

Final Exam Review
Chapters A-D and 1-4

Simplify using exponent rules.

1. $\left(\frac{8x^3y^{-6}}{x^{-8}y^{-1}}\right)^{1/3}$

2. $\sqrt[3]{8x^3y^6}\sqrt[4]{2x^5y}$

3. $\sqrt{x^2\sqrt[3]{x^4}}$

Perform the indicated operation and simplify.

4. $\frac{x^2 - 10x + 21}{2x^2 - 12x - 14} \div \frac{x^2 + 2x - 15}{2x^2 + 12x + 10}$

5. $\frac{x}{x^2 + 2x + 1} - \frac{1}{x + 1}$

Solve the inequality. Write your solution in interval notation and graph it on the real number line.

6. $x^2 - 5x - 6 > 0$

7. $-3 \geq -8 - 5x > -27$

Solve the quadratic equation by factoring.

8. $x^2 + 7x = 30$

Solve the quadratic equation by any method learned in class.

9. $x^2 + 7x + 1 = 0$

Factor completely.

10. $y^2(x^2 - 4) - (x^2 - 4)$

11. $4w^2 + 4wy + y^2$

12. $5x^3 + 10x^2 - 2x - 4$

13. $4(2x + 1)^2 - 9$

14. Let $P(8, 4)$ and $Q(6, -2)$ be two points in the coordinate plane.

(a) Find the distance between the points P and Q .

(b) Find the midpoint between the points P and Q .

15. A set of data is given in the following table. Find an equation to model the data. Use your model to predict the value of y when $x = 20$.

x	y
0	12
1	17
2	22
3	27
4	32

16. A set of ordered pairs defining a relation is given below.

$$\{(5, 2), (4, 6), (2, 3), (2, 1)\}$$

- (a) Find the domain of the relation.
 - (b) Find the range of the relation.
 - (c) Sketch a diagram of the relation.
 - (d) Does the relation define a function?
17. Consider the function given by

$$r(z) = \frac{8(z - 4)^2}{z - 3}.$$

- (a) What is the name of the function?
- (b) What letter represents the input?
- (c) What is the output?
- (d) Find $r(3)$. What does it represent?
- (e) What is the domain of the function?

18. When a skydiver jumps out of an airplane from a height of 13,000 ft, her height h above the ground after t seconds is given by the function

$$h(t) = 13,000 - 16t^2.$$

- (a) Find $h(10)$ and $h(20)$. What do these values represent?
- (b) For safety reasons a sky diver must open the parachute at a height of about 2500 ft (or higher). A sky diver opens her parachute after 24 seconds. Did she open the parachute at a safe height?
- (c) Find the net change in the sky diver's height from 0 to 25 seconds.

Find the domain, inverse and range.

19. $f(x) = \frac{1}{\sqrt{x-3}}$.

20. $f(x) = \ln\left(\frac{x}{3}\right)$.

21. Find a function that models the number of q quarters in D dollars.

Combine into a single logarithm.

22. $3 \log_5(x) - 4 \log_5(x) + 8 \log_5(y)$

23. $1/2 \ln(2) + 1/4 \ln(z) + 1/8 \ln(y)$

Expand into as many logarithms as possible. (In both cases this is three logarithms)

24. $\log\left(\frac{z^3}{\sqrt{xy}}\right)$

25. $\ln\left(\frac{a^2 - b^2}{c^2}\right)$

Evaluate without using a calculator.

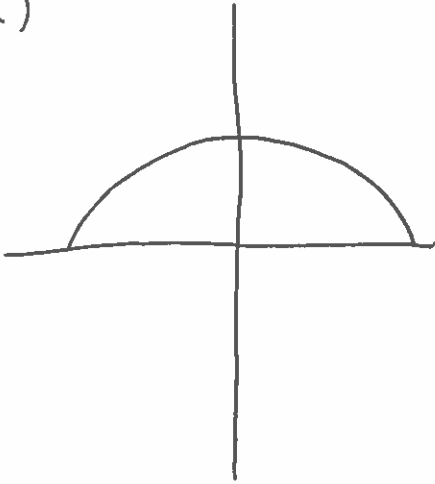
26. $\log_8 1/2$

27. $\log_3(27)$

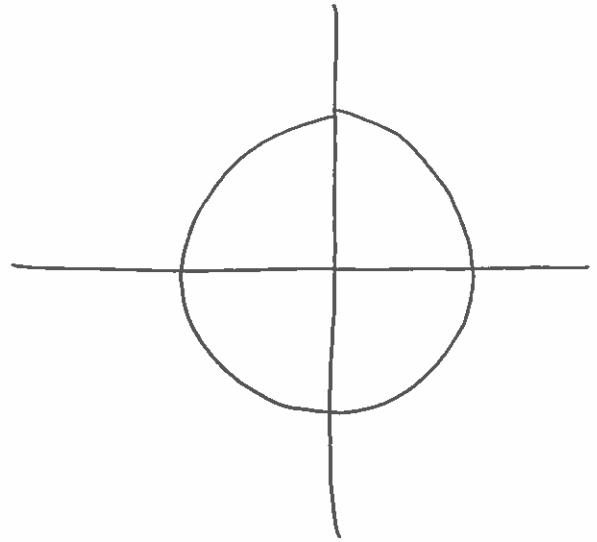
28. $\log(1,000,000)$

Determine if the following graphs are functions.
If so, determine if they are invertible.

