

Circle the correct answer and then write it in the answer blank provided. Show all work on every problem.

\_\_\_\_ 1. Simplify  $\sqrt{128}$

(A)  $2\sqrt{8}$

(B)  $8\sqrt{2}$

(C)  $6\sqrt{2}$

(D)  $4\sqrt{6}$

\_\_\_\_ 2. Simplify  $\frac{8}{\sqrt{2}}$

(A)  $8\sqrt{2}$

(B) 2

(C) 4

(D)  $4\sqrt{2}$

\_\_\_\_ 3. Simplify  $4\sqrt{7} - 5\sqrt{28}$

(A)  $2\sqrt{7}$

(B)  $-6\sqrt{7}$

(C)  $14\sqrt{7}$

(D)  $4\sqrt{7} - 35\sqrt{2}$

\_\_\_\_ 4. Simplify  $\sqrt[3]{-108}$

(A) -6

(B)  $3i\sqrt[3]{4}$

(C)  $-3\sqrt[3]{4}$

(D)  $-4\sqrt[3]{3}$

\_\_\_\_ 5. Simplify  $\sqrt{-108y^7}$

(A)  $6y^3i\sqrt{3y}$

(B)  $-6y^3i\sqrt{3}$

(C)  $6y^3\sqrt{-3y}$

(D)  $3yi\sqrt{6y^5}$

\_\_\_\_ 6. Solve  $(x-4)^2 - 5 = 20$

(A)  $\{9, -1\}$

(B)  $\{9\}$

(C)  $\{-8 + \sqrt{29}, -8 - \sqrt{29}\}$

(D) no solution

\_\_\_\_ 7. Solve  $12x^2 - 9x = -12$

(A)  $\left\{\frac{3+i\sqrt{7}}{8}, \frac{9-i\sqrt{7}}{8}\right\}$

(B)  $\left\{\frac{3+\sqrt{73}}{8}, \frac{3-\sqrt{73}}{8}\right\}$

(C)  $\left\{\frac{3+i\sqrt{55}}{8}, \frac{3-i\sqrt{55}}{8}\right\}$

(D)  $\left\{\frac{-3+\sqrt{73}}{8}, \frac{-3-\sqrt{73}}{8}\right\}$

\_\_\_\_ 8. Solve  $x^2 - 6x + 4 = 0$

(A)  $\{-3 + \sqrt{5}, -3 - \sqrt{5}\}$

(B)  $\{3 + 2\sqrt{5}, 3 - 2\sqrt{5}\}$

(C)  $\{-3 + 5\sqrt{2}, -3 - 5\sqrt{2}\}$

(D)  $\{3 + \sqrt{5}, 3 - \sqrt{5}\}$

\_\_\_\_ 9. Solve  $x^2 - 13x + 36 = 0$

(A)  $\{-4, -9\}$

(B)  $\{9\}$

(C)  $\{4, 9\}$

(D)  $\{3, 12\}$

\_\_\_\_ 10. Solve  $4x^2 = -20x$

(A)  $\{-5\}$

(B)  $\{0, -5\}$

(C)  $\{-4, -5\}$

(D)  $\{4, 5\}$

\_\_\_\_ 11. Simplify  $(2-i) - (2+6i)$

(A)  $4+5i$

(B)  $5i$

(C) -10

(D)  $-7i$

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\_\_\_\_ 12. Simplify  $(5 + 2i) + (8 - i)$

(A) 42

(B)  $42 + 11i$ (C)  $13 + i$ (D)  $40 - 2i$ 

\_\_\_\_ 13. Simplify  $(3 + 2i)(8 - 4i)$

(A) 32

(B)  $32 + 4i$ (C)  $32 - 4i$ (D)  $24 - 4i$ 

\_\_\_\_ 14. Simplify  $(2 + 7i)^2$

(A)  $-45 + 28i$ 

(B) -45

(C)  $4 - 49i$ 

(D) 53

\_\_\_\_ 15. Simplify  $(5 - 3i)(5 + 3i)$

(A)  $25 - 9i$ (B)  $25 + 6i$ 

(C) 34

(D) 16

If a football is kicked straight upward, then the height  $h(t)$  of the football in feet at time  $t$  in seconds is given by  $h(t) = -16t^2 + 64t + 10$ .

