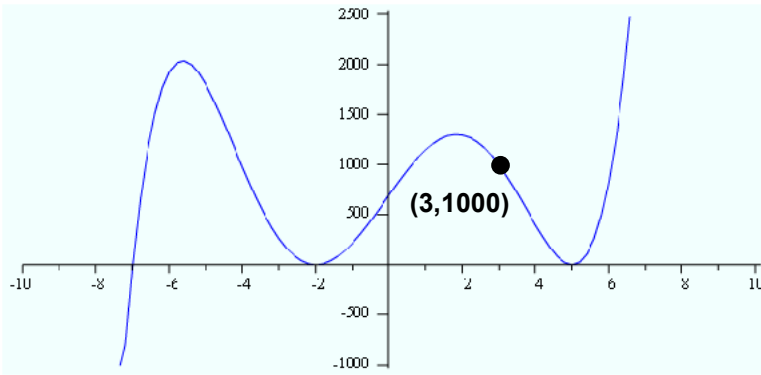


- I.** Find the equation of least degree for the following polynomial function. (a) Write the equation with 'a' as the lead coefficient. (b) Use the given point to solve for 'a.' (c) Find the y-intercept.



- II.** Find the polynomial function in factored form for the following:
P(x) is of degree 4 ; P(0) = -783 ; zeros: x = -3 (mult. 2), -2 + 5i

- III.** List all possible rational zeros for the given function. Use substitution to confirm that the given x-value is a zero. Then use synthetic division to find the other zeros.

$$P(x) = x^3 - 9x^2 - 22x + 240 ; x = 6$$

- IV.** Solve the rational inequality. Graph solution on numberline.

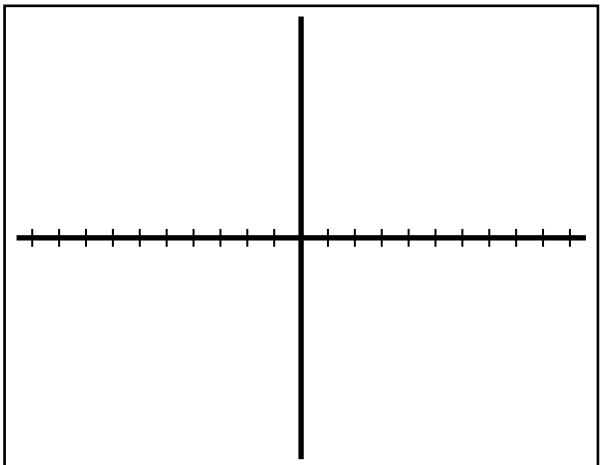
$$\frac{7x-11}{2x-5} \leq 3$$



V. Simplify each function and state its vertical asymptote(s), hole(s), horizontal asymptote, x-intercept(s), and y-intercept. If none exist, state "none." Give equations for asymptotes and coordinates for intercepts and holes. Graph the function. Then state its domain and range.

$$y = \frac{3(x-2)(x^2-5x-14)}{(x^2+4x-12)(x-4)}$$

VA:
hole:
HA:
x-int:
y-int:
domain:
range:



VI. Simplify the following expressions. Show all steps and work.

(a) $\frac{1}{1 + \frac{4}{5x}} + \frac{2}{1 - \frac{4}{x}}$

(b) $\frac{1 - \sqrt{5}}{2 + \sqrt{5}} + 3 - \sqrt{20}$

VII. Solve each exponential or log equation. Show all steps. Give exact and approximate answers for (a).

(a) $4(9)^{x+3} - 7 = 55$

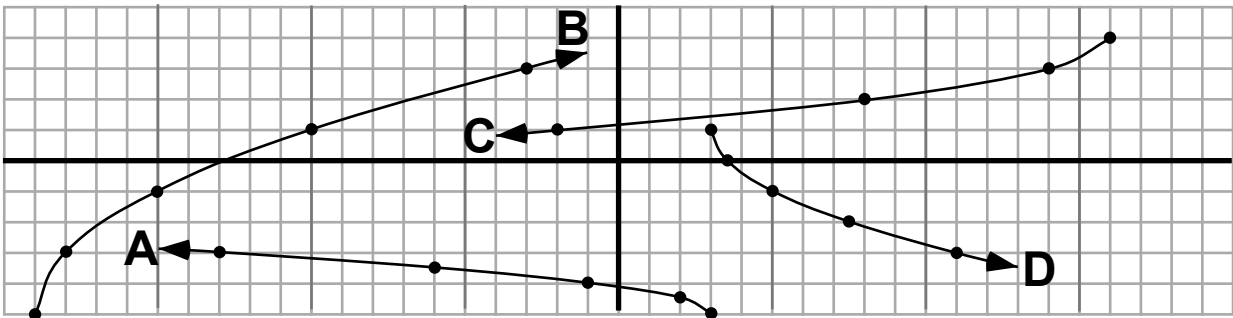
(b) $2\log(3x) - 5 = 7$

VIII. Solve the rational equation. Check for excluded values.

$$\frac{x+2}{x-1} - \frac{4}{2x} = \frac{5x-2}{3x}$$

IX. Find the correct equation for the given graphs. Assume that the graphs have been only vertically stretched/compressed in A & B and only horizontally stretched/compressed in C & D.

