DEPARTMENT

FINAL MATH 125

EXAMINATION

Do NOT write on the test!

Do all work on provided scratch paper.

Put your answers on scantron.

NO CELL PHONES ALLOWED!!!

VERSION C TEST #_____

1. A solution of 66% fertilizer is to be mixed with a solution of 26% fertilizer to form 160 liters of a 43% solution. How many liters of the 66% solution must be used?

   [A] 104 [B] 78 [C] 97 [D] 68

2. Train A leaves a station traveling at 40 miles per hour. Four hours later train B leaves the same station traveling in the same direction at 60 miles per hour. How long does it take for train B to catch up to train A?

   [A] 10 hr [B] 11 hr [C] 9 hr [D] 8 hr

3. Solve. $|3x-1| \geq 1$

   [A] $\left\{x \mid x<0 \text{ or } x>\frac{2}{3}\right\}$ [B] $\left\{x \mid 0 \leq x \leq \frac{2}{3}\right\}$

   [C] $\left\{x \mid x \leq 0 \text{ or } x \geq \frac{2}{3}\right\}$ [D] none of these

4. Determine the equation of the line, in standard form, that contains the points. $(3, -7)$ and $(-4, -3)$

   [A] $-4x+7y=-37$ [B] $-4x-7y=37$

   [C] $-4x-3y=-37$ [D] $-7x-4y=37$

5. Solve the system: $3x-y-2z=5$

   $2x+y+3z=6$

   $6x-y-4z=9$

   [A] (2,-1,1) [B] (1,-14,6) [C] (2,1,0) [D] none of the above.

6. A coffee house blended 15 pounds of espresso flavored coffee beans with 5 pounds of vanilla flavored coffee beans. The 20 pound mixture cost $175. A second mixture included 6 pounds of espresso flavored coffee beans and 9 pounds of vanilla flavored coffee beans. The 15 pound mixture cost $126. Find the cost per pound of the espresso and vanilla flavored coffee beans.

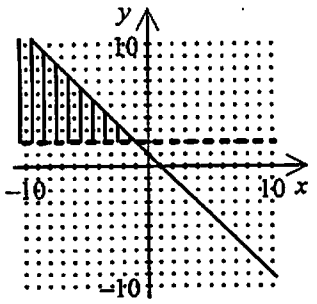
   [A] espresso: $8; vanilla: $9 [B] espresso: $7; vanilla: $6

   [C] espresso: $9; vanilla: $8 [D] espresso: $6; vanilla: $7

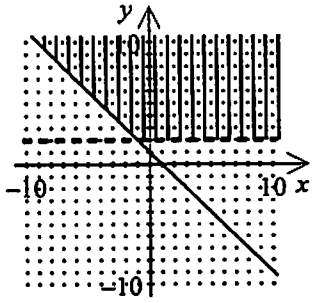
7. Graph the solution set. $y \geq -x+1$

$y>2$

[A]



[B]



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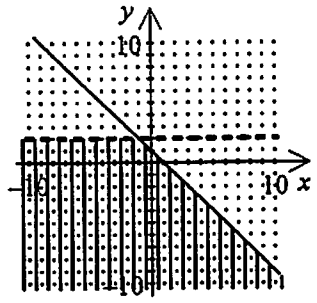

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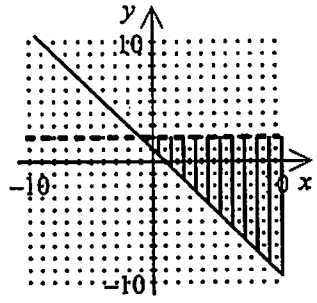


8. Divide. $(2x^3-3x+9)\div(x-2)$

[A] $2x^2+x+11+\dfrac{22}{x-2}$

[B] $2x^2+4x-11-\dfrac{16}{x-2}$

[C] $2x^2+x-2+\dfrac{5}{x-2}$

[D] $2x^2+4x+5+\dfrac{19}{x-2}$

9. Solve by factoring. $10x^2+13x-3=0$

[A] $\dfrac{1}{5},\ -\dfrac{3}{2}$ [B] $\dfrac{1}{5},\ \dfrac{3}{2}$ [C] $-\dfrac{1}{5},\ -\dfrac{3}{2}$ [D] $-\dfrac{1}{5},\ \dfrac{3}{2}$

10. Determine the domain of the function. $g(x)=\dfrac{4x}{x(x-4)}$

[A] $\{x \mid x \neq 4,\ x \neq 0\}$ [B] $\{x \mid x \neq 2\}$ [C] $\{x \mid x \neq \pm 4,\ x \neq 0\}$ [D] $\{x \mid x \neq \pm 2\}$

Simplify.