16. What is the average rate of change of the height of the football on the interval  $[2, 4]$ ?

$-32$  ft/sec

17. How long does it take the football to return to earth (round to the nearest hundredth)?

4.15 sec

18. How long is the ball above a height of 50 feet?

About 2.44 sec

19. How long does it take to reach the maximum height?

2 sec

20. What is the maximum height?

74 ft

21. What is the real world domain of the function?

$[0, 4.15]$  seconds

22. What is the real world range of the function?

$[0, 74]$  feet

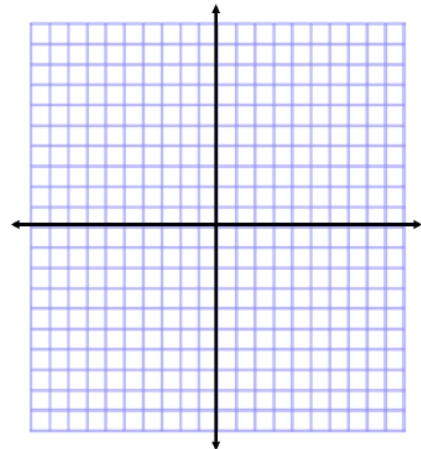
23. What is the height of the football 4 seconds after it is kicked? 10 ft

Solve the following system of equations, show all your work.  
(use the graph if you would like)

$$24. y = -x^2 - 5$$

$$y = x^2 + 10x + 3$$

$(-4, -21)$  and  $(-1, -6)$



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Researchers surveyed 100 students on which superpower they would most like to have. This two-way table displays data for the sample of students who responded to the survey:

	Fly	Invisibility	Totals
Male	29	9	38
Female	26	16	42
Totals	55	25	80

Using the two-way table above, find the joint and marginal relative frequencies, round to two decimal places if necessary.

	Fly	Invisibility	Totals
Men	25. <b>0.36</b>	26. <b>0.11</b>	27. <b>0.47</b>
Women	28. <b>0.33</b>	29. <b>0.20</b>	30. <b>0.53</b>
Totals	31. <b>0.69</b>	32. <b>0.31</b>	1

A gumball machine contains 5 pink gumballs, 10 yellow gumballs, and 7 blue gumballs. Find the probability of randomly selecting the following:

\_\_\_\_ 33. A pink or blue gumball

- a.  $\frac{3}{11}$   
 b.  $\frac{5}{22}$   
 c.  $\frac{35}{121}$   
 d.  **$\frac{6}{11}$**

\_\_\_\_ 34. A yellow and then a blue gumball with replacement.

- a.  **$\frac{35}{242}$**   
 b.  $\frac{17}{22}$   
 c.  $\frac{5}{33}$   
 d.  $\frac{10}{77}$

\_\_\_\_ 35. A yellow gumball

- a.  **$\frac{5}{11}$**   
 b.  $\frac{5}{22}$   
 c.  $\frac{7}{22}$   
 d.  $\frac{10}{11}$

\_\_\_\_ 36. A blue gumball and then a pink gumball without replacement.

- a.  $\frac{35}{43}$   
 b.  **$\frac{5}{66}$**   
 c.  $\frac{4}{7}$   
 d.  $\frac{35}{484}$

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Use the chart to answer questions 37-44. Round to the hundredths if necessary

(H = Drinks Hot Chocolate, C = Drinks Cider,  $\bar{H}$  = Doesn't Drink Hot Chocolate,  $\bar{C}$  = Doesn't Drink Cider)

	Drinks Hot Chocolate	Doesn't Drink Hot Chocolate	Total
Drinks Cider	246	51	297
Doesn't Drink Cider	88	15	103
Total	334	66	400

37. What is the probability of choosing someone that drinks hot chocolate?  $P(H)$

$$\frac{334}{400} = 0.84$$

38. What is the probability of choosing someone that doesn't drink hot chocolate?  $P(\bar{H})$

$$\frac{66}{400} = 0.17$$

39. What is the probability of choosing someone that doesn't drink either?  $P(\bar{H} \cap \bar{C})$

$$\frac{15}{400} = 0.04$$

40. What is the probability of choosing someone that drinks both hot chocolate and cider?  $P(H \cap C)$

$$\frac{246}{400} = 0.62$$

41. What is the probability of choosing someone that drinks cider given they drink hot chocolate?  $P(C|H)$

$$\frac{246}{334} = 0.74$$

42. What is the probability of choosing someone who doesn't drink cider that drinks hot chocolate?  $P(H|\bar{C})$

$$\frac{88}{103} = 0.85$$

43. What is the probability of choosing someone that drinks hot chocolate or cider?  $P(H \cup C)$

$$\frac{385}{400} = 0.96$$

44. What is the probability of choosing someone that doesn't drink hot chocolate or cider?  $P(\bar{H} \cup \bar{C})$

$$\frac{154}{400} = 0.39$$