WeBWorK Assignment Homework03 is due: 05/21/2016 at 04:05pm EDT.

Reference: Axler, Precalculus, 2nd ed, Sections 2.1, 2.2, and 2.3

Here's the list of functions and symbols that WeBWorK understands.

1. (1 pt) Find an equation for the linear function which has f(50) = 1800 and f(700) = 4200
   f(x) = __________

2. (1 pt) Find an equation for the line passing through the point (4, 3) and perpendicular to the line y = 5x - 6.
   y = __________

3. (1 pt) Line L in the figure below is parallel to the line y = 4x + 2. Find the coordinates of the point P

   (click on the graph to get a larger version)

   P = __________

4. (1 pt) You bought a new car for $27,500 in 2005, and the value of the car depreciates by $500 each year. Find a formula for V, the value of the car, in terms of t, the number of years since 2005.

   V(t) = __________

   (Be sure NOT TO USE ANY COMMAS when you enter your formula. For example enter two thousand as 2000 and not as 2,000.)

5. (1 pt) In a college meal plan you pay a membership fee, then all of your meals are at a fixed price per week. If 20 meals cost $152 and 60 meals cost $252, answer the following questions:

   a) Write a formula for the cost of a meal plan, C, in terms of the number of meals, n.
      C = __________

   b) What is the membership fee? $ __________

   c) What is the price per meal? $ __________ per meal

   d) Find the cost for 40 meals. $ __________

   e) Find n in terms of C. n = __________

   f) Finally, use your answer in part (e) to determine the maximum number of meals you can buy on a budget of $300. Maximum number of meals implies if you find that n = 3.9, then you can buy a maximum of 3 meals. You must truncate any decimal solutions (which is different from rounding).
      n = __________ meals

6. (1 pt) You want to choose one long distance telephone company from the following options:

   - Company A charges $0.35 dollars per minute (no fixed monthly charge).
   - Company B charges $14.05 per month plus $0.18 per minute.
   - Company C charges a fixed rate of $50 per month.

   Let A(x), B(x), and C(x) denote the monthly charges of Company A, B, and C respectively for spending x minutes on long distance calls.

   a) Find a formula for the monthly cost of using Company A, A(x):
      A(x) = __________

   b) Find a formula for the monthly cost of using Company B, B(x):
      B(x) = __________

   c) Find a formula for the monthly cost of using Company C, C(x):
      C(x) = __________

   d) If you spend 125 minutes talking long distance in a month, which of the three companies will be cheapest? Enter the letter (A, B, or C) here: __________

   e) Given the graph below, match the number of each graph to corresponding company it represents:

   Company A __________
   Company B __________
   Company C __________
7. (1 pt) Find the zero(s) (if any) of the function \( y = x^2 - 5x - 50 \)
Enter your answer as a comma separated list. If no real zeros exist, enter NONE.
The zero(s) is/are \( x = \ldots \)

8. (1 pt) Find the vertex of the parabola \( y = (x - 15)^2 + 8 \) and determine whether it is a minimum or maximum.
The vertex is the point ( ___ , ___ ) and it is a (MIN or MAX) ___

9. (1 pt) The parabola given by the equation \( y = -x^2 + 6x - 2 \) has its vertex at \((h, k)\) for:
\[ h = \ldots \]
and
\[ k = \ldots \]

10. (1 pt) A ball is tossed straight up from the edge of a 27 foot high building, with an initial upward velocity of 26$ feet/second. Its height in feet after \( t \) seconds is
\[ h(t) = -16t^2 + 26t + 27. \]
Answer the following questions, including units in your answers.
How long before the ball hits the ground \( (h(t) = 0) \)?
How long before it reaches its maximum height?
How high will it go?

