Tutorial: _____ **Math 005** Name: _____

Duration: **quiz03** ID Number: _____

1. Solve for x:

$$\frac{e^x - e^{-x}}{2} = \frac{3}{4}$$

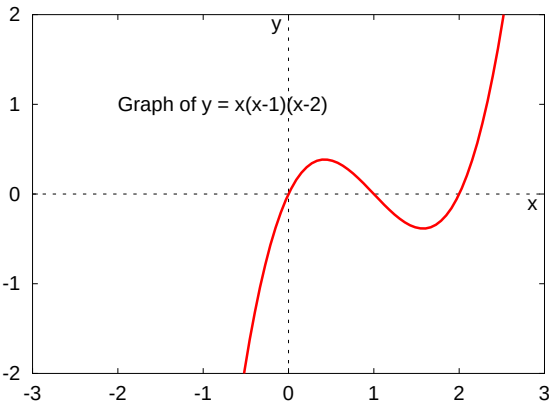
Hint. First solve $\frac{u - \frac{1}{u}}{2} = \frac{3}{4}$ by the quadratic equation, then solve $e^x = u$. The final answer is that x is the ln of a number.

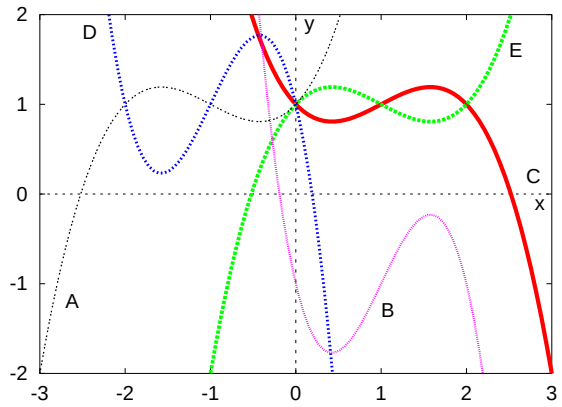
(a) $x = \ln(2)$ (b) $x = \ln(3)$ (c) $x = \ln(4)$ (d) $x = \ln(5)$ (e) $x = \ln(6)$

2. From sales record, there is a linear relationship $0.6p + 0.03q = 12.6$ between the weekly demand (q kg) and price (p dollar per kg) of the chicken wings sold in BBQ Supermarket. At what **weekly sales level** can BBQ Supermarket obtain maximum weekly revenue?

(a) 260 kg (b) 270 kg (c) 290 kg (d) 210 kg (e) 230 kg

3. Given the graph of the function $f(x) = x(x-1)(x-2)$ in the figure on the left below, which curve (sketched with different widths) in the figure on the right is the graph of $g(x) = -2x(x-1)(x-2) - 1$





(a) A (b) B (c) C (d) D (e) E

4. Solve $x^2 - x - 2 \leq 0$:

(a) $x \geq -1$ or $2 \leq x$ (b) $x \leq -1$ or $2 \geq x$ (c) $-1 \leq x \leq 2$

(d) $x \leq -1$ and $2 \leq x$ (e) $x \geq -1$ or $2 \geq x$

5. Find the domain and intercepts for the rational function $f(x) = \frac{x-2}{x+3}$

(a) Domain: $x = -3$, x-intercept=2 and y-intercept= $-\frac{2}{3}$

(b) Domain: $x \neq -3$, x-intercept=2 and y-intercept= $\frac{2}{3}$

(c) Domain: $x \neq -3$, x-intercept=2 and y-intercept= $-\frac{2}{3}$

(d) Domain: $x \neq -3$, x-intercept=-2 and y-intercept= $-\frac{2}{3}$

(e) Domain: $x \neq -3$, x-intercept=3 and y-intercept= $-\frac{2}{3}$

6. Determine which one of the quadratic functions $f(x)$ below has the property that it attains its maximum at the coordinate $(-2,\ 1/2)$:

(a) $f(x) = -(2x+1)^2 + \frac{1}{2}$
(b) $f(x) = (\frac{1}{2}x+1)^2 + \frac{1}{2}$
(c) $f(x) = -(\frac{1}{2}x+1)^2 + \frac{1}{2}$
(d) $f(x) = +(2x+1)^2 + \frac{1}{2}$
(e) $f(x) = -(\frac{1}{2}x+1)^2 - \frac{1}{2}$

7. Suppose the unemployment rate has been rising at a constant rate of 0.5 thousand per month for the last few years. It is anticipated that the trend will continue for another year. Suppose the unemployment figure is 22 thousand at the beginning of this year. What will be the unemployment at the end of this year?

(a) 34,000 (b) 30,000 (c) 12,000 (d) 28,000 (e) 6,000

8. Determine the vertical axis of symmetry of the graph of the function $y = f(x) = -x^2 - 8x + 12$.

(a) $x = 4$ (b) $x = \frac{3}{2}$ (c) $x = -4$ (d) $x = \frac{5}{2}$ (e) $x = \frac{7}{2}$

9. The population (in millions) of the state of Michigan USA, is $7.8 \cdot 1.0058^t$ where t is the number of years from the start of 1960. In what month and year did Michigan achieve a population of 8.3 million?

(a) July 1972 (b) April 1975 (c) February 1978 (d) September 1970 (e) April 1985

10. Let $f(x) = 2x - x^2 + 1$. Simplify $\dfrac{f(2+h) - f(2)}{h}$.

(a) $-h-2$ (b) $-h-1$ (c) $-h$ (d) $-h+1$ (e) $-h+2$

11. Find the domain of the function $f(x) = \dfrac{(2x-1)}{(x+3)(x-1)}$.

(a) All real numbers
(b) All real numbers except $1/2$
(c) All real numbers except $1/2$, -3, and 1
(d) All real numbers except -3 and 1
(e) All real numbers $< 1/2$

12. A Hong Kong bank lists the following rates for buying and selling currency into Hong Kong dollars:

	Buy	Sell
US Dollar	7.7530	7.7810
Pound Sterling	12.7590	12.8480
Japanese (1000) Yen	69.1600	69.5900
Euro	8.8930	8.9500

The bank charges a fixed transaction fee of HK$30 per transaction. A tourist wishes to change Euros into US Dollars and is required to make a transaction first into Hong Kong Dollars and then into US Dollars. Find the linear function D=f(E) which gives the amount D of US Dollars obtained from E Euros. You may assume the amount exchanged is enough to cover the fixed costs for each of the two transactions and that both fees are paid after the first transaction. Enter your answer into the line provided. (No partial credit.)

Answer: D = f(E) = _____

Answers: 1.a 2.d 3.b 4.c 5.c 6.c 7.d 8.c 9.d 10.e 11.d

12. $D = f(E) = \frac{1}{7.781}\,(8.8930\,E\,-\,60)$