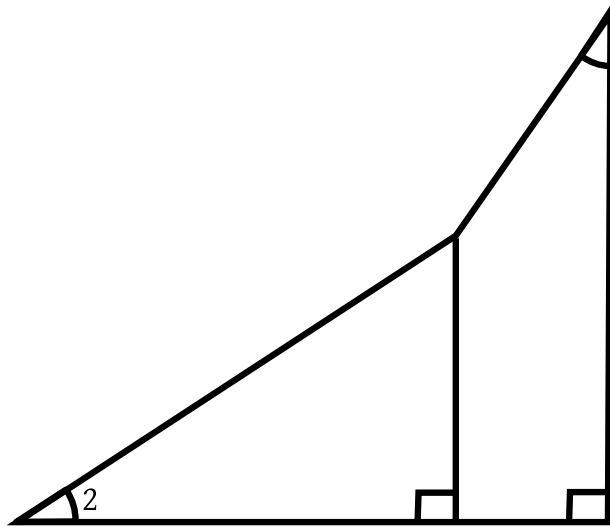# FINAL EXAMINATION - WINTER 2010

Question 1. *(5 marks)*
Find the length x in the diagram given below.

Question 2. *(6 marks)*
Solve the following equations.

a. $\log_8 x = -2$

b. $\log_b\left(\frac{1}{64}\right) = -3$

c. $\log_5 125^{-1} = x + 1$

Question 3. *(8 marks)*
Factor the given expressions completely.

a. $x^2 - 4x - 45$

b. $2k^2 - k - 36$

c. $4x^2 - 64y^4$

d. $16x^3y + 54y$

Question 4.
Solve each system of equations using any method.
a. *(3 marks)*

$2x - 3y = -5$
$3x + 2y = 12$

b. *(5 marks)*

$3r + s - t = 2$
$r - 2s + t = 0$
$4r - s + t = 3$

Question 5.
Given the function $f(x) = 2 + 3x + x^2$
a. *(5 marks)*
Graph the function $y = f(x)$ indicating its vertex x-intercepts and y-intercept.

b. *(3 marks)*
State the domain and range of f.

Question 6. *(4 marks)*
Given $\cos\theta = \frac{\sqrt{3}}{2}$, find θ for $0 \quad \theta < 2\pi$

Question 7. *(6 marks)*
a. Find the slope and *y*-intercept of the line $3x - 7y = 6$

b. Find the value of k such that the line $kx - 2t$

Question 9.

Question 10.

Solve the following equations.

a. *(2 marks)*

$2^{x+1} = 0.75$

b. *(3 marks)*

$\log_3(x-2) + \log_3(x) = 1$

c. *(3 marks)*

$2(5^x) = 3^{x+1}$

Question 11. *(4 marks)*

If $\log_b x = 2$ and $\log_b y = 3$ then find the value of $\log_b \sqrt{x^5 y^3}$

Question 12. *(4 marks)*

Perform the indicated operation. Express the result in rectangular, exponential and polar forms.

$(3 - 4j)^6$

Question 13. *(4 marks)*
Find θ for $0 \le \theta < 360$
If $\tan \theta = 1.35$ and $\sin \theta < 0$

Question 14. *(3 marks)*
Isolate the variable μ in the equation $I = \frac{VR_2 + VR_1(1+\mu)}{R_1 R_2}$.

Question 15. *(5 marks)*
Graph the function $y = \frac{1}{2}\cos(2\pi x)$ over two periods. State its period and its amplitude.

Question 16.
Solve the following equations.
a. *(3 marks)*
$6x^2 = 9 - 4x$

b. $\frac{x-2}{x-5} = \frac{15}{x^2-5x}$ *(5 marks)*

Question 17 *(5 marks)*

Find the cube roots of -64.

Question 18. *(4 marks)*