

HAlg2: Sem 1 FE Review
Chapters 1, 2, 5-8.4

Name _____

Hour _____

1. What is the value of ...

a. i

b. i^2

c. e

2. Apply the operations. Simplify.

a. $(6+3i)+(-2-9i)$

b. $(-11-2i)-(7i-4)$

3. Apply the operations. Simplify.

a. $(6-7i)(8+3i)$

b. $\frac{5+3i}{1-2i}$

4. Solve:

a. $x^2 + 4x = -20$

b. $-2x^2 = -2x + 3$

5. Write the transformed function $g(x)$ from $f(x) = x^2$

a. reflected across the x-axis, down 3 units, and a horizontal stretch by a factor of 4.

b. left two units, and a vertical stretch by a factor of 3.

6. Evaluate the function for the given value.

a. $f(x) = -3(x-2)^2 - 5$; $f(-5)$

b. $f(x) = -\frac{2}{3}x^2 - x + 5$; $f(-3)$

7. Using $f(x) = -\frac{2}{3}(x+3)^2 - 4$

a. What's the maximum?

b. What's the axis of symmetry?

8. What are the zeros?

a. $f(x) = 3x^2 + 14x - 5$

b. $f(x) = 9x^2 - 100$

c. $f(x) = 3x^2 + 2x$

9. Using $f(x) = 3(x+2)(x+8)$

a. What are the x-intercepts?

b. What is the axis of symmetry?

10. Using $f(x) = x^2 - 6x + 11$

a. What are the x-intercepts?

b. What is the y-intercept?

c. What is the minimum value?

11. Using: $f(x) = -3x^2 + 6x + 9$

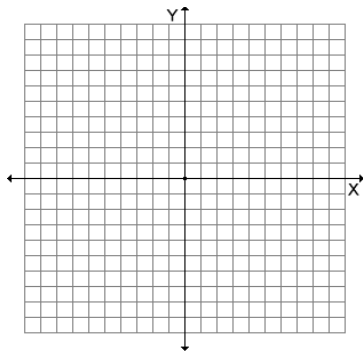
a. Write in intercept form.

b. Write in vertex form.

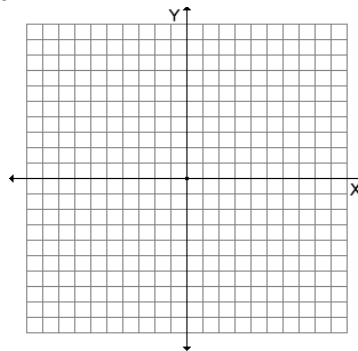
12. You have made a rectangular stained glass window that is 2 feet by 4 feet. You have 7 square feet of clear glass to create a border of uniform width around the window. What should the width of the border be?
13. Factor completely:
- a. $81x^4 - 16$ b. $27x^3 + 64$ c. $2x^3 - 5x^2 - 6x + 15$
14. Divide $x^3 + 2x^2 - 6x - 9$ by
- a. $(x - 2)$ b. $(x + 3)$
15. What is the end behavior of
- a. $f(x) = -3x^3 + 2x^2 - x + 1$ b. $f(x) = 2x^6 + 3x^4 + x^2 + 1$

16. Sketch the graphs.

a. $f(x) = -(x+3)(x-1)^2$



b. $f(x) = (x+3)(x-2)^2$



17. Expand:

a. $(2x+3)^3$

b. $(x-2)^5$

18. Describe the transformation from the parent function $f(x) = x^3$

a. $g(x) = -(x+1)^3$

b. $g(x) = \left(\frac{1}{4}x\right)^3 + 2$

c. $g(x) = (-x+4)^3$

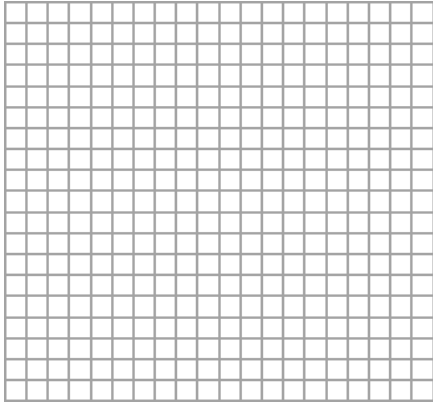
19. Let $f(x) = x^2 - 3x - 1$.

a. What is $f(a-5)$?

