2025 Algebra II Sample Items

1 Given: $A = \{3, 6, 9, 12, 15\}$

       $B = \{2, 4, 6, 8, 10, 12\}$

What is $A \cup B$, the union of set A and set B?
1) $\{6\}$
2) $\{6, 12\}$
3) $\{2, 3, 4, 8, 9, 10, 15\}$
4) $\{2, 3, 4, 6, 8, 9, 10, 12, 15\}$

2 A fair six-sided die is rolled three times. Let A be the event that at least one of the rolls is a six. Which event represents A', the complement of A?
1) Exactly one of the rolls is a six.
2) None of the rolls is a six.
3) At most one of the rolls is a six.
4) All of the rolls are sixes.

3 Which statement is true of the function $y = -2\cos[3(x - 4)] + 7$?
1) The midline is $y = -4$
2) The amplitude is -2
3) The range is $[-2, 2]$
4) The frequency is $\dfrac{3}{2\pi}$

4 The quadratic function $f(x)$ has a vertex of $(-4, 2)$. If $g(x) = f(2x)$, what is the vertex of $g(x)$?
1) $(-8, 2)$
2) $(-2, 2)$
3) $(-8, 4)$
4) $(-2, 1)$

5 In the diagram below point A, $\left(\frac{1}{4}, \frac{\sqrt{15}}{4}\right)$, represents the point where the terminal side of θ intersects the unit circle.

What is $\sin(-\theta)$?

1) $\frac{1}{4}$ 3) $\frac{\sqrt{15}}{4}$

2) $-\frac{1}{4}$ 4) $-\frac{\sqrt{15}}{4}$

6 Given $f(x) = -|x|$ and $g(x) = \log_2(x)$, which interval best represents the solution set to the inequality $g(x) > f(x)$?
1) $(-0.64, \infty)$ 3) $(0, 0.64]$
2) $(0.64, \infty)$ 4) $(0, 0.64)$

7 The table below shows the results of an experiment involving the growth of bacteria.

Time (x) (in minutes)	1	3	5	7	9	11
Number of Bacteria (y)	2	25	81	175	310	497

A power regression equation for this set of data is
1) $y = 48.914x - 111.819$ 3) $y = 2.001x^{2.298}$
2) $y = 3.186(1.670)^x$ 4) $y = 5.071x^2 - 11.943x + 11.586$

8 A rabbit population doubles every four weeks. There are currently five rabbits in a restricted area. If t represents the time in weeks and $P(t)$ is the population of rabbits with respect to time, which inequality could be used to determine when there will be at least 56 rabbits?

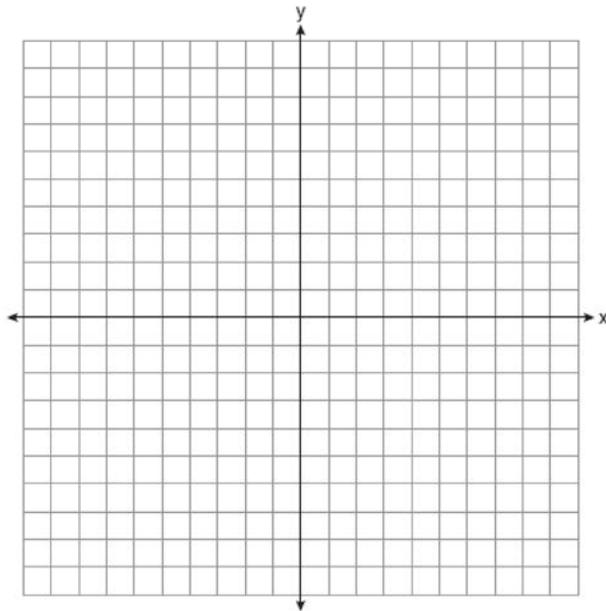1) $5(2)^{\frac{t}{4}} \geq 56$

2) $5(2)^{\frac{t}{4}} \leq 56$

3) $5(2)^{\frac{4}{t}} \geq 56$

4) $5(2)^{\frac{4}{t}} \leq 56$

9 Find the quotient when $3x^4 - 19x^3 - 29x^2 - x + 8$ is divided by $x^2 - 8x + 3$. If there is a remainder, express the result in the form $q(x) + \dfrac{r(x)}{b(x)}$.