11. $\frac{x+1}{4x+y} \cdot \frac{16x^2-y^2}{3x^2-2x-5}$

[A] $\frac{4x+y}{-2x-2}$ [B] $-\frac{4x-y}{2}$ [C] $\frac{4x-y}{3x-5}$ [D] $\frac{4x^2-y^2}{3x-5}$

12. $\frac{2}{x+3}+\frac{5}{x-3}$ [A] $\frac{7}{x^2-9}$ [B] $\frac{7x+9}{x^2-9}$ [C] $\frac{7x+9}{7}$ [D] $\frac{7}{x+3}$

13. $\frac{-\frac{3}{x+3}}{\frac{1}{x}-5}$

[A] $\frac{-3x}{-4x-12}$ [B] $\frac{-3x}{-5x^2-14x+3}$ [C] $\frac{-3x+15}{x+3}$ [D] $\frac{15x-3}{-5x+15}$

14. Solve. $1-\frac{4}{x+2}=\frac{16}{x^2-4}$

[A] 6 [B] -6 or -2 [C] -2 or 6 [D] no solution

15. At noon a horse and buggy headed north traveling 8 miles per hour. Two hours later, a roadster headed south from the same location driving 50 miles per hour. At which time will the horse and buggy be 132 miles from the roadster?

[A] 4:00 P.M. [B] 3:45 P.M. [C] 3:50 P.M. [D] 4:10 P.M.

16. The price per person of renting a bus varies inversely with the number of people renting the bus. It costs \$19 per person if 23 people rent the bus. How much will it cost per person if 39 people rent the bus? Round to the nearest cent.

[A] \$47.21 [B] \$14.30 [C] \$32.22 [D] \$11.21

17. Rewrite the exponential expression as a radical expression.
$x^{4/3}$

[A] $\sqrt{x^{4/3}}$ [B] $\sqrt{x^{3/4}}$ [C] $\sqrt[3]{x^4}$ [D] $\frac{1}{\sqrt[3]{x^4}}$

18. Determine the domain of the function $f(x)=\sqrt{x+9}+4$.

[A] domain $\{x \mid x \geq -9\}$

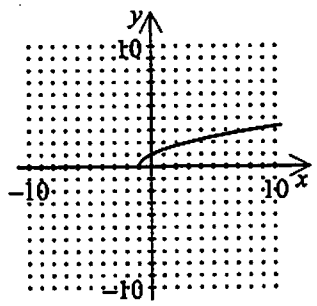
[B] domain $\{x \mid x \leq 0\}$

[C] domain $\{x \mid x \geq 0\}$

[D] domain $\{x \mid x \geq 9\}$

19. Graph: $f(x)=\sqrt{x}-1$

[A]



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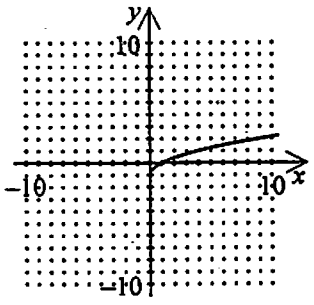

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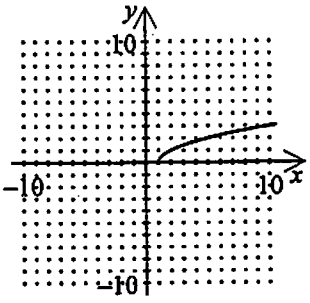