11. (1 pt) Consider the two points \((5, -1)\) and \((9, 6)\).
The distance between them is: \ldots
The midpoint of the line segment that joins them is: \ldots

12. (1 pt) Find all \( x \) such that the distance between the points \((-2, 4)\) and \((x, -1)\) is 28. Note: If there is more that one \( x \), give a comma separated list (i.e.: 1,2).
\[ x = \ldots \]

13. (1 pt) Find the point \((0, b)\) on the y-axis that is equidistant from the points \((2, 2)\) and \((3, -2)\).
\[ b = \ldots \]

14. (1 pt) Find an equation of the circle with center at the origin and passing through \((3, 4)\) in the form of
\[ (x - A)^2 + (y - B)^2 = C \]
where \( A, B, C \) are constants. Then
\[ A = \ldots \]
\[ B = \ldots \]
\[ C = \ldots \]

15. (1 pt) The equation
\[ (x - 2)^2 + (y + 5)^2 = 9 \]
defines a circle with center ( ___ , ___ ) and radius ___.
Hint: This equation is already in the form of the general equation of a circle.

16. (1 pt) \( x^2 + y^2 + 18x - 10y - 63 = 0 \) is the equation of a circle with center \((h, k)\) and radius \( r \) for:
\[ h = \ldots \]
and
\[ k = \ldots \]
and
\[ r = \ldots \]

17. (1 pt) (a) Find the equation of the circle whose diameter has endpoints \((-2, -4)\) and \((4, -8)\). Write it in the form
\[ (x - h)^2 + (y - k)^2 = r^2 \]
and identify \( h, k, \) and \( r \).
\[ h = \ldots \]
\[ k = \ldots \]
\[ r = \ldots \]
(b) Find the equation of the circle that has center \((-1, -2)\) and is tangent to the y-axis. Write it in the form
\[ (x - h)^2 + (y - k)^2 = r^2 \]
and identify \( h, k, \) and \( r \).
\[ h = \ldots \]
\[ k = \ldots \]
\[ r = \ldots \]

18. (1 pt) The equation
\[ \frac{(x - 2)^2}{9} + \frac{(y - 4)^2}{25} = 1 \]
defines an ellipse with center ( ___ , ___ ). The major axis has length ___ and the minor axis has length ___.
Hint: This equation is in standard form.

19. (1 pt) The equation
\[ 9x^2 - 18x + 4y^2 + 8y = 23 \]
defines an ellipse with center ( ___ , ___ ). The major axis has length ___ and the minor axis has length ___.
Hint: Convert the equation to standard form.
20. (1 pt) Write equations for each ellipse (If you have a hard time seeing the picture clearly, click on the picture so that you can inspect it more closely.)

\[
\frac{(y-A)^2}{B^2} + \frac{(x-C)^2}{D^2} = 1
\]

where \( A = \) ___, 
where \( B = \) ___, 
where \( C = \) ___, 
where \( D = \) ___

21. (1 pt) Consider the hyperbola \(49y^2 - 49x^2 = 49\).
Its vertices are \((0, \pm A)\) with \( A = \) ____;
its foci are \((0, \pm B)\) with \( B = \) ____;
its asymptotes are \(y = \pm Cx\) with \( C = \) ____.

22. (1 pt) Evaluate the following expression without using a calculator. Simplify your answer as much as possible, and enter your answer as a fraction.

\[
\left(\frac{64}{8}\right)^{-1/3} =
\]

23. (1 pt) Simplify the following expression as much as possible. Assume that all variables are positive.

\[
\sqrt[3]{64x^5} \sqrt[4]{64y^5} =
\]

24. (1 pt) The expression

\[
\left(\frac{x^6y^{4/5}}{y^4}\right)
\]

equals \(x^r/y^t\) where

\( r, \) the exponent of \( x, \) is: __________
\( t, \) the exponent of \( y, \) is: __________

25. (1 pt) Change the radical

\[
\sqrt[3]{\frac{5}{8}}
\]

into simplest radical form \(\frac{A}{B}\sqrt{C}\), where \( A, B, \) and \( C \) are all integers.

Answer: \( A = \) _____, \( B = \) ______, and \( C = \) ______

26. (1 pt) Find the product

\[
(2\sqrt{x} - 6\sqrt{y})(2\sqrt{x} + 6\sqrt{y})
\]

and express your answer in simplest radical form.

Answer: __________

27. (1 pt) The solution of the equation \(\sqrt{2x + 1} = \sqrt{2x - 1} + 1\) is \(x = \) ___.

28. (1 pt) The solution of the equation

\[
(2x - 1)^{\frac{1}{2}} - 3 = 0
\]

is \(x = \) ___.

Hint: You need to take something to the power 3.