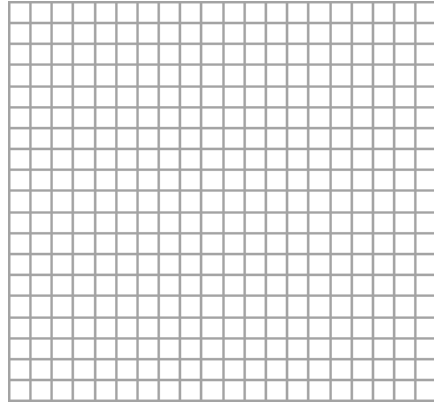
b. What is $f(z+9)$?

20. Graph each function:

a. $f(x) = 2^{x+4} - 3$



b. $f(x) = \frac{1}{x+2} + 2$



21. Find the product:

a.

$$\frac{x^2 - 16}{x^2 - 6x + 8} \times \frac{5x - 10}{3x + 12}$$

b.

$$\frac{6x - 18}{x^2 - 4} \times \frac{x^2 + 5x + 6}{x^2 - 9}$$

22. Find the sum:

a.

$$\frac{1}{2-x} + \frac{x+1}{x^2-4}$$

b.

$$\frac{2}{x+3} + \frac{3}{x^2+7x+12}$$

23. Find the quotient:

a.

$$\frac{x^2 - 9x - 36}{x^2 - 3x - 18} \div \frac{2x^2 - 21x - 36}{2x^2 + 15x + 18}$$

b.

$$\frac{x^2 + 3x - 10}{x^2 - 2x - 15} \div \frac{x^2 + x - 6}{x^2 + 6x + 9}$$

24. What is the inverse of the following?

a. $f(x) = -3x - 16$

b. $f(x) = 2^x + 9$

c. $f(x) = 5(x + 12)$

25. Write an equation that has the following characteristics:

a. an exponential function with a y intercept of 4

b. a rational function with a hole at 4, a vertical asymptote at -1 and a horizontal asymptote at 2

c. an rational function with a horizontal asymptote at -5

26. a. An initial population of 1000 frogs decreases at a rate of 13% per year.

Write the function that represents the population after x years?

- b. Anne deposits \$500 into an account that earns 5% interest compounded monthly.

Write a function that represents the amount in Anne's account after t years

- c. An initial population of 16 bacteria doubles every hour.

Write the function that represents the population after x hours?

27. James invests \$1500 at 3.5% compounded continuously. Write an equation for James.

Cheri invests \$1100 at 5.25% compounded continuously. Write an equation for Cheri.

When will they have the same amount in their accounts?

28. As x approaches $+\infty$, determine the order of the graphs of the functions that increases at the slowest rate to the fastest rate?

a. $f(x) = 2^x$

b. $f(x) = x^4 + 1$

c. $f(x) = 2x^2$

d. $f(x) = \sqrt{5x}$

29. Simplify:

a. $\log 10^9 + 10^{\log 5}$

b. $e^{2\ln x} + \ln e^x$

c. $\frac{\log 10^{32} - 2(10^{\log 8})}{\log_2 2^{16}}$

30. Express each expression as a single logarithm:

a. $\log_4 27 - 2\log_4 3$

b. $3\log_3 4 - 2\log_3 8 + 4\log_3 2$

c. $\log_4 18 - \left(\frac{1}{2}\log_4 36 + 2\log_4 3\right)$

31. Solve:

a. $\log_4(5x - 3) + \log_4(9 - x) = 3$

b. $\left(\frac{3}{2}\right)^x = 3$

c. $8^{x+7} = 16^{2x-1}$

d. $\log(x-3) = 1 - \log x$

e. $\log_3(x+16) = 6$

f. $12^{3x} = 267$

32. Complete the square to write each equation in vertex form.

a. $f(x) = x^2 - 8x + 5$

b. $f(x) = x^2 - 9x - 20$

c. $f(x) = 2x^2 - 12x - 12$

33. Identify all asymptotes, x-ints, and holes of the following:

a. $f(x) = \frac{6x - 12}{x^2 - 5x + 6}$

b. $g(x) = \frac{2x^2 - x - 6}{x^2 + 2x - 8}$

34. Use finite differences to determine the type of function that best describes the data. Explain.

a.

