Math 1010 Final Exam
Form B, Fall 2009

Name: _____

Instructor: _____ ID verification: _____

Each problem is equally weighted. Scientific calculators are permitted.
Time limit: Two hours.
Not allowed: notes, books, graphing/programable calculators, cell phones or other hand held devices.

Find the exact solution. If no solution exists, state this.

1) $2^{(2x+1)} = 32$

A) x = 4 B) x = 2 C) x = 3 D) x = 16

Simplify. Write the answer using positive exponents only. Leave the answer in exponential notation.

2) $\left(\frac{2x^{3}y^{-3}}{x^{-3}y^{4}}\right)^{-5}$

A) $\frac{-8x^{30}}{y^{35}}$ B) $\frac{y^{35}}{2x^{6}}$ C) $\frac{y^{35}}{2x^{30}}$ D) $\frac{y^{35}}{32x^{30}}$

Solve.

3) A helicopter goes 270 miles with the wind in the same time it can go 180 miles against the wind. The speed of the wind is 6 miles per hour. Find the speed of the helicopter with no wind.

A) 45 mph B) 30 mph C) 36 mph D) 24 mph

Solve for m.

4) $3m^2 + 8m + 1 = 0$

A) $m = \frac{-4 \pm \sqrt{13}}{6}$ B) $m = \frac{-4 \pm \sqrt{19}}{3}$ C) $m = \frac{-8 \pm \sqrt{13}}{3}$ D) $m = \frac{-4 \pm \sqrt{13}}{3}$

Solve.

5) $\sqrt{5q + 6} = 6$

A) $q = \frac{42}{5}$ B) $q = 36$ C) $q = 6$ D) $q = \frac{36}{5}$

6) John owns a hotdog stand. He has found that his profit is represented by the equation $P = -x^2 + 64x + 82$, with P being the profit in dollars, and x the number of hotdogs sold. How many hotdogs must he sell to earn the most profit?

A) 25 hotdogs B) 32 hotdogs C) 33 hotdogs D) 50 hotdogs

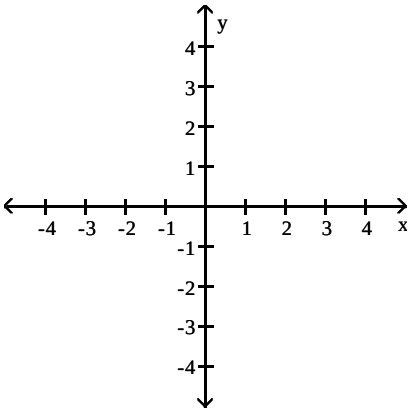
Find the exact solution. If no solution exists, state this.

7) $\log_2 (3x - 3) = 1$

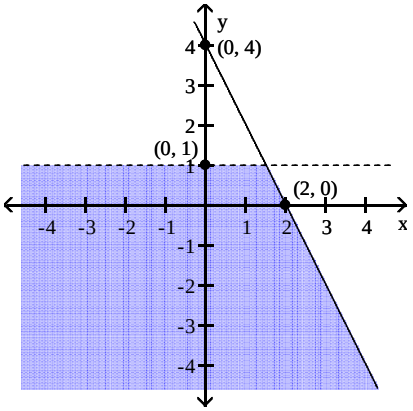
A) $x = 2$ B) $x = \frac{5}{3}$ C) $x = \frac{5}{4}$ D) No solution

Graph the system of linear inequalities.

8) $2x + y \leq 4$ and $y - 1 < 0$



A)



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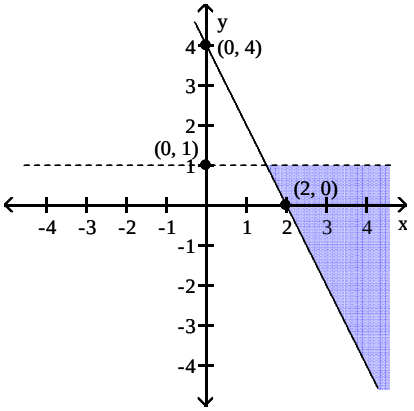

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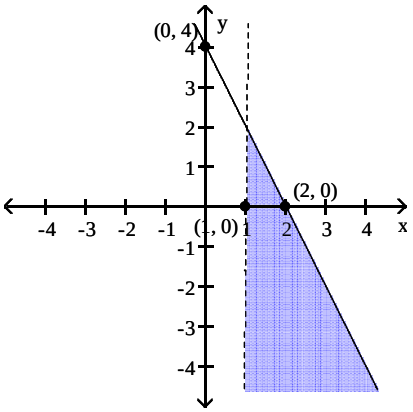
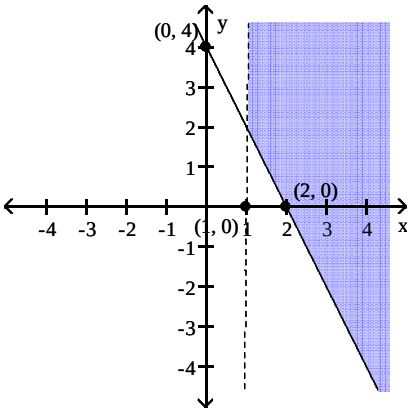


D)



Perform the indicated operation and simplify. Write the answer in the form a + bi.

