Math 1643 Final Exam – Form MC name: _____

instructor: _____ section: _____

Part One. Place your answers on the scantron. Use Special Codes to identify your section. Also, darken in your name and ID #.

1) What is the vertex of the parabola $y = -4x^2 - 160x - 1500$?

A) (- 20 , 100) B) (20 , - 6300) C) (- 40 , - 1500)

D) (40 , - 14300) E) (- 80 , - 14300)

2) Factor completely: $2x^6 - 128x^3$

A) $2x^3(x-8)(x+8)$ B) $2x^3(x-8)^2$ C) $2x^3(x-4)^3$

D) $2x^3(x-4)(x^2+4x+16)$ E) $2x^3(x-4)(x^2-4x+16)$

3) Find the solution set for: $\log_2 x - \log_2(x-3) = 4$

A) $x = 4$ B) $x = \frac{16}{5}$ C) $x = \frac{48}{17}$ D) $x = -4$ E) $x = \frac{1}{5}$

4) If $f(x) = \frac{16-4x}{3}$ and $g(x) = \frac{1}{2}x^3$, then $g \circ f(-\frac{1}{2}) = ??$

A) $\frac{1372}{27}$ B) $\frac{43}{8}$ C) 108 D) 27 E) - 4

5) $\sqrt{75} - 3\sqrt{12} + 5\sqrt{48} = ??$

A) $2\sqrt{111}$ B) $31\sqrt{3}$ C) $20\sqrt{3}$ D) $19\sqrt{3}$ E) $\sqrt{279}$

6) Given the four points:

A = (- 2 , 7) B = (6 , - 8) C = (18 , - 3) D = (10 , 12)

which of the following statements is true?

A) The midpoint of segment BC is (12 , - 6)
B) The distance from A to B is the same as the distance from C to D
C) The distance from A to C is the same as the distance from B to D
D) Line AB is perpendicular to line CD
E) The slope of the line AC is $\frac{1}{2}$

7) Find all solutions for the equation $\sqrt{3\ x\ +\ 7}$ = 2 x

A) $\{\frac{7}{2}, -1\}$ B) $\{\frac{7}{4}, -1\}$ C) $\{1, -1\}$ D) $\{\frac{7}{4}\}$ E) $\{-1\}$

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

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

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

9) If $\log_5(\log_4(\log_3 x)) = 0$, then $x = ??$

A) 64 B) 256 C) 27 D) 81 E) undefined

10) Find the slope of the line $\frac{5}{3}y + 60x = 801$

A) - 100 B) 100 C) - 60 D) - 4 E) - 36

11) Find the domain of the function: $y = 23 - \ln(16 - 2x)$

A) $(-\infty, 8]$ B) $(8, \infty)$ C) $(0, 8)$ D) $(-\infty, 8)$ E) $(-8, 8)$

12) Find the solution set for this inequality: $\frac{1}{4}x - \frac{2}{3} \leq \frac{3}{8}x - \frac{5}{6}$

A) $(-\infty, \frac{3}{4}]$ B) $[\frac{4}{3}, \infty)$ C) $(-\infty, 8]$ D) $[8, \infty)$ E) $[\frac{5}{9}, \infty)$

13) If the midpoint of the line segment joining $(-8, t)$ and $(k, 14)$ is the point $(15, 12)$, then find the value of $t + k$

A) 21 B) 2 C) 48 D) 32 E) 76

14) Find the equation of the line with slope $-\frac{7}{5}$ and passes through the point $(-8, 11)$.

A) $7x - 5y + 111 = 0$ B) $7x + 5y + 1 = 0$ C) $5x - 7y + 117 = 0$

D) $5x + 7y - 23 = 0$ E) $5y = 19 - 7x$

15) If $f(x) = \begin{cases} 4x - 1 & \text{if } x < -2 \\ 9 - 2x & \text{if } -2 \le x < 1 \\ 4x^2 - 1 & \text{if } x \ge 1 \end{cases}$, then find $\dfrac{f\left(-\frac{1}{2}\right) - f\left(\frac{3}{2}\right)}{2}$

A) $\frac{9}{2}$ B) $-\frac{1}{2}$ C) 1 D) 2 E) $-\frac{23}{4}$

16) Given the polynomial $P(x) = 3x^3 - 5x^2 - 12x + 20$, which of the following is a factor of $P(x)$?

A) $3x + 5$ B) $x - 4$ C) $x + 1$ D) $3x - 4$ E) $x + 2$

17) What is the horizontal asymptote of $y = \dfrac{12 - 24x}{4x + 3}$?

A) $y = 3$ B) $y = -\frac{3}{4}$ C) $y = 2$ D) $y = -6$ E) $y = 4$

18) Find the x-intercept of $y = 7(2^{4x-10}) - 28$

A) $(3, 0)$ B) $(2, 0)$ C) $(-2, 0)$ D) $(\frac{1}{2}, 0)$ E) $(-3, 0)$

19) What is the vertical asymptote of $y = \frac{24x+48}{12+x}$?

A) x = - 2 B) x = 24 C) x = 4 D) x = - 12 E) x = 2

20) Find the average value of $f(x) = \frac{\sqrt{3x+1}}{4} + x$ from x = 5 to x = 21

A) 17 B) $\frac{29}{16}$ C) $\frac{29}{26}$ D) $\frac{17}{16}$ E) $\frac{181}{8}$

21) Find the difference quotient $[\frac{f(x+h)-f(x)}{h}]$ for $f(x) = 2 - x - x^2$

A) $-1-2x$ B) $-3x$ C) $-2x-h-1$ D) $-2x+h$ E) $-2x-2h$

22) Find the solution set for this inequality: $|7 - \frac{1}{3}x| < 8$

A) (0, 45) B) (0, 5) C) (- 3, 45) D) (- 3, 5) E) (0, - 3)

23) Y squared varies inversely as the square root of M and directly as the variable X. If Y = 8 when X = 12 and M = 9, then find the value of Y when X = 18 and M = 4.

A) 144 B) 16 C) 48 D) 12 E) 7

24)If $f(x) = \frac{8x+3}{7-9x}$, then find $f^{-1}(x)$

A) $\frac{7x-3}{8+9x}$ B) $\frac{7-9x}{8x+3}$ C) $\frac{7-3x}{8x+9}$ D) $\frac{7x+3}{8-9x}$ E) $\frac{8-3x}{7x+9}$

25)Find the equation of the line whose x-intercept is (- 4 , 0) and whose y-intercept is (0 , - 7)

A) $7x + 4y = 28$ B) $28 - 7x - 4y = 0$ C) $28 + 7x + 4y = 0$

D) $4x - 7y + 28 = 0$ E) $4x + 7y = -28$

26) Change $9^T = M$ to logarithmic form.

A) $\log_9 T = M$ B) $\log_T M = 9$ C) $\log_M T = 9$

D) $\log_9 M = T$ E) $\log_M 9 = T$

27) Change 275 degrees to radians.

A) $\frac{55\pi}{72}$ B) $\frac{55\pi}{36}$ C) $\frac{55\pi}{18}$ D) $\frac{75\pi}{82}$ E) $\frac{75\pi}{72}$