Please show work so we can see how you find your solutions.

Function Notation and Composition of Functions:

#1. Let $f(x) = x - 2$ and $g(x) = x^3$. Find $g(f(4))$.

#2. Express the function $F(x) = \tan^3(x)$ in the form $f(g(x))$. $f(x) =$ _____

$g(x) =$ _____

#3. If *If* $f(x) = 2x^2 - 5x,$ *write* $\dfrac{f(x+h) - f(x)}{h}$ *in simplest form.*

#4. Use the table to find the value of the function or composition at the given x.

| x	-3	-1	0	3	5	7
$f(x)$	3	4	-1	-2	-1	5
$g(x)$	5	17	0	4	-3	-1

$g(-1) =$ _____ $f(g(5)) =$ _____ $f(f(7)) =$ _____

#5. Multiple Choice: Relative to the graph $y = \cos x$, the graph of $y = 3\ln(x+2)$ is changed in what way?

A) Shifted 2 units downward

B) Compressed horizontally by a factor of 3

C) Shifted 2 units to the right

D) Stretched vertically by a factor of 3

E) Shifted 2 units upward

F) Shifted 2 units to the right and stretched 3 times vertically

G) Shifted 2 units to the left and stretched 3 times vertically

H) Shifted 2 units to the left

Domain/Range and Interval notation:

#6.   State the domain and range of this function:
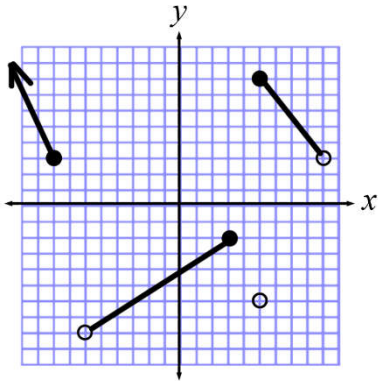
#7. Multiple Choice: The function $f(x) = \dfrac{x-2}{x-5} + \sqrt{(x-3)(x+2)}$ has as its domain all values of x such that

A) $(-\infty, 2) \cup (2,3) \cup (3,5)$

B) $[3,5) \cup (5,\infty)$

C) $(-\infty, 0) \cup [5,\infty)$

D) $(-\infty, 0) \cup (3,5) \cup (5,\infty)$

E) $[3,5]$

F) $(3,5) \cup (5,\infty)$

G) $(-\infty, 0) \cup (5,\infty)$

H) $(-\infty, 0) \cup [3,5) \cup (5,\infty)$

#8. Multiple Choice: Let $f(x)=\sqrt{x+2}$ and $g(x)=\sqrt{x^2-9}$. Find the domain of $(fg)(x)$.

A) $(-\infty,-3)\cup(3,\infty)$ E) $(-\infty,-3]\cup[3,\infty)$

B) $(2,\infty)$ F) $[2,\infty)$

C) $(-\infty,-2)$ G) $(-\infty,-2]$

D) $[3,\infty)$ H) $(3,\infty)$

Factoring and Completing the Square:

#9. Factor completely: x^2+x-42

#10. Factor completely: $5x^2-13x+6$

#11. Factor completely: $3x^4-48x^2$

#12. Complete the square to write the equation in the form of a circle: $x^2+y^2+4x-8y+19=0$

Exponent Rules and Logarithms:

#13. Write in simplest form: $3a^2 4b^{-4}a^6b^4c^3$

#14.   Write in simplest form without using a fraction or negative exponents: $\dfrac{2e^{-3x}}{5e^{-7x}}$

#15. Simplify the logarithmic expression into one logarithm: $4\log_3(x)+\log_3(y)-3\log_3(z)+\dfrac{1}{2}\log_3(x)$

#16. Expand the logarithmic expression to the sum and/or difference of factors of logarithms with no exponents.

$\ln\left(\dfrac{5y^4}{x^6}\right)$

Unit Circle Trigonometry and Basic Trig Identities:

#17. Evaluate (answer in exact form, no decimals): $\cos\left(\dfrac{-\pi}{3}\right)=$

#18. Evaluate (answer in exact form, no decimals): $\cot\left(\dfrac{7\pi}{6}\right)=$

#19. Evaluate (answer in exact form, no decimals): $\csc\left(\dfrac{5\pi}{3}\right)=$

#20. Evaluate (answer in exact form, no decimals): $\sin^{-1}\left(\dfrac{-\sqrt{3}}{2}\right) =$

#21. Evaluate (answer in exact form, no decimals): $\sin\left[\cos^{-1}\left(\dfrac{\sqrt{3}}{2}\right)\right] =$

#22. Simplify fully: $\dfrac{3\sin^3\theta}{\cos\theta} + 3\sin\theta\cos\theta$

Solving equations:

#23. Solve the equation (Exact answers only): $\dfrac{x^2-4}{3} = \dfrac{x}{4}$

#24. Solve the equation (Exact answers only): $4x^2 + x - 3 = 0$

#25. Solve the equation (Exact answers only): $e^{2x+6} = 4$

#26. Solve the equation (Exact answers only): $\ln(3x-1) = 5$

#27. Solve the equation (Exact answers only): $4\cos(\theta) - 2 = 0$ $(0 \le \theta < 2\pi)$

#28. Solve the equation (Exact answers only): $2\sin^2(\theta) + 3\sin(\theta) - 2 = 0$ $(0 \le \theta < 2\pi)$