**Math 1643** **Final Exam - Form A** **Fall , 2012**

**Name:** _____ **ID # :** _____

**Instructor:** _____ **section :** _____

**Directions: Use a #2 pencil. Choose only one answer for each question. Put your work on this paper and circle your answers. Mark your answers on the scantron sheet. Fill in your name, ID and section number on the grid. Use the first 3 columns of the special code section (KLM) for your 3-digit section number.**

**1) Find the equation of the line that passes through the points ( 4 , 2 ) and ( 8 , - 5 )**

**A)** $7x - 4y = 20$ **B)** $4x - 7y = 2$ **C)** $7x + 4y = 36$

**D)** $4x + 7y = 30$ **E)** $3x + 4y = 15$

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**2) The revenue R for a concert is given by** $R = -\frac{1}{4}x^2 + 1800x$**, where x is the number of tickets sold. Determine the number of tickets that will yield maximum revenue.**

**A)** 3600 **B)** 2400 **C)** 7200 **D)** 3240 **E)** 14400

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**3) What is the horizontal asymptote of the function** $y = \frac{12 - 24x - 9x^2}{4x + 3x^2 + 6}$ **?**

**A)** $y = 3$ **B)** $y = -3$ **C)** $y = 2$ **D)** $y = -6$ **E)** $y = -8$

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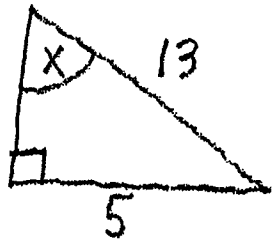
**4) Given the triangle to the right, find sec X.**




**A)** $\frac{5}{13}$ **B)** $\frac{12}{13}$ **C)** $\frac{5}{12}$ **D)** $\frac{13}{5}$ **E)** $\frac{13}{12}$

5) Find the solution of $\frac{3x+2}{3} - \frac{6x+4}{5} = \frac{14}{5}$

A) $-\frac{44}{3}$ B) $\frac{20}{33}$ C) $-4$ D) $5$ E) $-\frac{40}{3}$

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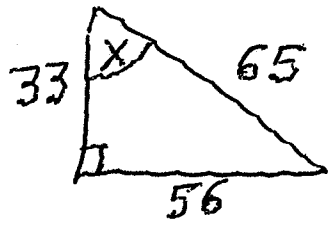
6) Given the triangle to the right, find the measure of angle X, to the nearest degree.




A) 27° B) 41° C) 59° D) 63° E) 49°

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7) Factor completely: $54bc^3 - 24bc$

A) $6bc(3c+2)(3c-2)$ B) $2b(3c-2)(9c^2-6c+4)$

C) $2b(3c-2)(9c^2+6c+4)$ D) $(6c^3+12)(9b-2c)$

E) $6bc(3c-2)^2$

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8) If $f(x) = \frac{22-4x}{7}$, then $f^{-1}(-6) = ??$

A) $-\frac{2}{7}$ B) 16 C) $\frac{9}{4}$ D) $\frac{11}{2}$ E) $-5$

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9) Simplify: $x - \frac{3x}{2x-\frac{1}{5}}$

A) $\frac{-5x^2-x}{10x-1}$ B) $\frac{x^2-5x}{10x-1}$ C) $\frac{10x^2-16x}{10x-1}$ D) $\frac{10x^2-14x}{10x-1}$

E) $\frac{2x^2-4x}{10x-1}$

10) Write $\log_c(4y-5)=x$ in exponential form.

A) $x^c=4y-5$ B) $c^{4y-5}=x$ C) $x^{4y-5}=c$

D) $c^x=4y-5$ E) $(4y-5)^c=x$

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11) Write $\frac{1}{2}\ln x+\frac{4}{3}\ln t-3\ln y+\ln 4$ as a single logarithm.

A) $\ln\left(\frac{\sqrt{x}\,\sqrt[4]{t^3}}{4y^3}\right)$ B) $\ln\left(\frac{\sqrt{x}\,\sqrt[3]{t^4}}{4y^3}\right)$ C) $\ln\left(\frac{4x^2\,\sqrt[3]{t^4}}{y^3}\right)$

D) $\ln\left(\frac{4\sqrt{x}\,\sqrt[4]{t^3}}{y^3}\right)$ E) $\ln\left(\frac{4\sqrt{x}\,\sqrt[3]{t^4}}{y^3}\right)$

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12) If $f(x)=x-x^2$ and $g(x)=5x-4$, then $g\circ f(x)=??$

A) $-25x^2-35x+12$ B) $-25x^2+45x-20$ C) $-25x^2-45x+20$

D) $-5x^2+5x-4$ E) $-5x^2-5x-4$

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13) Find the midpoint of the segment connecting $(-3,-5)$ and $(7,-11)$.