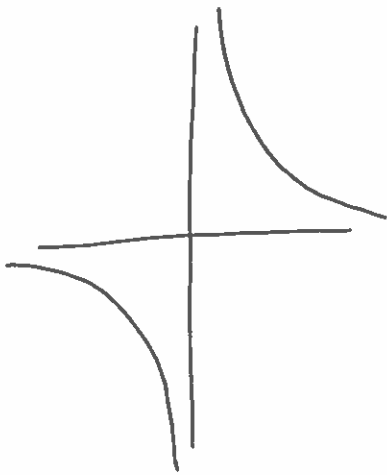
(a)



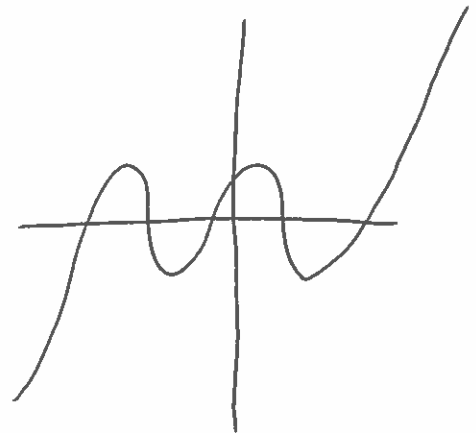
(b)



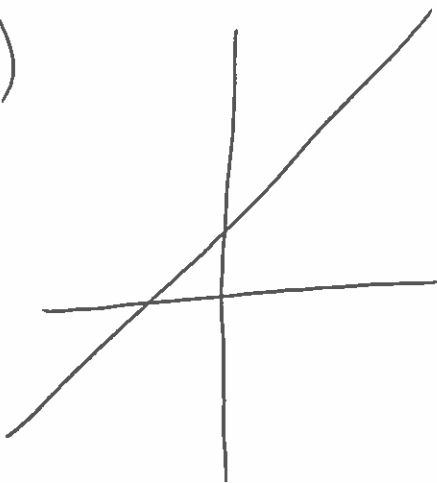
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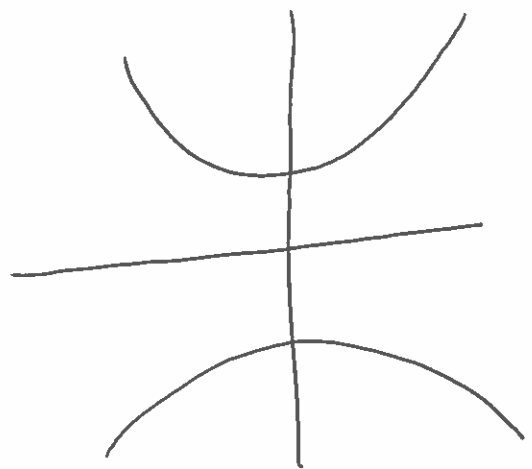
(d)



(e)

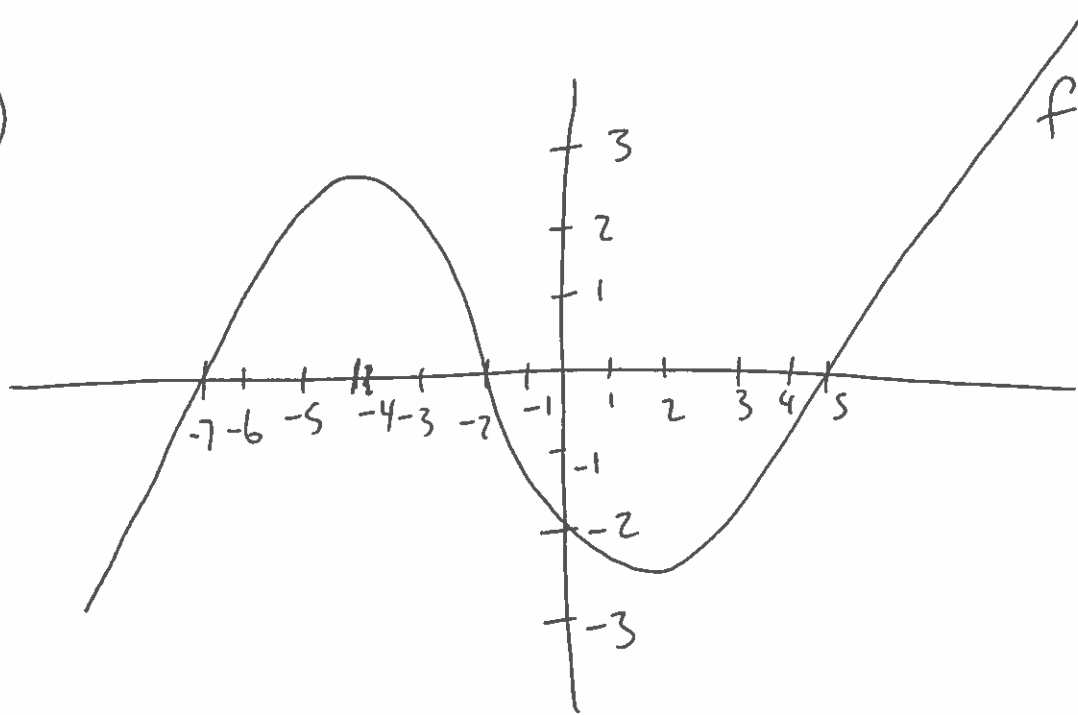


(f)



Determine where the function is increasing/decreasing. Find the maxima and minima for the function and identify the x -values corresponding to each.

(a)



(b)