9) $3i(6 - 2i)$

A) $18i - 6i^2$ B) $18i + 6i^2$ C) $-6 + 18i$ D) $6 + 18i$

Find the center and the radius of the circle.

10) $x^2 + y^2 + 6x - 40 = 0$

A) (−3, 0), r = 7 B) (−3, 0), r = 49 C) (3, 0), r = 7 D) (3, 0), r = 49

Find the distance between the pair of points. Give your answer in exact form.

11) (−3, 2) and (1, −4)

A) $2\sqrt{13}$ B) $20\sqrt{5}$ C) −2 D) 10

Solve the equation.

12) $x^3 + 10 = 10x^2 + x$

A) {10, 1, −10} B) { −1, 1, −10} C) {10, 1} D) {10, −1, 1}

13) $|5x + 8| = |x - 1|$

A) $\left\{-\frac{9}{4}, -\frac{7}{6}\right\}$ B) ∅ C) $\left\{\frac{9}{4}, \frac{7}{6}\right\}$ D) $\left\{-\frac{9}{4}\right\}$

Solve the problem.

14) The number of bacteria growing in an incubation culture increases with time according to $B(x) = 2500(3)^x$, where x is time in days.

Find the number of bacteria when $x = 0$ and $x = 4$.

A) $B(0) = 2500$, $B(2) = 202{,}500$
B) $B(0) = 2500$, $B(2) = 67{,}500$
C) $B(0) = 7500$, $B(2) = 202{,}500$
D) $B(0) = 2500$, $B(2) = 30{,}000$

Multiply.

15) $(2\sqrt{2} + 7\sqrt{5})(6\sqrt{2} + 5\sqrt{5})$

A) $12\sqrt{2} + 35\sqrt{5}$
B) $12\sqrt{2} + 35\sqrt{5} + 52\sqrt{10}$
C) $-151 + 52\sqrt{10}$
D) $199 + 52\sqrt{10}$

Find an equation of the line containing the given pair of points. Write your final answer as a linear function in slope–intercept form.

16) (5, −5) and (2, 1)

A) $f(x) = -2x + 2$
B) $f(x) = 2x + 5$
C) $f(x) = -2x + 5$
D) $f(x) = 5x - 2$

Find the function value.

17) Find $f(-4)$ when $f(x) = x^2 - 5x + 2$.

A) $f(-4) = 38$
B) $f(-4) = -2$
C) $f(-4) = 34$
D) $f(-4) = 6$

Rationalize the denominator. Assume all variables represent positive numbers.

18) $\dfrac{5\sqrt{x}}{\sqrt{x} + 2\sqrt{y}}$

A) $\dfrac{5x + 10\sqrt{xy}}{x + 2y}$ B) $\dfrac{5x + 10\sqrt{xy}}{x + 4y}$ C) $\dfrac{5x - 10\sqrt{xy}}{x - 2y}$ D) $\dfrac{5x - 10\sqrt{xy}}{x - 4y}$

Solve the problem.

19) To make jewelry, Anne wishes to mix a metal alloy that is 22% copper with an alloy that is 25% copper to form 63 ounces of an alloy that is 24% copper. How many ounces of the 22% copper alloy must be used?

A) 21 ounces B) 42 ounces C) 47 ounces D) 23 ounces

Multiply or divide as indicated. Simplify completely.

20) $\dfrac{x^3 + 1}{x^3 - x^2 + x} \div \dfrac{-12x - 12}{6x}$

A) $-\dfrac{x^2 + 1}{2}$ B) $-\dfrac{1}{2}$ C) $-\dfrac{x^3 + 1}{2(x + 1)}$ D) $\dfrac{x + 1}{2(-x - 1)}$

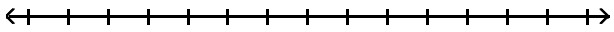
Solve the system for z.

21) $4x - y + 3z = 12$
$2x + 9z = -5$
$x + 4y + 6z = -32$

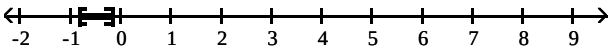
A) $z = 1$ B) $z = -1$ C) $z = 2$ D) $z = -2$

Solve and graph.