x	y
7	28
8	15
9	-1
10	-20
11	-42
12	-67
13	-95

b.

x	y
50	-100
55	-200
60	-290
65	-364
70	-420
75	-460
80	-490

c.

x	-1	0	1	2	3
f(x)	$\frac{243}{4}$	$\frac{81}{2}$	27	18	12

35. a. Carol drives her daughter to school at an average rate of 30 miles per hour, but only goes an average rate of 20 miles per hour on the way home because of traffic. What is her average rate for the entire round trip?

b. Inlet pipe #1 can fill a pool in 8 hours. Inlet pipes #1 and #2 together can fill the pool in 6 hours. How long will it take inlet pipe #2 to fill the pool by itself?

36. a. Write an equation that represents the statement " P varies directly with Q and inversely with the product of R and T ."

b. P varies directly with Q and inversely with R , and $P = 10$ when $Q = 5$ and $R = 6$. Find P when $Q = 6$ and $R = 4$.

37. Simplify:

a.

$$\frac{\frac{x-6}{x+1}}{\frac{x}{x^2+2x+1}}$$

b.

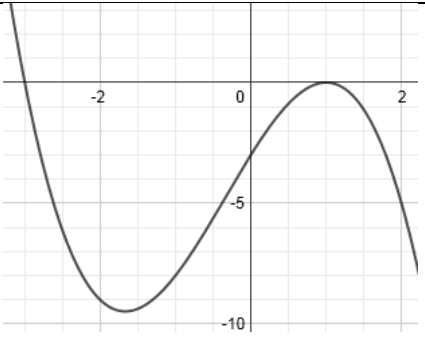
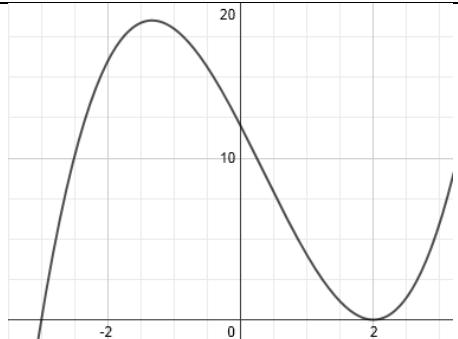
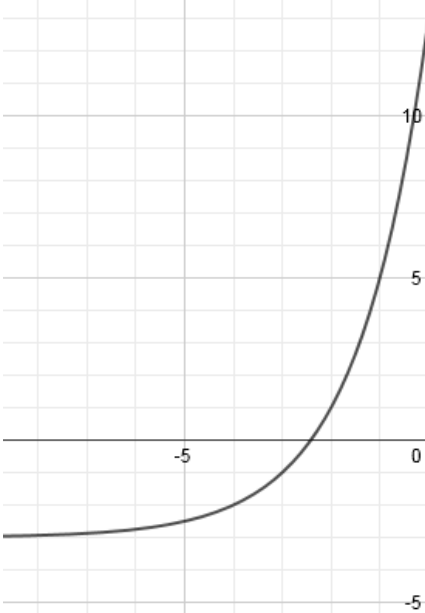
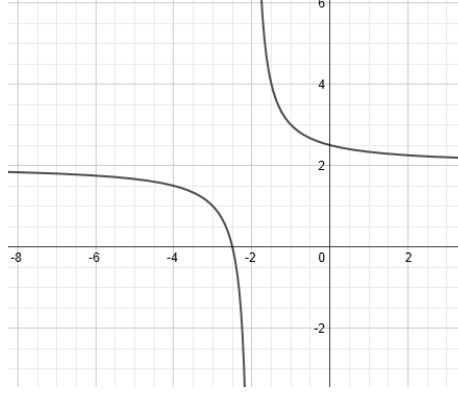
$$\frac{2x^2-5x-3}{x^2-16} + \frac{4x^2-1}{2x^2+7x-4}$$

c.

