Unit Test - Functions (Full Test Review)

Short Answer

1. Find the value of $f(-9)$ and $g(4)$ if $f(x) = -4x + 8$ and $g(x) = 6x + 25x^{-2}$.

   Simplify the given expression. Assume that no variable equals 0.

2. $(14x)(4xy^{14})(-4x^{-10}y^7)$

3. $(\dfrac{20x^{20}y^9}{40x^7y^{13}})^4$

4. Find $[g \circ h](x)$ and $[h \circ g](x)$.
   $g(x) = 7x$
   $h(x) = -5x^3 + 9x^2 - 2x + 2$

5. Find $(\dfrac{f}{g})(x)$ for the following functions.
   $f(x) = 20x^3 - 4x^2 + 10x - 13$
   $g(x) = -12x^2 - 7$

6. Find $(f - g)(x)$ for the following functions.
   $f(x) = 12x + 15$
   $g(x) = -20x^2 + 2x + 30$

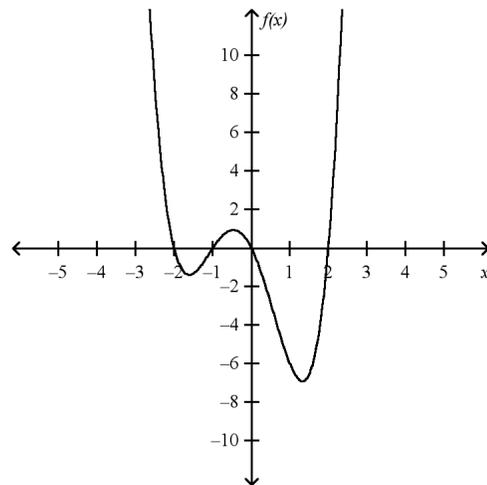7. Find $(f \cdot g)(x)$ for the following functions.
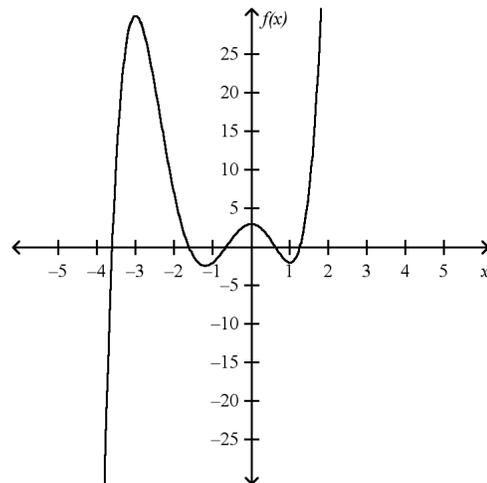 $f(x) = 3x^2 - 4x - 5$
   $g(x) = 11x - 3$

For the given graph,
a. *describe the end behavior,*
b. *determine whether it represents an odd-degree or even-degree polynomial function, and*
c. *state the number of real zeros.*

8.

9.

10. Find $(f + g)(x)$ for the following functions.
    $f(x) = 6x^2 + 9x + 8$
    $g(x) = 4x + 6$

Simplify the expression using long division.

11. $(9x^2 - 41x - 6) \div (x - 4)$

Simplify using long division.

12. $(3x^3 - 35x^2 + 128x - 140) \div (x - 5)$

13. A turtle travels at a rate of 0.7 meter per minute. Write a function expressing the distance traveled by the turtle, d, in terms of minutes traveled, t.

14. Daniel pays $389 in advance on his account at the athletic club. Each time he uses the club, $7 is deducted from the account. Write a linear function to calculate the value remaining in his account after x visits to the club. Use the linear function to find the value remaining in the account after 11 visits.

15. When an object is thrown up in the air with a given initial height and velocity, its position is given as a function of time by starting with the initial height, adding the product of the initial velocity and the time, and adding the product of half the gravitational acceleration and the square of the time to that. On the surface of the earth, the acceleration due to gravity is 9.8 m/s². If an object is thrown from a height of 12.17 meters at an initial velocity of 7.87 meters per second, write the position function of the object. Use the position function to find the position of an object after 3 seconds. (Acceleration is negative if an object is thrown up.)

16. The light from a laser beam travels at a speed of 3×10^8 meters per second. How long will the light take to cover a distance of 4×10^{12} meters?

17. The initial price of a stock was x dollars. The first week of trading, the price gained $x^2 - x + 4$ dollars and the second week it lost $2x^2 + x - 2$ dollars. Write an expression that represents the price of the stock at the end of the second week.

18. The perimeter of a triangle is $8x + 3y$. The length of two sides of the triangle are $4x + y$ and $2x - 3y$. Find the measure of the third side of the triangle.

19. Ben wants to buy a DVD player that is on sale for 20% off the original price of $169. The sales tax is 6.25%.

     Find the composition function that represents the price of the DVD Player., Explain your reasoning.

20. Ryan has two discount coupons. One coupon is for $50 off the original price of $349 for a microwave oven and the other coupon is for 12% of the original price of the same appliance. Both coupons can be used at once, and Ryan has the option of which discount is taken first. Show how Ryan uses the composition of the following function to make his decision. Find which discount coupon Ryan should use to take a maximum discount.

     $d(x) = x - 50.00$

     $p(x) = 0.88x$