GSE Algebra II

FINAL EXAM REVIEW

1. Find the factors of $f(x) = x^2 + 5x + 6$

a) $f(x) = (x+1)(x+6)$ b) $f(x) = (x+2)(x+3)$

c) $f(x) = (x-2)(x-3)$ d) $f(x) = (x+1)(x+5)$

2. Factor the polynomial completely.

$x^2 + 4x - 21$

$a)\ (x-3)(x+7)$

$b)\ (x-7)(x+3)$

$c)\ (x-21)(x+1)$

$d)\ (x+2)(x+8)$

3. Solve for x.

$x^2 - 9 = 0$

a) $x = 3$ b) $x = 3, -9$ c) $x = 9, -9$ d) $x = -3, 3.$

4. Subtract and write your answer in standard form.

$(7x^4 - 2x^3 + 6x^2 - 3x + 5) - (x^4 - 4x^3 - 2)$

a) $4x^5 + 2x^4 - 10$

b) $8x^4 - 6x^3 + 6x^2 - 3x + 3$

c) $6x^4 + 2x^3 + 6x^2 - 3x + 7$

d) $4x^4 - 8x + 2$

5. Find the product $(2x-1)(x^2+3x-4)$

a) $5x^3 - 3x^2 - 5x - 6$

b) $2x^3 + 5x^2 - 11x + 4$

c) $2x^3 - 3x^2 + 25x - 4$

d) $5x^3 + 2x^2 - 5x - 6$

6. Determine if the binomial is a factor of the polynomial.

$f(x) = x^3 + 2x^2 - 5x - 6;\ (x-2)$

a) yes

b) no

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7. Solve the following equation. You should get imaginary solutions!

$$x^2 - 2x + 10 = 0$$

a) $x = 1 \pm 3i$ b) $x = 5, 2$
c) $x = -1 \pm 6i$ d) $x = 2 \pm 3i$

8. Find the expansion of $f(x) = (x + y)^4$

a) $x^4 + x^3y + x^2y^2 + xy^3 + y^4$ b) $x^4 + y^4$
c) $x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + y^4$ d) $x^3 - 3x^2y + 3xy^2 - y^3$

9. Using the binomial expansion and Pascal's Triangle, find the expansion of $f(x) = (x - 2)^5$.

a) $x^5 - 5x^4 + 3x^3 - 5x + 8$ b) $x^5 - 10x^4 + 40x^3 - 80x^2 + 80x - 32$
c) $x^5 - 2x^4 + 4x^3 - 8x^2 + 16x - 32$ d) $x^5 + 10x^4 - 4x^3 - 80x^2 + 80x + 32$.

10. Given that $f(x) = x + 5 \; and \; g(x) = x^2 - 7$. Find $f(g(x))$.

a) $x^2 + 1$ b) $x^2 - 12$ c) $x^2 + 10x + 25$ d) $x^2 - 2$

11. Simplify the expression: $5i^{28} + 3i^{10} - 12i^7$

a) $5i$ b) $2 + 12i$ c) $8 - 12i$ d) 5

12. Simplify $\frac{3x+6}{2x-1} \cdot \frac{6x-3}{x^2-2x-8}$

a) $\frac{3}{2x-1}$ b) $\frac{3x}{x^2-8}$

c) $\frac{9}{x-4}$ d) $\frac{x-3}{x-4}$

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13. Simplify the function $f(x) = \frac{3}{x-2} + \frac{5}{x+1}$ and identify where it is undefined.

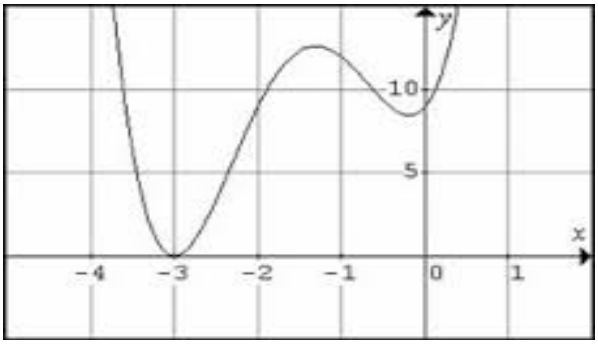
a) $\frac{8x-7}{(x-2)(x+1)}, x \neq 2, -1$

b) $\frac{8x+12}{x^2-2}, x \neq \sqrt{2}$

c) $\frac{x}{(x-2)(x+1)}, x \neq -2, 1$

d) $\frac{2x-7}{x-2}, x \neq 2$

14. Given the graph, identify the domain and range.



a) Domain: $(-\infty, \infty)$, Range: $(-\infty, \infty)$ b) Domain: $(-\infty, \infty)$, Range: $[0, \infty)$
c) Domain: $(-3, \infty)$, Range: $(-\infty, \infty)$ d) Domain: $(-\infty, \infty)$, Range: $(-3, \infty)$

15. Determine if the following functions are inverses of each other:

$f(x) = \sqrt[3]{\frac{2x-3}{4}}$ $g(x) = 2x^3 + \frac{3}{2}$

a) yes, $f(x)$ and $g(x)$ are inverse functions.
b) no, $f(x)$ and $g(x)$ are not inverse functions.