10 Solve for x algebraically: $\sqrt{9-x} - \sqrt{2x} = 3$

11 On the set of axes below, graph $y = \tan(x) + 1$ for *at least one* cycle.

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Answer Section

1 ANS: 4   PTS: 2   REF: fall2501aii   NAT: S.CP.A.1
   TOP: Set Theory   KEY: union
2 ANS: 2   PTS: 2   REF: fall2501aii   NAT: S.CP.A.1
   TOP: Set Theory   KEY: complement
3 ANS: 4   PTS: 2   REF: fall2502aii   NAT: F.IF.B.4
   TOP: Graphing Trigonometric Functions
4 ANS: 2

A horizontal compression or stretch of $f(kx)$: $(x, f(x)) \rightarrow \left(\dfrac{x}{k}, f(x) \right)$

   PTS: 2   REF: fall2503aii   NAT: F.BF.B.3   TOP: Transformations with Functions
5 ANS: 4   PTS: 2   REF: fall2504aii   NAT: F.TF.A.4
   TOP: Unit Circle
6 ANS: 2
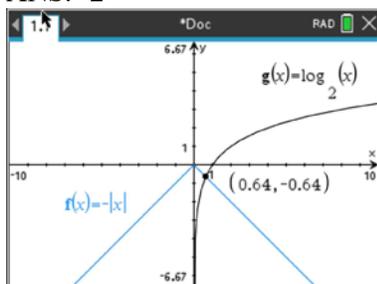
   PTS: 2   REF: fall2505aii   NAT: A.REI.D.11   TOP: Other Systems
   KEY: logarithmic
7 ANS: 3

   PTS: 2   REF: fall2506aii   NAT: S.ID.B.6   TOP: Regression
   KEY: power
8 ANS: 1   PTS: 2   REF: fall2507aii   NAT: A.CED.A.1
   TOP: Modeling Exponential Ineqalities

9   ANS:

$$
\begin{array}{r}
3x^2 + 5x + 2 \\
x^2 - 8x + 3\overline{\smash{\big)}\ 3x^4 - 19x^3 - 29x^2 - x + 8} \\
\underline{3x^4 - 24x^3 + 9x^2} \\
5x^3 - 38x^2 - x \\
\underline{5x^3 - 40x^2 + 15x} \\
2x^2 - 16x + 8 \\
\underline{2x^2 - 16x + 6} \\
2
\end{array}
$$

$3x^2 + 5x + 2 + \dfrac{2}{x^2 - 8x + 3}$

PTS: 2   REF: fall2508aii   NAT: A.APR.D.6   TOP: Rational Expressions
KEY: division

10 ANS:

$\sqrt{9 - x} = \sqrt{2x} + 3$ 8 is extraneous.

$9 - x = 2x + 6\sqrt{2x} + 9$

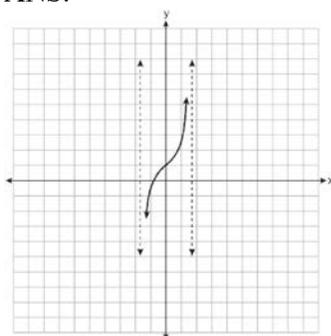$-3x = 6\sqrt{2x}$

$9x^2 = 36(2x)$

$9x^2 - 72x = 0$

$9x(x - 8) = 0$

$x = 0, 8$

PTS: 4   REF: fall2509aii   NAT: A.REI.A.2   TOP: Solving Radicals

11 ANS:

PTS: 2   REF: fall2510aii   NAT: F.IF.C.7   TOP: Graphing Trigonometric Functions
KEY: graph