

Practice Test, Unit 2 Assessment

1. Determine where in the domain will  $f(x)$  be increasing? (use interval notation to write your answers.)

**(Following a, b, and c are 3 separate questions)**

(a)  $f(x) = |x-2| + 2|x+2|$

(b)  $f(x) = -|x-3| + \frac{1}{2}|x-2|$

(c)  $f(x) = |2x-1| + |2x-5|$

2. Given  $f(x) = x^2, x > 0$ , if  $f^{-1}(x) = g(x+2)$ ,

(a) find the domain and range of  $g^{-1}(x)$

(b) graph  $g^{-1}(x)$

3. For each pair of functions  $f(x)$  and  $g(x)$ , find the intersection of  $f(x)$  and  $g(x)$  algebraically and verify your result graphically.

**(Following a and b are 2 separate questions)**

a)  $f(x) = |2x-1|, g(x) = x^2$

b)  $f(x) = \frac{1}{x-1}, g(x) = \frac{4}{3}$

4. Given  $f(x) = 4 - x^2$  and  $g(x) = -\frac{3}{2}x + b$ , if  $f(x)$  and  $g(x)$  intersect at exactly one point.

(a) Find the variable  $b$

(b) Find a line that is perpendicular to  $g(x)$  and passes through the point of tangency between  $f(x)$  and  $g(x)$ .

5. Find all possible rational zeros of  $f(x)$ .

**(Following a, b, and c are 3 separate questions)**

a)  $f(x) = 2x^4 - 7x^3 + x^2 + 7x - 3$

b)  $f(x) = 2x^4 + 5x^3 - 2x^2 - 11x - 6$

c)  $f(x) = 2x^4 + 5x^3 - 12x^2 - 7x + 6$

6. Assume  $f(x)$  is a 4<sup>th</sup> degree polynomial and all coefficients of  $f(x)$  are real numbers. If  $f(x)$  has

**(Following a, b, and c are 3 separate questions)**

a) 1, -3, and  $2+i$  as zeros and  $f(0) = \frac{15}{2}$

b)  $3-i$  and  $\frac{1}{2} - \frac{\sqrt{3}}{2}i$  as zeros

and  $f(0) = -5$

c) 2, 0,  $1-i$  as zeros and  $f(1) = -1$

1) Find  $f(x)$  (in general form)

2) What is the remainder if  $f(x) \div (x-2)$ .

7. Consider the following polynomial,

**(Following a, b, and c are 3 separate questions)**

a)  $f(x) = (x-2)(x^2-4) - (x^2-4)$

b)  $f(x) = x^3 + 6x^2 - 9x - 54$

c)  $f(x) = (x+2)(2x^2-x-6) - x^2(x^2-4)$

1) Describe the ending behavior of the polynomial

2) Describe the behavior of the polynomial around its zero.

3) Sketch  $f(x)$ , based on the results from 1) and 2)

8. Assume  $z_1, z_2$  are complex numbers, and  $a, b$  are real numbers if

**(Following a, b and c are 3 separate questions)**

$z_1 = a + bi,$

a)  $z_2 = 2a - 3bi,$

$z_1 + z_2 = 3 + 4i$

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$$z_1 = 2a - bi,$$

b)  $z_2 = (a + b) - 4bi,$

$$z_1 - z_2 = 2 + 3i$$

$$z_1 = 3a - 2bi,$$

c)  $z_2 = (a + b) + ai,$

$$z_1 - z_2 = -4i$$

Find

1)  $z_1, z_2$

2)  $\left| \frac{z_2}{z_1} \right|$