Math 107 online practice test 3

Your exam will contain 16 questions selected from the following problem types.

1. From the following equations,

i)	$y(x) = -7x + 4$	ii)	$y(x) = -3(x - 3)^2 - 4$
iii)	$y(x) = 3(x - 3)(x + 4)$	iv)	$y(x) = 4x - 7$
v)	$y(x) = -4x + 7$	vi)	$y(x) = -5(x - 3)(x + 4)$

identify the equation of
a) a linear function which has slope 4 and y-intercept (0,-7)
b) a quadratic function which opens downwards and has a vertex at (3, -4)

2. From the following equations,

i)	$y(x) = x^4$	ii)	$y(x) = (x + 3)(x - 4)(x + 7)(3x - 5)$
iii)	$(x - 3)^2 + (y + 4)^2 = 64$	iv)	$y(x) = (x - 3)(x + 4)(x + 2)^2$
v)	$(x + 3)^2 + (y - 4)^2 = 8$	vi)	$(x + 3)^2 + (y - 4)^2 = 64$

identify the equation of
a) a circle which has radius 8 and center (-3, 4)
b) a function which has four x-intercepts.

3. Graph the function $y(x) = x^2 - 2x - 3$ for the domain $\{x| -2 \le x \le 4\}$

4. Graph the relation $(x + 2)^2 + (y - 3)^2 = 9$

5. Explain why the questions "Solve: $-3x^2 + 6x + 24 = 0$" and "Find the x-intercepts of the quadratic function f: $f(x) = -3x^2 + 6x + 24$" necessarily have the same values of x as solutions.

6. Find the x-intercepts of the quadratic function f: $f(x) = -3x^2 + 6x + 24$

7. Find the vertex of the function f, where $f(x) = -3x^2 + 6x + 24$

8. Sketch the function f, where $f(x) = -3x^2 + 6x + 24$. On your sketch, shade the interval on x which corresponds to the solution set of the inequality $-3x^2 + 6x + 24 < 0$

9. State the domain and the range of the function f given in question 6.

For questions 10, 11, 12 use the following for functions f, g and h:

$F(x) = 4 + 3x$, $g(x) = 2x^2 - 7$, $h(x) = \dfrac{1}{x^2}$

10. Find a) $(fg)(3)$
b) $(f - g)(x)$

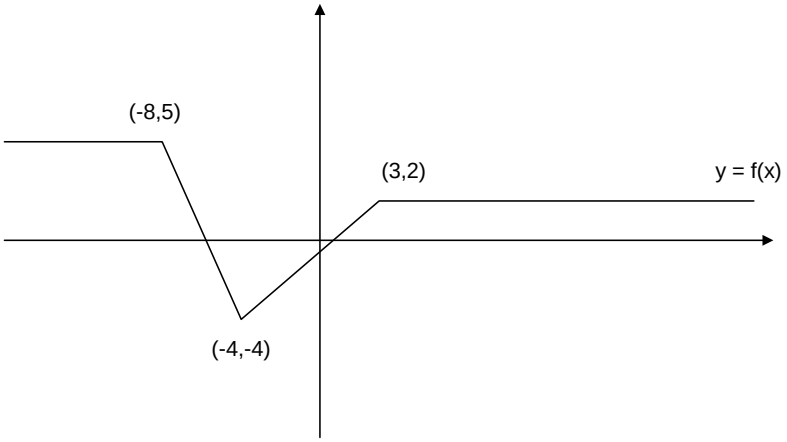
11. Solve: $(f - g)(x) = 0$

12. Find a) $g \circ h\,(x)$
b) $h \circ h\,(x)$

13. The graph of the function y = f(x) is drawn below. Describe in words the effects on the graph of the following transformations.

a) $y = -3f(x)$

b) $y = f(x + 3)$



14. Referring to the graph of y = f(x) in question 13, draw a graph of the transformed function $y = -f(x - 2) + 3$.

15. Use long division to divide the polynomials: $(x^5 - 2x^4 - x^3 + 3x + 8) \div (x + 4)$

16. Use synthetic division to divide the polynomials: $(x^5 - 2x^4 - x^3 + 3x + 8) \div (x + 4)$

17. Use the remainder theorem to find P(-2), given $P(x) = x^5 - 2x^4 - x^3 + 3x + 8$

18. Find the real zeros of the polynomial by factoring: $2x^3 - 6x^2 - 20x$

19. Use the zero location theorem to determine whether that $P(x) = x^5 - 2x^4 - x^3 + 3x + 8$ has a zero between -3 and -1.

20. Use the rational zeros theorem to determine the possible zeros for the polynomial function $P(x) = 4x^4 - 3x^3 + 7x^2 + 4x + 6$

21. Use Descartes' Rule of Signs to determine the number of possible positive and negative zeros for $P(x) = 4x^4 - 3x^3 + 7x^2 + 4x + 6$

22. The complex number (3 + 2i) is a zero of the polynomial function $P(x) = x^3 + 5x^2 - 13x - 65$. Find the other zeros.

23. Find a polynomial function of lowest degree with integer coefficients that has the zeros: 6 + 3i, 6 – 3i, 7.