- A** _____
- B** _____
- C** _____
- D** _____



X. Complete the table and then state the transformations from

$$y = \frac{1}{3}\sqrt{-2(x+6)} - 7$$

Δx	x	y	Δy
	vertex		
<input type="checkbox"/>			<input type="checkbox"/>
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XI. Solve for x. Check solutions.

$$x = 3 + \sqrt{2x - 6}$$

XII. Find the domain.

$$y = \sqrt{3x^2 + 19x - 40}$$

XIII. Applications of logs.

(a) The value of a computer is \$3000 and depreciates at a rate of 15% each year.
 (i) Write an expression for the projected value of the computer after n years.
 (ii) When will the computer be worth \$750?

(b) A cold virus can multiply continuously at a rate of 5% every hour.
 (i) How many viruses will there be after 2 days of growth (starting with 1 virus)?
 (ii) How long will it take until there are 10000 viruses?

(c) \$15000 is invested in an account which earns 6.2% each year. Find the balance after 14 years if it's compounded...
 (i) ...monthly.
 (ii) ...daily.

XIV. Answer the following counting principle, permutation, combination, and probability questions. Show all steps.

(a) A prix-fixe (fixed price) dinner lets you choose among 4 appetizers, 7 entrees, and 5 desserts. How many different three course dinners (appetizer, entree, and dessert) can be created from the prix-fixe menu?

(c) Twelve children and their teacher are playing "Ring Around the Rosie" and are all holding hands in circle. In how many different ways can everyone be arranged?

(e) An advisory group is made up of 5 students and 8 faculty. Find the probability of randomly selecting a committee of 2 students and 5 faculty from this group.

(b) In how many ways can starting team of center, left/right guards, and left/right forwards be chosen from a roster of 15 basketball players?

(d) A spa offers 8 different physical activities and 6 different beauty treatments. Their "Weekender" package lets you choose 4 physical activities and 2 beauty treatments. How many different "Weekender" packages can be created?

XV. Disjoint/Inclusive & Independent/Dependent Events.

Find the probability for events A and B and $P(A \& B)$ when rolling two dice. Then determine whether the pair of events are disjoint or inclusive and find $P(A \text{ or } B)$. Next determine whether A and B are independent or dependent.

Note: express probabilities as reduced fractions.

die #1

	1	2	3	4	5	6	
die #2	1	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	9
	4	5	6	7	8	9	10
	5	6	7	8	9	10	11
	6	7	8	9	10	11	12

die #1

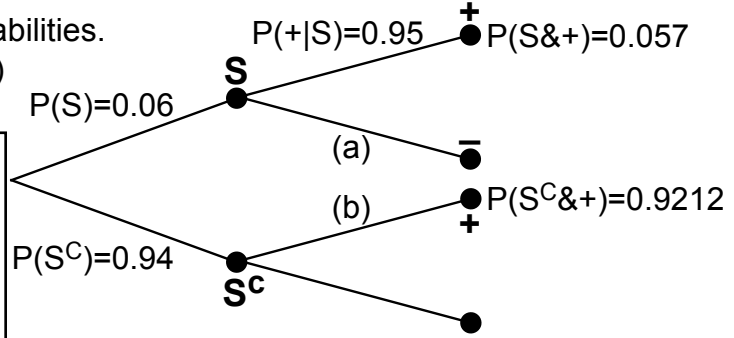
	1	2	3	4	5	6	
die #2	1	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	9
	4	5	6	7	8	9	10
	5	6	7	8	9	10	11
	6	7	8	9	10	11	12

	event A	event B	P(A)	P(B)	P(A&B)	inclusive/exclusive	P(A or B)	Are A and B independent? Use formula to check
(i)	rolling < 5 on die #1	sum > 8						
(ii)	rolling an even # on die #2	sum is odd						

XVI. Using the given tree diagram, find the following probabilities.

Indicate symbolically what the probabilities are for (a) and (b) (such as $P(S)=...$). Answers to 4 decimals.

(a)	(b)	P(+)	P(S +)



XVII. Answer the following questions involving sequences and series. Use formulas and show all steps.

(a) Find the 5 arithmetic means between **-8** and **37**.

(b) State the first three terms of the infinite series and then find the sum.

$$\sum_{k=1}^{\infty} \frac{6}{4^k}$$

(c) Express the repeating decimal 0.0053535353... as an infinite sum in sigma notation. Then convert to a fraction.

(d) If $S_6 = 324$ and $S_7 = 434$, find the first 7 terms of the arithmetic series. Find a_7 , a_1 , d , and then find the remaining terms.

(e) Find a_{10} for a geometric sequence where

$$a_4 = -448 \text{ and } a_7 = 28672.$$

- find r
- find a_1
- write an explicit formula for a_n
- use the formula to find a_{10}