FINAL EXAM-WINTER 06 SHORT FORM
EACH QUESTION IS WORTH 5 MARKS.

1. With the help of factoring simplify:
$$\frac{2x^2-11x+5}{2x^2+9x-5} \div \frac{x^2-25}{x^2+8x+15} \times \frac{-x-5}{x+3}$$
ANS. $\frac{x+3}{x+5}$

2. Solve the equation.
$$\frac{x-3}{x^2-1}+\frac{3}{x-1}=\frac{8}{x+1}$$
ANS $x=2$

3. Find the inverse function $\left(f^{-1}(t)\right)$, given; $f(t)=t^3+4 \quad (t>0)$.
ANS $f^{-1}(t)=\sqrt[3]{t-4}$

4. Solve for x using quadratic formula, given: $-11x^2+12x-1=0$.
$x=1$ OR $x=1/11$

5. Simplify: (i) $\dfrac{\left(-3x^2y^3\right)^4\left(x^{-2}\right)^3}{\left(x^{-3}y^{-2}\right)^{-4}}$ (ii) $\sqrt[3]{16x^8 \cdot y^5}$

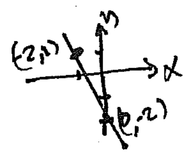
i) ANS $\frac{81y^4}{x^{10}}$

ii ANS $2x^2y\sqrt[3]{2x^2y^2}$

6. Given: a) $f(x)=2x+7$, find $\dfrac{f(x+h)-f(x)}{h}$. ANS 2

b) Rationalize the denominator and simplify, $\dfrac{3-\sqrt{2}}{5-\sqrt{8}}$ ANS $\frac{11+\sqrt{2}}{17}$

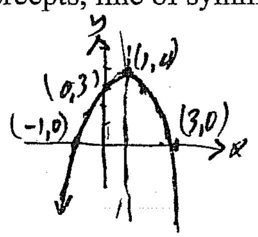
7. Find the equation of a line in standard form passing through $(0,-2)$ and perpendicular to the line represented by $2x-3y+6=0$. Graph this line indicating x & y intercepts. ANS $3x+2y=-4$



8. Given: $f(x)=2x^2-1 \qquad g(x)=2x-3$. Find
(i) $(f-g)(2)$ (ii) $(g \circ f)(x)$ ANS $4x^2-5$
ANS $=6$

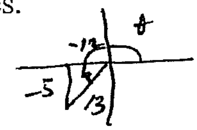
9. Graph the parabola represented by the equation $y=-x^2+2x+3$.
Calculate and indicate on the graph, x and y intercepts, line of symmetry, and the co-ordinates of the vertex.

x-int $(-1,0)$ & $(3,0)$
y-int $(0,3)$
VERTEX $(1,4)$ line of sym $x=1$



10. Given $sec\theta = \frac{-13}{12}$ and $\tan\theta > 0$. Locate this angle in its proper quadrant and then write all other trigonometric function values.

$\sin\theta = -5/13$ $\csc\theta = -\frac{13}{5}$
$\cos\theta = -12/13$ $\sec\theta = -\frac{13}{12}$
$\tan\theta = 5/12$ $\cot\theta = \frac{12}{5}$



11. Use the calculator to find:

1) $\sec\left(\frac{13\pi}{8}\right) =$ 2.6131

2) $\cot^{-1}(5.7)$, $\theta(DEG) =$ 9.9506^{0}

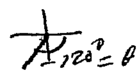
3) $\log_5 3125 =$ 5

4) $\log(x) = -3$, $x =$ .001

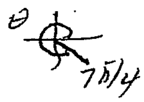
5) $\ln\left(e^{-13.5}\right) =$ -13.5

12. a) Locate these exact value angles in their proper quadrants, label the three sides of the right triangle and then find:

(i) sec(-120°) REF ∠ 60° sec -120° = -2 in Q_2



(ii) $\tan\left(\frac{7\pi}{4}\right)$ REF ∠ $\pi/4$ = 45° in Q_4 $\tan\frac{7\pi}{4} = -1$



13. The angle of elevation to the top of the C.N.Tower from a point on the ground 200 m from the base of the pole is $66°45'$. Find the height of the C.N. Tower.

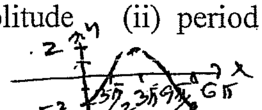
H = 465.5 m

14. Verify the identity.
$\csc\theta - \cos\theta \cdot \cot\theta = \sin\theta$

15. Solve for x: $0° \le x < 360°$
$\sqrt{3}\tan x + 1 = 0$.

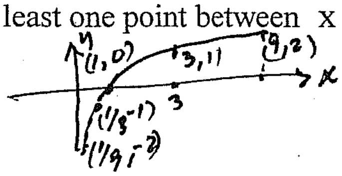
$\theta = \{150° \text{ or } 330°\}$

16. Sketch the graph of $y = -2\cos\frac{1}{3}(x)$ for one period interval, calculate and indicate on the graph, (i) amplitude (ii) period (iii) quarter points co-ordinates



amp = 2
period = 6π
$0, 3\pi/2, 3\pi, 9\pi/2, 6\pi$

17. Sketch the graph of $y = \log_3(x)$. Indicate the x-intercept point and additional 3 points (at least one point between x = 0 to x = 1).



18. Solve for t:

$\log_2(t+22)-\log_2(t+1)=\log_2(2)^3$. Ans $t=2$

19. Solve for t: $2(4)^{1.7t}=262144$. Ans $t=5$

20. The wheelchair ramp is in the form of a circular sector and is 2 m wide. If the inner radius is 10 m and the central angle is $50°15'$, find the area of the ramp.
$\left(A_{\text{sector}}=\frac{1}{2}\theta r^2\right)$ Ans $A=19.29\ m^2$