$$\frac{\frac{x-7}{x+2}}{\frac{x-5}{x+6}}$$

Honors Algebra 2: 1st Semester Final Exam Review Answer Key

#	a	b	c
1.	$\sqrt{-1}$	-1	≈ 2.718
2.	$4 - 6i$	$-7 - 9i$	
3.	$69 - 38i$	$\frac{-1 + 13i}{5}$	
4.	$-2 \pm 4i$	$\frac{1}{2} \pm \frac{i\sqrt{5}}{2}$	
5.	$g(x) = -\left(\frac{1}{4}x\right)^2 - 3$	$g(x) = 3(x+2)^2$	
6.	-152	2	
7.	-4	$x = -3$	
8.	-5 and $\frac{1}{3}$	$\pm \frac{10}{3}$	0 and $\frac{-2}{3}$
9.	(-2, 0) and (-8, 0)	$x = -5$	
10.	None	(0, 11)	2
11.	$f(x) = -3(x+1)(x-3)$	$f(x) = -3(x-1)^2 + 12$	
12.	$x = .5$ ft or 6 in		
13.	$(9x^2 + 4)(3x + 2)(3x - 2)$	$(3x + 4)(9x^2 - 12x + 16)$	$(x^2 - 3)(2x - 5)$
14.	$x^2 + 4x + 2 + \frac{-5}{x-2}$; remainder was -5	$x^2 - x - 3$; remainder was 0.	
15.	as $x \rightarrow -\infty$, $f(x) \rightarrow +\infty$ and as $x \rightarrow +\infty$, $f(x) \rightarrow -\infty$ (rise/fall)	as $x \rightarrow -\infty$, $f(x) \rightarrow +\infty$ and as $x \rightarrow +\infty$, $f(x) \rightarrow +\infty$ (rise/rise)	

16.			
17.	$8x^3 + 36x^2 + 54x + 27$	$x^5 - 10x^4 + 40x^3 - 80x^2 + 80x - 32$	
18.	reflected over x-axis, translated 1 unit left	horizontal stretch by a factor of 4, translated 2 units up	reflected over y-axis, translated 4 units right
19.	$a^2 - 13a + 39$	$z^2 + 15z + 53$	
20.			
21.	$\frac{5}{3}$	$\frac{6}{x-2}$	
22.	$\frac{-1}{x^2 - 4}$	$\frac{2x+11}{x^2 + 7x + 12}$	
23.	$\frac{x+6}{x-6}$	$\frac{x+5}{x-5}$	
24.	$f^{-1}(x) = -\left(\frac{x+16}{3}\right)$	$f^{-1}(x) = \log_2(x-9)$	$f^{-1}(x) = \left(\frac{x}{5}\right) - 12$
25.	Various: ex $\rightarrow y = 22^x + 3$	Various: ex $\rightarrow y = \frac{2x(x-4)}{(x+1)(x-4)}$	Various: ex $\rightarrow y = \frac{1}{x} - 5$ or $y = \frac{-5x}{(x+1)}$
26.	$y = 1000(.87)^x$	$y = 500\left(1 + \frac{.05}{12}\right)^{12t}$	$y = 16(2)^x$

27.	$y = 1500(e)^{.035t}$	$y = 1100(e)^{.0525t}$	~17.7 years
28.	Slowest: $f(x) = \sqrt{5x} \rightarrow$	$f(x) = 2x^2 \rightarrow f(x) = x^4 + 1 \rightarrow$	$f(x) = 2^x$ Fastest
29.	14	$x^2 + x$	1
30.	$\log_4(3)$	$\log_3(16)$	$\log_4\left(\frac{1}{3}\right)$
31.	a. $x = \frac{13}{5}$ & 7	b. $x \approx 2.71$	c. $x = 5$
	d. $x = 5$	e. $x = 713$	f. $x \approx 0.75$
32.	$f(x) = (x-4)^2 - 11$	$f(x) = \left(x - \frac{9}{2}\right)^2 - \frac{161}{4}$	$f(x) = 2(x-3)^2 - 30$
33.	Holes: $x = 2$, VA's: $x = 3$, HA's: $y = 0$	Holes: $x = 2$, VA's: $x = -4$, HA's: $y = 2$	
34.	Quadratic Polynomial	Quartic Polynomial	Exponential Function
35.	24 mi/ hour	24 hours	
36.	$P = \frac{kQ}{RT}$	$P = 18$	
37.	$\frac{(x-6)(x+1)}{x}$	$\frac{(x-3)}{(x-4)}$	$\frac{(x+6)(x-7)}{(x+2)(x-5)}$