Topics on the 3rd Quarter Final Exam

Complex numbers
Add, subtract, multiply

1. a) $(3-4i)+(2+6i)$

$3+2-4i+6i$

$=5+2i$

b) $5i-(-7+2i)$

$5i+7-2i$

$7+3i$

Remember

$\sqrt{-1}=i$

$-1=i^2$

c) $2i\cdot 5i$

$=2\cdot 5\cdot i\cdot i$

$=10i^2$

$=-10$

d) $(-8i)^2$

$64i^2$

-64

e) $(2-5i)(3+6i)$

$=6+12i-15i-30i^2$

$=6-3i+30$

$=36-3i$

f) $(3+2i)(3-2i)$

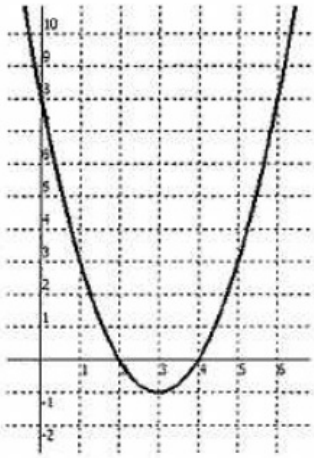
$9-6i+6i-4i^2$

$9+4$

13

Quadratics
Determine the domain and range
Understand translations

2. **Given the graph of** $f(x)=$



a) Find $f(0)=$ 8

b) Find $f(5)=$ 3

c) Find the y-intercept (0,8)

d) Find the x-intercepts (2,0) and (4,0)

e) Determine the domain $\mathbb{R}$

f) Determine the range $y\geq -1$

g) Determine the vertex (3,-1)

h) Write the equation of the function

$f(x)=$ $(x-3)^2-1$ vertex form

$f(x)=$ $(x-2)(x-4)$ factored form

$f(x)=$ x^2-6x+8 standard form

Solving by . . .

Factoring
Quadratic Formula
Square Roots
Graphing – *(not necessary in March 2012)*

Derive the quadratic equation given the solutions

3. Solve the following equations using any method – You must practice all 4 methods.
(Use the easiest method when solving each problem – You must show your work)