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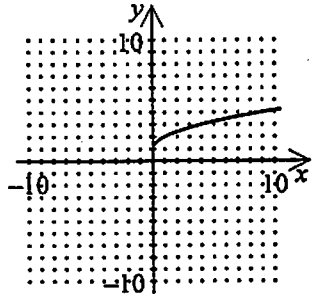


20. Solve. $\sqrt{x+14}=x-16$

[A] 22, 11 [B] 11 [C] 22 [D] no solution

21. Simplify. $\dfrac{1+2i}{5+2i}$

[A] $-\dfrac{9}{29}+\dfrac{8}{29}i$ [B] $\dfrac{9}{29}-\dfrac{8}{29}i$ [C] $-\dfrac{9}{29}-\dfrac{8}{29}i$ [D] $\dfrac{9}{29}+\dfrac{8}{29}i$

22. Solve using the quadratic formula. $x^2-4x+8=0$

[A] $-2+4i,\ -2-4i$

[B] $2+4i,\ 2-4i$

[C] $2+2i,\ 2-2i$

[D] $-2+2i,\ -2-2i$

23. Solve. $x^4 - 18x^2 + 17 = 0$

[A] $1, \sqrt{17}$ [B] $\pm 1, \pm 17$ [C] $\pm 1, \pm\sqrt{17}$ [D] $1, 17$

24. When a rocket is shot into the air, its height h, in feet above the ground, is a function of time t, in seconds. The height of the rocket can be found using the formula $h(t) = 176t - 16t^2$.
After how many seconds will the rocket be at a height of 448 feet?

[A] 11 [B] 3 and 8 [C] 4 and 7 [D] 4

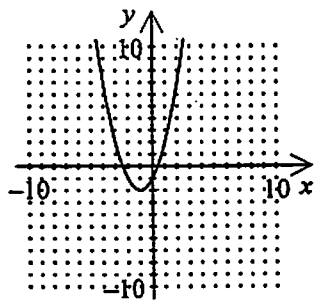
25. Solve. $x^2 + 7x \geq 18$

[A] $\{x | -2 \leq x \leq 9\}$ [B] $\{x | -9 \leq x \leq 2\}$

[C] $\{x | x \leq -2 \text{ or } x \geq 9\}$ [D] $\{x | x \leq -9 \text{ or } x \geq 2\}$

26. Find the graph of the equation. $f(x) = x^2 - 2x - 1$

[A]



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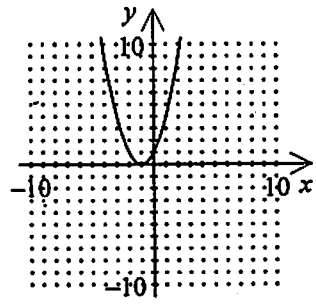

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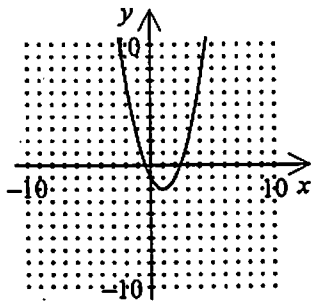

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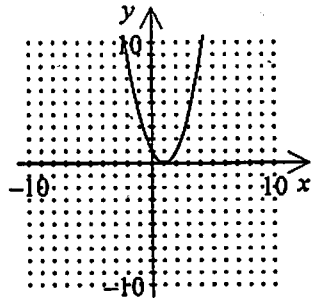
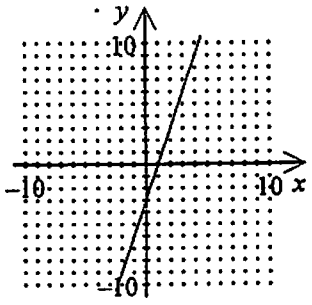


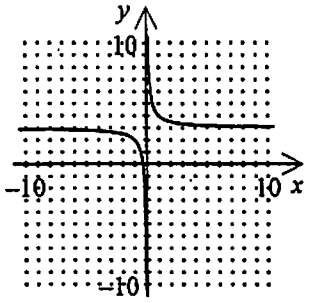
27. For the pair of functions, find $(g \circ f)(x)$.

