MATH 095 Sample 01 Exam 2

For each problem, show your work in the space provided.
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Factor:

1. $9s^2t^4 - 6st^3$

   [A] $3st^3(3st-2)$ [B] $3st^3(3st+2)$ [C] $3(3s^2t^4-2st^3)$ [D] $3st(3st^3-2t^2)$

2. $3x^3+3x^2+9x$

   [A] $3x(x^2+x+3)$ [B] $3(x^3+x^2+3x)$ [C] $3x(x+1)(x+3)$ [D] $x(3x^2+3x+9)$

3. $54x-9y-9z$

   [A] $9(x+y+z)$ [B] $9(6x+y-z)$ [C] $9(6x-y-z)$ [D] $6x-y-z$

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4. Solve: $x^2 + 4x = 0$ [A] 0, –4 [B] –4, 4 [C] –4, 3 [D] 0, 4

Factor:

5. $9g^2 + 24g + 16$

   [A] $(3g+4)^2$ [B] $(3g-16)(3g+1)$ [C] $(3g-4)^2$ [D] $(3g+4)(3g-4)$

6. $4x^2 - 12xy + 9y^2$

   [A] $(2x-3y)^2$ [B] $(2x-3y)(2x+3y)$ [C] $(2x+3y)^2$ [D] $(4x-3y)(x+3y)$

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7. Determine the value or values of the variable for which $\frac{x+3}{4x-3}$ is defined.

Simplify:

8. $\frac{3d+de}{10d}$ [A] $\frac{3d+e}{10}$ [B] $\frac{3+de}{10}$ [C] $\frac{3e}{10}$ [D] $\frac{3+e}{10}$

9. $\frac{6(x+7)^4(x-6)^9}{18(x+7)^9(x-6)^3}$ [A] $\frac{1}{3}$ [B] $\frac{(x-6)^6}{3(x+7)^5}$ [C] $\frac{(x^2-42)^9}{3}$ [D] $\frac{(x+7)^6}{3(x-6)^3}$

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Add:

10. $\frac{2}{x+1} + \frac{3}{x-1}$ [A] $\frac{5x+1}{x^2-1}$ [B] $\frac{5x+1}{5}$ [C] $\frac{5}{x^2-1}$ [D] $\frac{5}{x+1}$

11. $\frac{5}{i+4} + \frac{5}{i^2-16}$

Simplify:

12. $\frac{h + \frac{3}{g}}{h^2 + \frac{2}{g^2}}$ [A] $\frac{g^2h+3}{g^2h^2+2g}$ [B] $\frac{g^2(h+3)}{g^2h^2+2}$ [C] $\frac{g^2h+2}{g^2h^2+3g}$ [D] $\frac{g^2h+3g}{g^2h^2+2}$

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Simplify:

13. $a^{-1}(a^3)(a^{-3})$

14. If f varies jointly with g and the square of h, and f is 300 when g is 2 and h is 5, find f when g is 5 and h is 4.

[A] 600 [B] 480 [C] 301 [D] 1200

15. Multiply: $\left(2+\sqrt{7}\right)^2$ [A] $11 + 4\sqrt{7}$ [B] $53 + 4\sqrt{7}$ [C] 11 [D] $11 - 2\sqrt{7}$

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Simplify:

16. $\sqrt{75x^9y^2}$ [A] $5xy\sqrt{75x}$ [B] $25x^8y\sqrt{3xy}$ [C] $x\sqrt{3x}$ [D] $5x^4y\sqrt{3x}$

17. $\sqrt[3]{x^{15}}$

18. $\sqrt{18x^5y^6}$

19. Solve: $3(x-2)^2 - 24 = 0$

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20. Find the missing term: $(x+4)^2 = x^2+8x +$ _____

[A] 8 [B] 2 [C] 16 [D] 4

21. Determine the nature of the roots: $4x^2-2x+5 = 0$

[A] one real root [B] two unequal real roots
[C] two unequal imaginary roots [D] one real root and one imaginary root

22. Determine the nature of the roots: $3x^2-x-4 = 0$

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23. Solve: $3x^2 + 4x - 5 = 0$

