Equations and Expressions- By Category: Level 3

1	The sum of three numbers is 855. One of the numbers, x, is 50% more than the sum of the other two numbers. What is the value of x ? A) 570 B) 513 C) 214 D) 155	Add like terms/Word Problem With Calculator-Level 3
2	If x is the average (arithmetic mean) of m and 9, y is the average of $2m$ and 15, and z is the average of $3m$ and 18, what is the average of x, y, and z in terms of m ? A) $m+6$ B) $m+7$ C) $2m+14$ D) $3m+21$	Add like terms/Word Problem With Calculator-Level 3
3	$x^2+y^2+4x-2y=-1$ The equation of a circle in the xy-plane is shown above. What is the radius of the circle? A) 2 B) 3 C) 4 D) 9	Complete the Square With Calculator-Level 3
4	Which of the following complex numbers is equivalent to $\frac{3-5i}{8+2i}$? (Note: $i=\sqrt{-1}$) A) $\frac{3}{8}-\frac{5i}{2}$ B) $\frac{3}{8}+\frac{5i}{2}$ C) $\frac{7}{34}-\frac{23i}{34}$ D) $\frac{7}{34}+\frac{23i}{34}$	Complex numbers No Calculator-Level 3

5	$\frac{8-i}{3-2i}$ If the expression above is rewritten in the form $a+bi$, where a and b are real numbers, what is the value of a ? (Note: $i=\sqrt{-1}$) A) 2 B) $\frac{8}{3}$ C) 3 D) $\frac{11}{3}$	complex numbers No Calculator-Level 3
6	If $x>3$, which of the following is equivalent to $\frac{1}{\frac{1}{x+2}+\frac{1}{x+3}}$? A) $\frac{2x+5}{x^2+5x+6}$ B) $\frac{x^2+5x+6}{2x+5}$ C) $2x+5$ D) x^2+5x+6	Cross Multiply-Rational Level 3- No Calculator
7	$R=\frac{F}{N+F}$ A website uses the formula above to calculate a seller's rating, R, based on the number of favorable reviews, F, and unfavorable reviews, N. Which of the following expresses the number of favorable reviews in terms of the other variables? A) $F=\frac{RN}{R-1}$ B) $F=\frac{RN}{1-R}$ C) $F=\frac{N}{1-R}$ D) $F=\frac{N}{R-1}$	Cross Multiply-Rational Level 3- No Calculator

8	The expression $\frac{5x-2}{x+3}$ is equivalent to which of the following? A) $\frac{5-2}{3}$ B) $5-\frac{2}{3}$ C) $5-\frac{2}{x+3}$ D) $5-\frac{17}{x+3}$	Cross Multiply-Rational Level 3- No Calculator
9	$x^3(x^2-5)=-4x$ If $x>0$, what is one possible solution to the equation above?	Factoring Polynomial No Calculator-Level 3
10	$x^2-\frac{k}{2}x=2p$ In the quadratic equation above, k and p are constants. What are the solutions for x ? A) $x=\frac{k}{4}\pm\frac{\sqrt{k^2+2p}}{4}$ B) $x=\frac{k}{4}\pm\frac{\sqrt{k^2+32p}}{4}$ C) $x=\frac{k}{2}\pm\frac{\sqrt{k^2+2p}}{2}$ D) $x=\frac{k}{2}\pm\frac{\sqrt{k^2+32p}}{4}$	Factoring Polynomial No Calculator-Level 3
11	What is the sum of all values of m that satisfy $2m^2-16m+8=0$? A) -8 B) $-4\sqrt{3}$ C) $4\sqrt{3}$ D) 8	Factoring Polynomial No Calculator-Level 3

12	What are the solutions to $3x^2 + 12x + 6 = 0$? A) $x = -2 \pm \sqrt{2}$ B) $x = -2 \pm \frac{\sqrt{30}}{3}$ C) $x = -6 \pm \sqrt{2}$ D) $x = -6 \pm 6\sqrt{2}$	Factoring Polynomial No Calculator-Level 3
13	$f(x) = 2x^3 + 6x^2 + 4x$ $g(x) = x^2 + 3x + 2$ The polynomials $f(x)$ and $g(x)$ are defined above. Which of the following polynomials is divisible by $2x + 3$? A) $h(x) = f(x) + g(x)$ B) $p(x) = f(x) + 3g(x)$ C) $r(x) = 2f(x) + 3g(x)$ D) $s(x) = 3f(x) + 2g(x)$	Factoring Polynomial With calculator-Level 3
14	If $(ax + 2)(bx + 7) = 15x^2 + cx + 14$ for all values of x, and $a + b = 8$, what are the two possible values for c ? A) 3 and 5 B) 6 and 35 C) 10 and 21 D) 31 and 41	FOIL No Calculator-Level 3
15	$f(x) = (x + 6)(x - 4)$ Which of the following is an equivalent form of the function f above in which the minimum value of f appears as a constant or coefficient? A) $f(x) = x^2 - 24$ B) $f(x) = x^2 + 2x - 24$ C) $f(x) = (x - 1)^2 - 21$ D) $f(x) = (x + 1)^2 - 25$	FOIL With Calculator-Level 3

16	$y = 3$ $y = ax^2 + b$ In the system of equations above, a and b are constants. For which of the following values of a and b does the system of equations have exactly two real solutions? A) $a = -2, b = 2$ B) $a = -2, b = 4$ C) $a = 2, b = 4$ D) $a = 4, b = 3$	Graphs to Equations
17	Let x and y be numbers such that $-y < x < y$. Which of the following must be true? I. $\lvert x \rvert < y$ II. $x > 0$ III. $y > 0$ A) I only B) I and II only C) I and III only D) I, II, and III	Inequalities With Calculators-Level 3
18	If $\frac{x^{a^2}}{x^{b^2}} = x^{16}$, $x > 1$, and $a + b = 2$, what is the value of $a - b$? A) 8 B) 14 C) 16 D) 18	Power rules No Calculator-Level 3
19	If $3x - y = 12$, what is the value of $\frac{8^x}{2^y}$? A) 2^{12} B) 4^4 C) 8^2 D) The value cannot be determined from the information given.	Power rules No Calculator-Level 3
20	If $a = 5\sqrt{2}$ and $2a = \sqrt{2x}$, what is the value of x ?	solving using Sqrt/ sqrd

21	$ax + by = 12$ $2x + 8y = 60$ In the system of equations above, a and b are constants. If the system has infinitely many solutions, what is the value of $\frac{a}{b}$?	System of equations No Calculator-Level 3
22	$-3x + 4y = 20$ $6x + 3y = 15$ If (x, y) is the solution to the system of equations above, what is the value of x ?	System of equations No Calculator-Level 3
23	$2x - 3y = -14$ $3x - 2y = -6$ If (x, y) is a solution to the system of equations above, what is the value of $x - y$? A) -20 B) -8 C) -4 D) 8	System of equations No Calculator-Level 3
24	$3x + b = 5x - 7$ $3y + c = 5y - 7$ In the equations above, b and c are constants. If b is c minus $\frac{1}{2}$, which of the following is true? A) x is y minus $\frac{1}{4}$. B) x is y minus $\frac{1}{2}$. C) x is y minus 1. D) x is y plus $\frac{1}{2}$.	System of equations With Calculator-Level 3