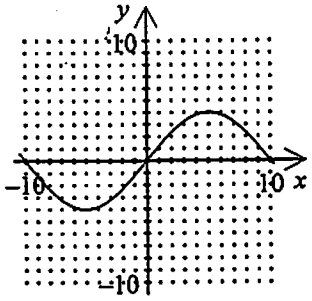
$f(x) = x + 6,\ g(x) = \sqrt{x+5};\ x \geq -5$

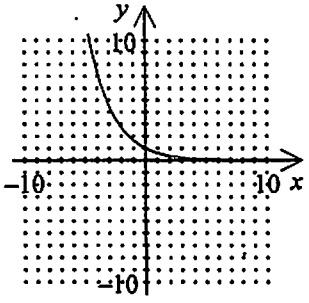
[A] $\sqrt{x+5} + 6$ [B] $\sqrt{x+6} - 5$ [C] $\sqrt{x+11}$ [D] $\sqrt{x+5}$

28. Which of the following are one-to-one functions?

i. 

ii. 

iii. 

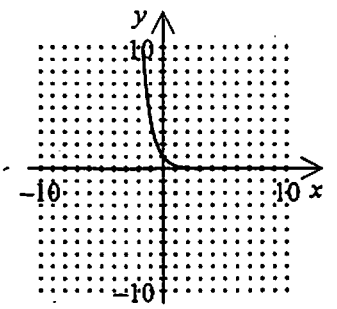
iv. 

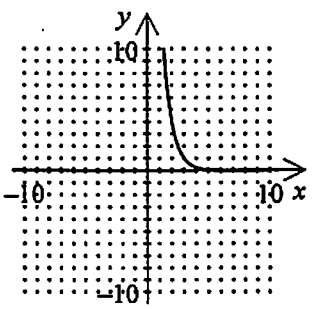
[A] ii and iv only [B] i and iv only [C] iv only [D] i, ii and iv only

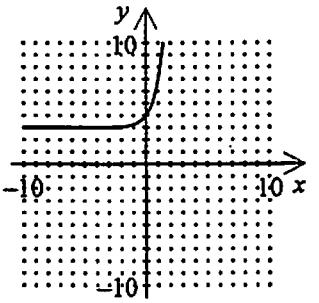
29. Find the inverse of the function. $y = f(x) = 5x - 2$

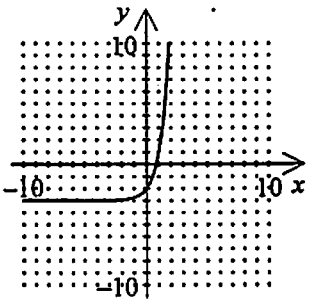
[A] $f^{-1}(x) = \frac{x+2}{5}$ [B] $f^{-1}(x) = \frac{x-5}{5}$ [C] $f^{-1}(x) = \frac{5x+2}{5}$ [D] $f^{-1}(x) = -2x + 5$

30. Identify the graph of the function. $f(x) = 4^x + 3$

[A] 

[B] 

[C] 

[D] 

31. Identify the logarithmic expression written in exponential form. $\log_3 \frac{1}{27} = -3$

[A] $3^{-3} = 27$ [B] $3^{-3} = \frac{1}{27}$ [C] $3^3 = -\frac{1}{27}$ [D] $3^3 = -27$

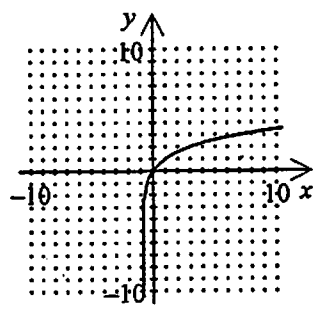
32. Find the equivalent form of the logarithmic expression. $\log_a xy^4z^3$

[A] $\frac{\log_a x + 4\log_a y}{3\log_a z}$ [B] $\log_a x + 4\log_a y - 3\log_a z$

[C] $\log_a 8 + \log_a xy - 3\log_a z$ [D] none of these

33. Identify the graph of the logarithmic function. $f(x) = \log_2(x-1)$

[A]