a. $x^2-13x+22=0$

M: 22
A: 13
-11, -2

$(x-11)(x-2)=0$

$x-11=0 \quad x-2=0$

$x=11, 2$

b. $x^2=9x-20$

$x^2-9x+20=0$

$(x-5)(x-4)=0$

$x-5=0 \quad x-4=0$

$x=5 \quad x=4$

c. $x^2+x+1=0$

$x=\frac{-(1)\pm\sqrt{(1)^2-4(1)(1)}}{2(1)}$

$x=\frac{-1\pm\sqrt{-3}}{2}$

$x=\frac{-1\pm i\sqrt{3}}{2}$

d. $(x+8)^2+6=0$

$-6 \quad -6$

$(x+8)^2=-6$

$\sqrt{(x+8)^2}=\sqrt{-6}$

$x+8=\pm i\sqrt{6}$

$x=-8\pm i\sqrt{6}$

e. $6x^2=2x$

$6x^2-2x=0$

$2x(3x-1)=0$

$2x=0 \quad 3x-1=0$

$x=0 \quad x=\frac{1}{3}$

f. $2=5x^2-3x$

$0=5x^2-3x-2$

$a=5$
$b=-3$
$c=-2$

$x=\frac{-(-3)\pm\sqrt{(-3)^2-4(5)(-2)}}{2(5)}$

$x=\frac{3\pm\sqrt{9+40}}{10}$

$x=\frac{3\pm7}{10}$

$x=\frac{3+7}{10}, \frac{3-7}{10}$

$x=1, -\frac{2}{5}$

4. Given the solutions, determine the quadratic equation

a. 5, -2 $\quad x=5 \quad x=-2$

$x^2-3x-10=0$

Graphing

vertex form
factored form

5. Determine the *x*-intercepts and *y*-intercept.
Draw a rough sketch of the function.

a. $f(x)=(x-5)(x+1)$

x-int

$0=(x-5)(x+1)$

$x=5, -1$

$(5,0)\ (-1,0)$

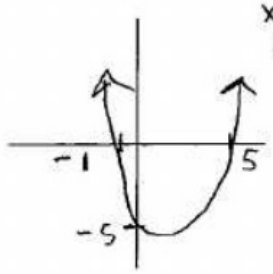
y-int

$(0-5)(0+1)$

$(-5)(1)$

-5

$(0,-5)$



b. $g(x)=-(x+3)^2+1$

x-int

$0=-(x+3)^2+1$

$(x+3)^2=1$

$\sqrt{(x+3)^2}=\sqrt{1}$

$x+3=\pm1$

$x=-3\pm1$

$x=-2, -4$

$(-2,0)\ (-4,0)$

y-int

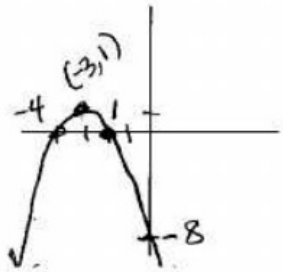
$-(0+3)^2+$

$-(3)^2+1$

$-9+1$

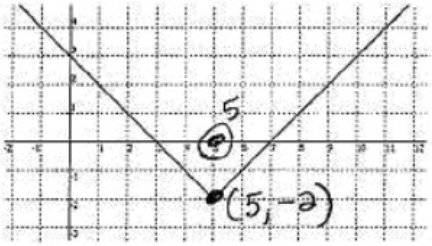
-8

$(0,-8)$



Absolute Value

6 a) Write the equation of the function $g(x) =$



a) Find $g(3) =$ 0

b) Find $g(5) =$ -2

c) Find the y-intercept (0, 3)

d) Find the x-intercepts (3, 0) and (7, 0)

e) Determine the vertex (5, -2)

f) Write the equation of the function
$g(x) =$ $|x-5|-2$

Trigonometry
Convert from degrees to radians and radians to degrees

7. How many radians is 30^0?

$$\frac{30^0}{1}\cdot\left(\frac{\pi}{180^0}\right) = \frac{\pi}{6}$$

8. What degree measure is equivalent to $\frac{5\pi}{3}$ radians?

$$\frac{5\pi}{3}\cdot\left(\frac{180^0}{\pi}\right) = 300^\circ$$

Convert to radians

a. $\frac{210^\circ}{6}\left(\frac{\pi}{180^\circ}\right) = \frac{7\pi}{6}$

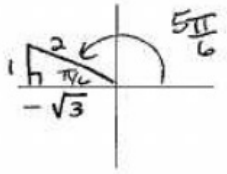
Convert to degree measure

a. $\frac{5\pi}{6}\left(\frac{180^\circ}{\pi}\right) = 150^\circ$

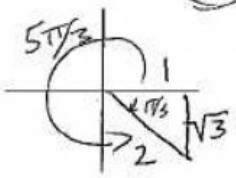
Evaluate trig. functions given special angles and quadrantal angles

9. Find the following trigonometric ratios for the given angles. **Do not use a calculator!**
You may find drawing a reference triangle helpful.

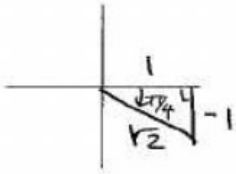
a) $\cos\left(\frac{5\pi}{6}\right) = -\frac{\sqrt{3}}{2}$



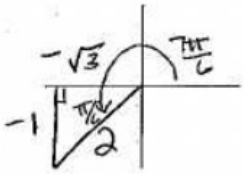
b) $\tan\left(\frac{5\pi}{3}\right) = -\frac{\sqrt{3}}{1}$



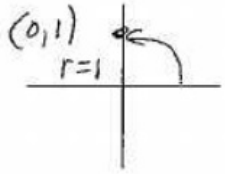
c) $\sin\left(-\frac{\pi}{4}\right) = -\frac{1}{\sqrt{2}} = -\frac{\sqrt{2}}{2}$



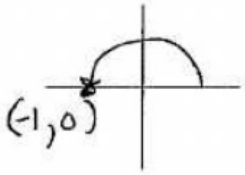
d) $\cos\left(\frac{7\pi}{6}\right) = -\frac{\sqrt{3}}{2}$



e) $\sin\left(\frac{\pi}{2}\right) = \frac{1}{1} = 1$



f) $\tan(\pi) = \frac{0}{-1} = 0$



Determine the angle given the ratio and quadrant for a trig. function.

10. If $\cos\theta = -\frac{1}{2}$, then $\theta = ?$ for $0 \le \theta \le \pi$

A. $\frac{\pi}{6}$

B. $\frac{\pi}{3}$

C. $\frac{5\pi}{6}$

D. $\frac{2\pi}{3}$