

## REVIEW TEST 2

### Chapters 8 & 9

1) Solve ( in the set of complex numbers  $\mathbb{C}$  ) using the Square root property:

a)  $9x^2 = 25$  ;      b)  $\left(x - \frac{1}{2}\right)^2 = \frac{3}{4}$  ;      c)  $3(t-2)^2 + 38 = 0$       d)  $1 - 3(y-1)^2 = 10$

2) Solve the following ( in the set of complex numbers  $\mathbb{C}$  ) by the quadratic formula:

a)  $2x^2 + 1 = 4x$  ;      b)  $t^2 - \frac{t}{2} + 1 = 0$  ;      c)  $\frac{1}{2}x^2 + 5 = \frac{3}{2}x$  ;

3) Solve the following ( in the set of complex numbers  $\mathbb{C}$  ) by completing the square:

a)  $x^2 - 6x - 7 = 0$  ;      b)  $2a^2 - 6a - 5 = 0$  ;      c)  $-4x^2 - 36x - 65 = 0$  ;      d)  $3x^2 = 5x + 21$

4) Answer all questions; show all work. Let  $y = \frac{1}{3}(x+3)^2 - 2$  be a parabola.

a) What type of curve is this?; b) y-intercept?; c) Vertex ; d) x- intercept(s)? ; e) sketch its graph; f) What is the standard form of the equation? g) Domain? h) Range? i) Is this function one-to-one? Does it have an inverse?

5) Answer all questions for each parabola.

i)  $y = -2x^2 + x + 3$       ii)  $y = 2x^2 - 5x - 6$       iii)  $y = \frac{1}{7}x^2 - 8x + 66$

a) What type of curve is this?; b) y-intercept?; c) Vertex ; d) x- intercept(s)? ; e) sketch its graph; f) What is the vertex form of the above equation? g) Domain? h) Range? i) Is this function one-to-one? Does it have an inverse?

6) A model rocket launched with an upward velocity of 3.75 meters per second. The height of the rocket after  $t$  seconds is given by the formula:  $h = -4.9t^2 + 3.75t + 12.25$  .

- How high is the rocket off the ground to start with?
- How long does it take the rocket to hit the ground?
- When does the rocket reach a height of 10 meters?
- What is the maximum height the rocket reaches and how long it takes to reach that height?

7) A baseball thrown vertically reaches a height  $h$  in feet given by  $h = 56t - 16t^2$  , where  $t$  is measured in seconds. What is the maximum height and how long it takes to get there? During what intervals is the height of the ball greater than 40 feet?

8) A baseball is thrown straight up from a rooftop. The function  $s(t) = -16t^2 + 48t + 448$  describes the ball's height above the ground,  $s(t)$ , in feet,  $t$  seconds after it is thrown.

- What was the initial height of the ball?
- Where is the ball after 1 second?
- How long will it take for the ball to hit the ground?

9) One leg of a right triangle is 12 inches. The hypotenuse is 3 inches less than twice the other leg. Find the lengths of the three sides of the triangle.

**More Word problems:** Section 5.7 – Problems 65, 66, 71, 83

1. Graph the following functions. Label the asymptote and 3 points on each graph. Give domain and range.

a.  $f(x) = 2^x$

c.  $g(x) = \log_3 x$

e.  $y = (0.3)^x$

b.  $h(x) = e^x$

d.  $y = \ln x$

f.  $y = \log_{\frac{1}{2}} x$

2. Let  $f(x) = 2x + 5$  and  $g(x) = \frac{3-x}{x+4}$ . Answer the following questions:

a) Find  $(g \circ f)(x)$

b)  $(f \circ g)(-3)$

c) Find  $f^{-1}(x)$

d)  $g^{-1}(x)$

3. Find the inverse of each function:

a)  $f(x) = \frac{1}{2}\sqrt{3x-7} + 4$

c)  $g(x) = 5 - 2\sqrt[3]{4+x}$

c)  $h(x) = \frac{2}{3}x + 6$

d)  $l(x) = \frac{x+1}{2-x}$

Exercise 6 Handout Chapter 9

4. Write each equation in its equivalent exponential form:

a)  $3 = \log_4 x$

b)  $\log_5 125 = y$

c)  $\ln(x+1) = 2$

Exercise 3 Handout Chapter 9

5. Write each equation in its equivalent logarithmic form:

a)  $2^{-4} = \frac{1}{16}$

b)  $15^x = 2$

c)  $e^5 = x$

Exercise 2 Handout Chapter 9

6. Write as a single logarithm with coefficient 1:

a)  $\log(x+1) - \log(x+2)$

b)  $2\ln 3 + \ln x - \frac{1}{2}\ln y$

Exercises 5, 10 Handout Chapter 9

7. Expand as much as possible.

a)  $\log_5 \left( \frac{125x^3}{y^2\sqrt{t}} \right)$

b)  $\ln \left( \sqrt[3]{\frac{x^2y}{4z^5}} \right)$

Exercise 4 Handout Chapter 9

8. Solve each equation. Give **exact answer** as well as an **approximation**. Write conditions whenever appropriate.

a)  $2^{4x-5} = 16^{1+x}$

d)  $\log_5 x + \log_5(4x-1) = 1$

Exercises 8,9 Handout Chapter 9

b)  $25e^{4x} + 12 = 50$

e)  $\log(x+4) - \log 2 = \log(5x+1)$

c)  $3\ln(x+2) - 4 = 3$

f)  $\ln(x+1) - \ln x = 1$

g)  $5^{x-3} + 1 = 12$

**All word problems from Handout Chapter 9, exercises 11 – 24 and from Homework Chapter 9.**