

Advanced Algebra Spring Practice Final

I. $P(x) = a(x+7)(x+2)^2(x-5)^2$

$a = 1$; y-int. $(0, 700)$

II. $P(x) = -3(x+3)^2(x^2 + 4x + 29)$

III. p.r. = $\pm 1, 2, 3, 4, 5, 6, 8, 10, 12, 15,$
 $16, 20, 24, 30, 40, 48, 60, 80, 120, 240$

zeros: $x = -5, 6, 8$

IV. $-4 \leq x < \frac{5}{2}$

V. VA: $x = -6, 4$; HA: $y = 3$; hole: $(2, \frac{15}{4})$

x-int: $(-2, 0)$ & $(7, 0)$; y-int: $(0, \frac{7}{4})$

domain: $x \in \mathbb{R} : x \neq -6, 2, 4$; range: $y \in \mathbb{R}$

VI. (a) $\frac{3x(5x-4)}{(x-4)(5x+4)}$

(b) $-4 + \sqrt{5}$

VII. let event A = spinning a number less than 4

(a) $P(\text{A each of 5 spins}) = \frac{1}{1024}$

(b) $P(\text{A on exactly 1 out of 5 spins}) = \frac{405}{1024}$

VIII. $x = -\frac{1}{2}, 4$

IX. A: $y = \frac{1}{2}\sqrt{-(x-3)} - 5$

B: $y = 2\sqrt{(x+19)} - 5$

C: $y = -\sqrt{-\frac{1}{2}(x-16)} + 4$

D: $y = -\sqrt{2(x-3)} + 1$

XI. $x = 3, 5$

XII. $x \leq -8$ or $x \geq \frac{5}{3}$

XIII. (a) $P(S) = \frac{17}{30}$; $P(B) = \frac{26}{75}$; $P(B \& S) = \frac{14}{75}$

$P(B \text{ or } S) = \frac{109}{150}$; $P(B | S) = \frac{28}{85}$; $P(S | B) = \frac{7}{13}$

$P(B \& C) = 0$; $P((H \text{ or } C) | J) = \frac{41}{65}$; $P(S \text{ or } J) = 1$

(b) $P(C | J) = \frac{5}{6} \approx 0.8333$

(c) $P(B \& C) = 0.20$

XIV. (a) 140

(b) 360360

(c) 479001600

(d) 1050

(e) $P(2 \text{ students \& } 5 \text{ faculty}) \approx 0.3263$

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

$b = -\frac{1}{2}$	X	Y	$a = \frac{1}{3}$
	vertex		
ΔX	-6	-7	ΔY
$-\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{2}{3}$	$+\frac{1}{3}$
$-\frac{3}{2}$	$-\frac{1}{2}$	$-\frac{3}{3}$	$+\frac{1}{3}$
$-\frac{5}{2}$	-8	$-\frac{1}{3}$	$+\frac{1}{3}$
$-\frac{7}{2}$	$-\frac{1}{2}$	-6	$+\frac{1}{3}$
$-\frac{7}{2}$	-14	$-\frac{2}{3}$	$+\frac{1}{3}$

- vertical comp. by a factor of 1/3
- horizontal comp. by a factor of 1/2
- reflected across the y-axis
- vertical shift 7 units down
- horizontal shift 6 units to the left

XV. (i) $P(A) = \frac{2}{3}$; $P(B) = \frac{5}{18}$; $P(A \& B) = \frac{1}{12}$;

inclusive; $P(A \text{ or } B) = \frac{31}{36}$; **not independent,**

$P(A \& B) \neq P(A) \cdot P(B) \triangleright \frac{1}{12} \neq \frac{2}{3} \cdot \frac{5}{18} \triangleright \frac{1}{12} \neq \frac{5}{27}$

(ii) $P(A) = \frac{1}{2}$; $P(B) = \frac{1}{2}$; $P(A \& B) = \frac{1}{4}$;

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$P(A \& B) = P(A) \cdot P(B) \triangleright \frac{1}{4} = \frac{1}{2} \cdot \frac{1}{2}$

XVI. (a) $P(-|S) = 0.05$

(b) $P(+|S^c) = 0.98$

$P(+)$ = 0.9782

$P(S|+)$ \approx 0.0583

XVII. (a) $-8, -0.5, 7, 14.5, 22, 29.5, 37$

(b) 2

(c) $\sum_{k=1}^{\infty} 0.53(0.01)^k$ or $\sum_{k=1}^{\infty} 0.0053(0.01)^{k-1} = \frac{53}{9900}$

(d) $a_7 = 110$, $a_1 = 14$, $d = 16$,
 $14, 30, 46, 62, 78, 94, 110$

(e) $r = -4$, $a_1 = 7$, $a_n = 7(-4)^{n-1}$

$a_{10} = -1835008$

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