[A] $\frac{2 + \sqrt{19}}{3}, \frac{2 - \sqrt{19}}{3}$

[B] $\frac{2 + 2\sqrt{19}}{3}, \frac{2 - 2\sqrt{19}}{3}$

[C] $\frac{-2 + 2\sqrt{19}}{3}, \frac{-2 - 2\sqrt{19}}{3}$

[D] $\frac{-2 + \sqrt{19}}{3}, \frac{-2 - \sqrt{19}}{3}$

24. Write the expression in the form $a + bi$: $(4 + 2i)(-5 + 6i)$

[A] $-8 + 34i$ [B] $-32 + 14i$ [C] $-32 - 14i$ [D] $-8 + 14i$

25. Find the domain of the relation $\{(3, -6), (2, -3), (0, 4)\}$.

[A] $\{-6, -3, 4\}$ [B] $\{-6, -3, 0\}$ [C] $\{3, 2, 0\}$ [D] $\{3, 2, 4\}$

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26. Determine the domain of the function $h(x) = \dfrac{6x}{x(x^2 - 25)}$.

[A] $\{x|x \neq 5\}$ [B] $\{x|x \neq \pm 5\}$ [C] $\{x|x \neq \pm 5, x \neq 0\}$ [D] $\{x|x \neq \pm 25, x \neq 0\}$

27. If $f(x) = x^4$ and $g(x) = -3 - x^2$, find $f(g(x))$.

[A] $\dfrac{x^4}{-3 - x^2}$ [B] $-3 - x^8$ [C] $-3x^4 - x^6$ [D] $\left(-3 - x^2\right)^4$

28. Which of the following is a one-to-one function?

[A] {(–2, 6), (4, 5), (5, 4), (3, 3)} [B] {(–2, 6), (4, 2), (5, 0), (3, 6)}
[C] {(–2, 6), (4, 2), (–2, 0), (2, 4)} [D] {(–2, 6), (4, 2), (5, 5), (4, 8)}

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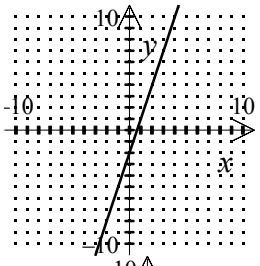
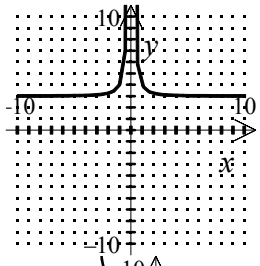
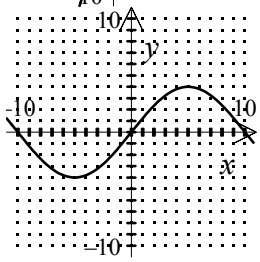
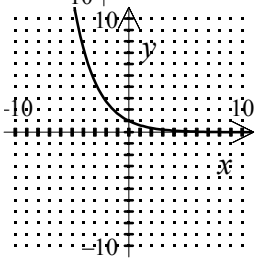
29. Use the horizontal line test to determine which of the following is a one-to-one function.

i) 

ii) 

iii) 

iv) 

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

30. Is $f(x) = 3x + 5$ a one-to-one function?

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[1] _____

[2] _____

[3] _____

[4] _____

[5] _____

[6] _____

[7] _____

[8] _____

[9] _____

[10] _____

[11] _____

[12] _____

[13] _____

[14] _____

[15] _____

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[16] _____

[17] _____

[18] _____

[19] _____

[20] _____

[21] _____

[22] _____

[23] _____

[24] _____

[25] _____

[26] _____

[27] _____

[28] _____

[29] _____

[30] _____

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[1] [A]

---

[2] [A]

---

[3] [C]

---

[4] [A]

---

[5] [A]

---

[6] [A]

---

[7] all real numbers except $x = \frac{3}{4}$

---

[8] [D]

---

[9] [B]

---

[10] [A]

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[11] $\dfrac{5(i-3)}{(i+4)(i-4)}$

---

[12] [D]

---

[13] $\dfrac{1}{a}$

---

[14] [B]

---

[15] [A]

---

[16] [D]

---

[17] x^5

---

[18] $3x^2y^3\sqrt{2x}$

---

[19] $\{2 - 2\sqrt{2},\ 2 + 2\sqrt{2}\}$

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[20] [C]

---

[21] [C]

---

[22] two unequal real roots

---

[23] [D]

---

[24] [B]

---

[25] [C]

---

[26] [C]

---

[27] [D]

---

[28] [A]

---

[29] [C]

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[30] yes