16. Given f(x) = $\frac{2(x^2-25)}{(x-4)(x+5)}$
Identify the vertical asymptotes, zeros, horizontal asymptotes, and holes in the function.

a) $VA: x = 4, \ HA: y = 2, \ Zero: x = 5, \ Hole: x = -5$
b) $VA: x = -4, \ HA: y = 3, , \ Zero: x = 3, \ Hole: none$
c) $VA: x = 2, -2 \ HA: y = 3, \ Zeros: x = 3, 2 \ Holes: x = -4, 5$
d) $VA: x = 25, \ HA: y = -5, \ Zero: x = 4, \ Hole: x = -5$

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17.Solve the equation $\sqrt{5x-2}=1$

a) $x=-\frac{1}{5}, not\ extraneous$ b) $x=\frac{3}{5}, not\ extraneous$

c) $x=\frac{4}{5}, \frac{1}{5}, where\ \frac{1}{5}\ is\ extraneous$ d) $x=2,5, where\ 2\ is\ extraneous.$

18. The parent function $f(x)=\sqrt{x}$ is translated 4 units right, then reflected across the x-axis, and then moved 2 units up. Write the new function $g(x)$..

a) $g(x)=-\sqrt{x-4}+2$
b) $g(x)=\sqrt{-x-4}-2$
c) $g(x)=-\sqrt{x+4}+2$
d) $g(x)=\sqrt{-x+4}-2$

19. Determine the left-hand and right-hand behavior of the graph of:

$$f(x)=-3x^3-4x^2+5x-7$$

a) $As\ x\to-\infty, f(x)\to-\infty.\ As\ x\to\infty, f(x)\to-\infty$
b) $As\ x\to-\infty, f(x)\to-\infty.\ As\ x\to\infty, f(x)\to+\infty$
c) $As\ x\to-\infty, f(x)\to+\infty.\ As\ x\to\infty, f(x)\to-\infty$
d) $As\ x\to-\infty, f(x)\to+\infty.\ As\ x\to+\infty, f(x)\to+\infty$

20. The function $f(x)$ has a zero of 3 with multiplicity 2. We know that …

a) since 3 is an odd number, the graph touches but does not cross the x-axis.
b) since 3 is an odd number, the graph crosses the x-axis.
c) since 2 is an even number, the graph touches but does not cross the x-axis.
d) since 2 is an even number, the graph crosses the x-axis.

21. Consider the function $7x^5-3x^4+6x^3+5x^2-12x-1$. At most how many turns does the graph of this function have?

a) At most 5 turns since the degree of the function is 5.
b) At most 7 turns since the leading coefficient is 7.
c) At most 6 turns since the leading coefficient is 7.
d) At most 4 turns since the degree of the function is 5.

22. Find the sum of the first 12 terms in the series.

$$2, 6, 18, 54, \ldots$$

a) 531,440 b) 531,441 c) -531,440 d) 1,371

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23. Find the average rate of change of the function $f(x) = x^2 - 2x + 3$ over the interval $[-1,\ 2]$.

a) 3 b) 6 c) -1 d) 10

24. Simplify using the properties of rational exponents.

$$\frac{8a^7b^5}{12a^5b^4}$$

a) $4a^2$ b) $\frac{2a^2b}{3}$ c) $\frac{4b}{3a^2}$ d) $\frac{4}{a^2}$

25. Express $x = y^z$ in logarithmic form.

a) $\log_z x = y$ b) $\log_y z = x$ c) $\log_x y = z$ d) $\log_y x = z$

26. Condense the expression using logarithmic properties.

$$3\log_4 7 + 2\log_4 x - \log_4 y$$

a) $y\log_4(\frac{x^2}{7})$ b) $\log_4(\frac{7^3x^2}{y})$ c) $\log_4(\frac{7^2y}{x^2})$ d) $\log_4(\frac{x^2}{7})$