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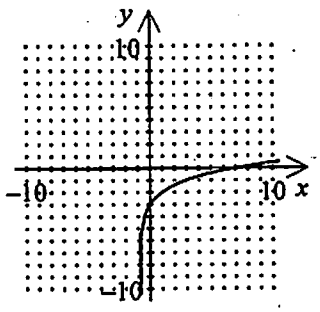
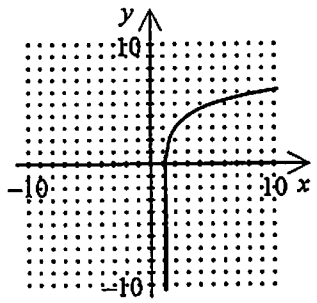
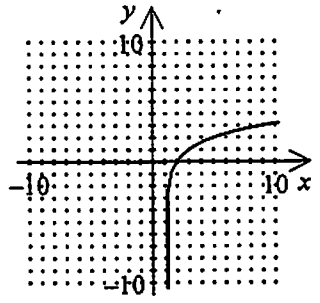


[C]



[D]



Solve for x.

34. $67^{5x+2} = 36$ [A] -0.2295 [B] -0.2925 [C] -0.1653 [D] 0.5075

35. $\log_3(x-1) - \log_3(x-4) = \log_3 4$ [A] $-\frac{1}{3}$ [B] 5 [C] 0 [D] 1

36. The number of bacteria present in a culture after t minutes is given as $B = 10e^{kt}$. If there are 1031 bacteria present after 4 minutes, find k.

[A] 1.159 [B] 4.636 [C] 18.543 [D] 1.147

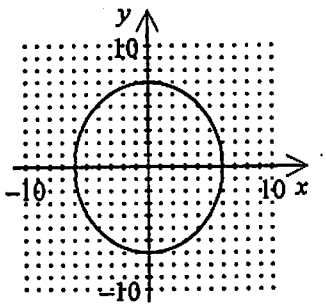
37. Identify the standard form of the equation of the circle.
$x^2 + 12x + y^2 - 4y + 27 = 0$

[A] $(x-6)^2 + (y+2)^2 = \sqrt{13}$ [B] $(x+2)^2 + (y-6)^2 = 13$

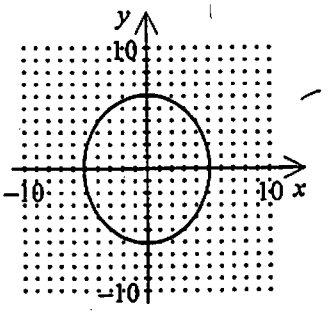
[C] $(x+2)^2 + (y-6)^2 = \sqrt{13}$ [D] $(x+6)^2 + (y-2)^2 = 13$

38. Identify the graph of the ellipse given by the equation. $\frac{x^2}{25}+\frac{y^2}{36}=1$

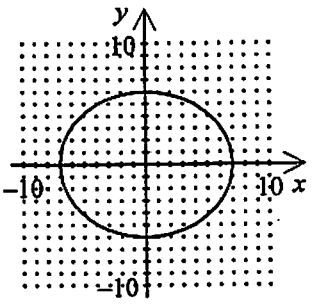
[A]



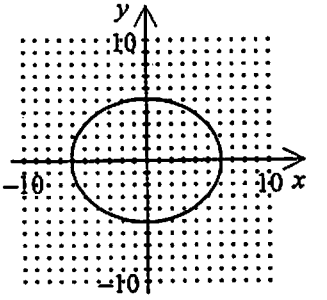
[B]



[C]



[D]



39. Solve the system. $4x^2+3y^2=147$

$5x^2+3y^2=183$

[A] (1, 5), (1, −5), (−1, 5), (−1, −5)

[B] (1, 5), (1, −5)

[C] (6, 1), (6, −1), (−6, 1), (−6, −1)

[D] no real solution

40. Write in expanded form.

$(a-2b)^4$

[A] $a^4+8a^3b+24a^2b^2+32ab^3+16b^4$

[B] $a^4-8a^3b+24a^2b^2-32ab^3+16b^4$

[C] $a^4-8a^3b+12a^2b^2-8ab^3+16b^4$

[D] $a^4+8a^3b+12a^2b^2+8ab^3+16b^4$