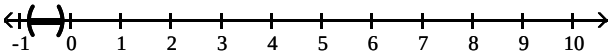
22) $|6k + 3| \leq 2$



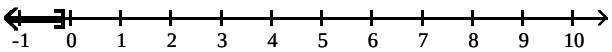
A) $\left[-\frac{5}{6}, -\frac{1}{6}\right]$



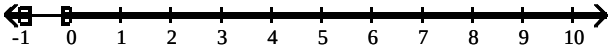
B) $\left(-\frac{5}{6}, -\frac{1}{6}\right)$



C) $\left(-\infty, -\frac{1}{6}\right]$

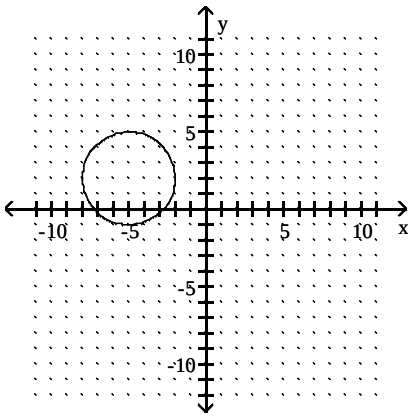


D) $\left(-\infty, -\frac{5}{6}\right] \cup \left[-\frac{1}{6}, \infty\right)$



Find the domain and the range of the relation. Use the vertical line test to determine whether the graph is the graph of a function.

23)



A) domain: [−8, −2]
range: [−1, 5]
not a function

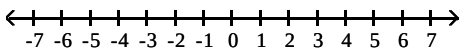
B) domain: [−1, 5]
range: [−8, −2]
function

C) domain: [−1, 5]
range: [−8, −2]
not a function

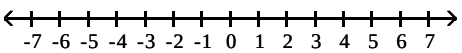
D) domain: [−8, −2]
range: [−1, 5]
function

Solve the inequality and graph the solution set.

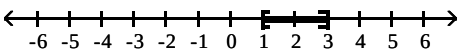
24) $12x - 8 < 4x$ or $-4x \leq -12$



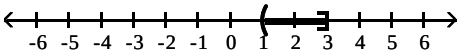
A) ∅



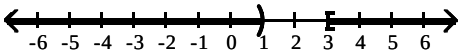
B) [1,3]



C) (1,3]



D) $(-\infty,1) \cup [3,\infty)$



Find the x– and y–intercepts. If no x–intercepts exist, state so.

25) $f(x) = x^2 + 12x$

A) No x–intercept; y–intercept (0,0)

B) x–intercepts (0, −12) and (−12, 0); y–intercept (0,0)

C) x–intercepts (0, 0) and (−12, 0); y–intercept (0,0)

D) x–intercepts (0, 0) and (12, 0); y–intercept (0,0)

Simplify.

26) $\dfrac{\dfrac{1}{x} + \dfrac{4}{x^2}}{x + \dfrac{64}{x^2}}$

A) $\dfrac{1}{x^2 + 4x + 16}$ B) $\dfrac{x + 4}{x^2 + 64}$ C) $\dfrac{1}{x^2 + 16}$ D) $\dfrac{1}{x^2 - 4x + 16}$

Find the domain of the function h.

27) $h(x) = \dfrac{x - 1}{x^2 + 5x - 14}$

A) {x| x is a real number and $x \neq -2$ and $x \neq 0$}
B) {x| x is a real number and $x \neq -7$ and $x \neq 2$ and $x \neq 1$}
C) {x| x is a real number and $x \neq -7$ and $x \neq 2$}
D) {x| x is a real number and $x \neq 0$}
E) {x| x is a real number and $x \neq -2$ and $x \neq 0$ and $x \neq -7$ and $x \neq 0$}

For the pair of functions f and g, find all values of x for which f(x) = g(x).

28) $f(x) = \dfrac{x - 2}{28}$, $g(x) = \dfrac{1}{x + 1}$

A) $x = 2, -1$ B) $x = 6, -5$ C) $x = 27, 2$ D) $x = -1, 30$

Perform the indicated operation and simplify.

29) $\dfrac{a+b}{a-b} - \dfrac{3ab+3b^2}{a^2-b^2}$

A) $\dfrac{a-2b}{a-b}$ B) $\dfrac{a^2-2ab-2b^2}{a^2-b^2}$ C) $\dfrac{a+2b}{a-b}$ D) $\dfrac{a-2b}{a+b}$

Find an equation for the described linear function.

30) Through $\left(0, \dfrac{1}{3}\right)$ and parallel to $5x - 8y = 2$

A) $y = \dfrac{5}{8}x + \dfrac{1}{3}$ B) $y = \dfrac{8}{5}x + \dfrac{1}{3}$ C) $y = -5x + \dfrac{1}{3}$ D) $y = -\dfrac{5}{8}x + \dfrac{1}{3}$

Answer Key
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1) B
2) D
3) B
4) D
5) C
6) B
7) B
8) A
9) D
10) A
11) A
12) D
13) A
14) A
15) D
16) C
17) A
18) D
19) A
20) B
21) B
22) A
23) A
24) D
25) C
26) D
27) C
28) B
29) A
30) A