27. $Solve$: $\log_2 8 + \log_2 x = 4$

a) $x = 0$ b) $x = -8$ c) $x = 2$ d) $x = 4$

28. Expand the expression using logarithmic properties.

$$\log_3\left(\frac{x}{y^2}\right)$$

a) $\log_3 x - y^2$ b) $2\log_3 x - \log_3 y$ c) $\log_3 x + 2\log_3 y$ d) $\log_3 x - 2\log_3 y$

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29. Solve: $4^{8x-3} = 4$

a) $x = \frac{1}{4}$ b) $x = 2$ c) $x = \frac{1}{2}$ d) $x = 4$

30. Determine whether the function is exponential growth or decay.

$$f(x) = 7\left(\frac{1}{2}\right)^x$$

a) Growth b) Decay

31. The value of a new car can be modeled by the equation $y = 21{,}000(0.75)^t$ where t is the number of years since the car was purchased. After how many years will the value of the new car be about $3740?

a). 7 years b). 4 years c). 9 years d). 6 years

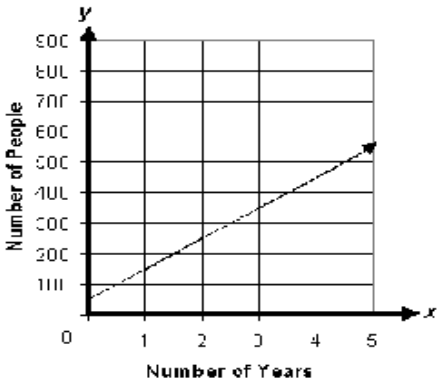
32. Given the function $g(x) = |x - 2| + 3$. Describe the transformations from the parent function $f(x) = |x|$ to $g(x)$.

a) Move 2 units right and 3 units up. b) Move 3 units right and 2 units down
c) Move 2 units left and 3 units up. d) Move 2 units right and 3 units down.

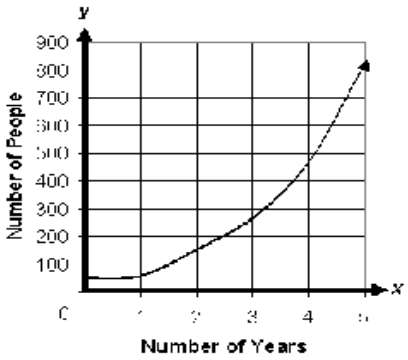
33. Scott is a computer-notebook salesman. He estimated that the number of people using notebooks, *y*, in a town after *x* years could be represented by the equation $y = 50(1.75)^x$.

Which of the following is a graph of this equation?

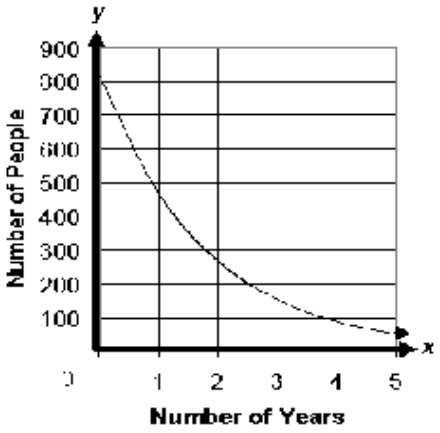
a)



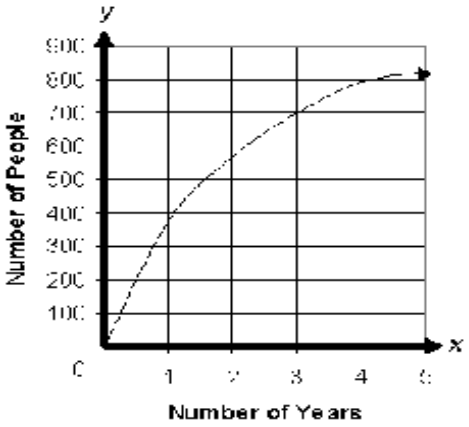
b)



c)



d)



34. State the asymptote, domain, and range of the function $f(x) = \log_2(x - 4) + 5$.

a) Asymptote: $x = 4$, Domain: $x > 4$, Range: All real numbers.
b) Asymptote: $x = 5$, Domain: $x > 5$, Range: All real numbers.
c) Asymptote: $x = 4$, Domain: $x > 4$, Range: $y > 5$.
d) Asymptote: $x = 5$, Domain: $x > 4$, Range: $y > 2$.

35. To determine whether a review session will improve his students' test scores, a Stat 113 instructor divides his class into two groups. He then requires one group to attend a study session and compares the test results of each group.

a) Observational study b) Experiment