A) $(5,-8)$ B) $(4,-16)$ C) $(2,8)$ D) $(4,-8)$ E) $(2,-8)$

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14) Rationalize the denominator: $\frac{7\sqrt{2}}{3+\sqrt{5}}$

A) $\frac{21\sqrt{2}+7\sqrt{10}}{-2}$ B) $\frac{21\sqrt{2}-7\sqrt{10}}{4}$ C) $\frac{21\sqrt{2}+7\sqrt{10}}{4}$

D) $\frac{21\sqrt{2}+7\sqrt{7}}{4}$ E) $\frac{21\sqrt{2}-7\sqrt{10}}{-2}$

15) The function $f(t) = \frac{80000}{1 + 79\, e^{-1.8t}}$ describes the number of people, $f(t)$, who became ill with the flu $t$ days after its initial outbreak in a town of 80,000 people. How many people became ill when the flu epidemic began?

A) 5690 B) 1000 C) 1013 D) 2000 E) 2051

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16) Solve this equation for x: $\log x + \log(x - 9) = 1$

A) $x = -2$ and $x = 5$ B) $x = 10$ C) $x = 10$ and $x = 1$ D) $x = 5$

E) $x = 10$ and $x = \sqrt{97}$

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17) Find the average rate of change of $f(x) = 12x - x^2$ from $x = -6$ to $x = 3$.

A) 15 B) 9 C) $\frac{80}{3}$ D) $\frac{25}{9}$ E) 7

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18) Change 372 degrees to radians.

A) $\frac{31\pi}{30}$ B) $\frac{29\pi}{15}$ C) $\frac{31\pi}{15}$ D) $\frac{67\pi}{60}$ E) $\frac{103\pi}{50}$

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19) Find the solution(s) to the following equation: $|7 - 2x| = 3x$

A) $x = 1$ B) $x = -7$ C) $x = \frac{7}{5}$ D) $x = -7$ and $x = \frac{7}{5}$ E) $x = \frac{5}{7}$

20) Which of the following pair of lines is perpendicular?

A) $3x - 2y = 7$
$2x - 3y = 17$

B) $8x - 4y = 11$
$x - 2y = 19$

C) $x - 3y = 17$
$4x + 12y = 11$

D) $9x - 3y = 27$
$x - 3y = 13$

E) $8x - 2y = 17$
$3x + 12y = 5$

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21) The variable t varies directly as the cube of x and varies inversely as the square root of y. If $x = 2$ and $y = 256$, then $t = 9$. Find the value of t when $x = -4$ and $y = 81$.

A) 128 B) - 128 C) 72 D) - 384 E) $-\frac{128}{3}$

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22) Find the solution set for this inequality: $\sqrt{\frac{1}{2}x + 13} < 7$

A) $(-\infty, 72)$ B) $(-\infty, -12)$ C) $[-26, 72)$

D) $(-72, 72)$ E) $[-26, -12)$

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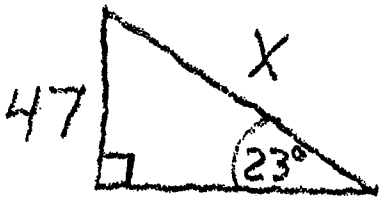
23) Fill in A and D on question 23 on your scantron and place AD next to Form on the long-answer sheet.

**Part 2. Long answer. Answer these problems on the additional answer sheet. Remember, partial credit is possible on these problems. Therefore, show as much of your work as you possibly can. Also, remember to place your final answer in the box for each problem.**

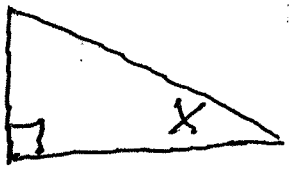
1) **Given the triangle to the right, find the length of the side marked with an X, to the nearest tenth.**




2) **Find the difference quotient** $\left[\frac{f(x+h)-f(x)}{h}\right]$ **for** $f(x) = 7x - 2x^2$, **assuming that h is not equal to zero.**

3) **Find the radius of the circle with equation** $x^2 + y^2 - 10x + 28y - 35 = 0$.

4) **Given the angle X to the right and given that** $\tan X = \frac{21}{20}$, **find the value of cos X in fraction form.**




5) **Find the slope of the line with equation** $\frac{8}{11}y - 56x = 801$

6) **Find the domain and range of the function** $f(x) = 93 - \sqrt{165 + 5x}$ .