\{-2\}$

35) $\frac{8}{15} + \frac{2}{5}i$

36) -48

37) $\left\{ \frac{9+i\sqrt{10}}{9}, \frac{9-i\sqrt{10}}{9} \right\}$

38) $\left\{ \frac{4}{7}, -1 \right\}$

39) $\left\{ \frac{9+\sqrt{201}}{6}, \frac{9-\sqrt{201}}{6} \right\}$

40) $\{-122, 11\}$

Answer Key

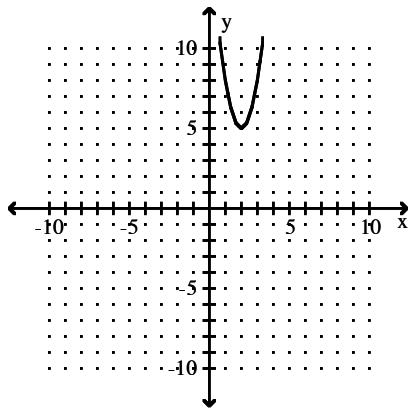
Testname: SELF-ASSESSMENT 1010

41) $\left\{-\frac{1}{3}, \frac{1}{6}\right\}$

42) Paul: 9.1 hr; Ron: 11.1 hr

43) 2 and 6.8 sec

44)



45) (1, -5)

46) axis: $y = 4$

domain: $(-\infty, 7]$

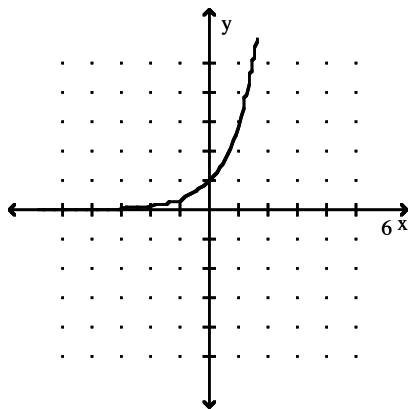
range: $(-\infty, \infty)$

47) 0.748

48) \$6367.89

49) 4410 ft

50)



51) 4.53 yr

52) $\{3\}$

53) $\{0.631\}$

54) $\{7\}$

55) $\emptyset$

56)

