|---|------|------|-------|-------|-------|

The following were changed at the resolution center at the convention:
8 B, 9 D, 17 E, 20 E, 22 E
1. **A.**

\[
\frac{(7a-2) - (7b-2)}{a-b} = \frac{7(a-b)}{a-b} = 7
\]

2. **D.** f is a line with positive slope; g is a line with negative slope; h is a line with 0 slope; k is a line with positive slope. f and k are increasing.

3. **B.**

\[
f^{-1}(x) = \frac{2y-5}{3} \text{ solves to } y = \frac{3x+5}{2}
\]

4. **D.**

**A.** Substituting shows that all three points line on the curve in choice A.

**B.** An even function has the property that \(f(-x) = f(x)\) for all x, and even powers are a clue to some even functions. II and IV do not change \(f(-x)\). Choice A has \(f(-x) = \) and for \(x=-1\) we see a different answer than \(x=1\).

5. **D.**

Let \(x=3: f(3) = \frac{f(1)}{f(2)} = 10\). Let \(x=5:\)

\[
f(5) = \frac{f(3)}{f(4)} = 20 \text{ so } \frac{10}{f(4)} = 20 \text{ and } f(4) = 1/2.
\]

So \(f(3), f(4), f(5)\) are 10, 1/2, 20 and by the formula, we can multiply two consecutive terms to get the term previous to both. So \(f(2)=5, f(1)=50, f(0)=250\). Then we have the sequence 250, 50, 5, 10, 1/2, 20 and we can verify each term by letting \(x=0\) through \(x=5\) or further. \(f(0)=250\).

6. **D.**

Divide to get

\[
\frac{(y-1)^2}{(x+2)^2} = 1
\]

which has asymptotes with slope \(\frac{\sqrt{B}}{2}\).

Since this is equal to \(3/4\) (original line given) then we have \(B = 9/4\).

7. **E.**

Since 3 times each term of \(f\) does not give \(g\), \(A\) is not true. Similarly adding 3 to \(f\) does not give \(g\), so \(B\) is not true. For \(c\), we consider \((x-3)^3 - 10(x-3)^2 + 27(x-3) - 18\) and let \(x=3\). This gives for \(C\), \(f(3)= -18\). But \(g(3)= 27-90+27-18\), not -18. So \(C\) is not true.

8. **A.** When \(x=1/2, 3x^{3/2} - \frac{\sqrt{x+1}}{|x-2|} \leq x \) (simplified) gives \(\frac{3}{2\sqrt{2}} - \frac{\sqrt{3/2}}{\sqrt{3/2}} = \frac{3\sqrt{2}}{2} - \frac{\sqrt{2}}{\sqrt{3}} = \frac{3\sqrt{2}}{4} = \frac{3\sqrt{2}}{3} = \frac{\sqrt{6}}{3} \approx 1.4(0.75-1.7/3) \approx 1.4(0.75-0.5) = 1.4(0.15) = 0.21 < 0.5\). Choice A.

9. **B.** Since sine has range \([-1, 1]\), the range of \(f\) is \(-4 \pm 1\).

10. **A.**

\[
x(x-4)(x+4) \neq 0
\]

11. **A.**

\[
\sqrt{3^2 + 3^2} = 3\sqrt{2}
\]
20. **D.** For Choice A, if \( b=2 \), \((a+5)\geq 0\), True.  
For Choice B, if \( b=-6 \), then \((a+5)\leq 0\), True.  
For Choice C, if \( b=-4 \), then \((a+5)\leq 0\), True.  
For Choice D, if \( b=-2 \), then \((a+5)\leq 0\), False.  
The answer is then **D**.

21. **E.** Phase shift is \(-1/\pi\).

22. **B.** The equation has roots at -4, 0 and 4. Knowing the shape of the graph, we see that over that interval, the value is negative after \( x=4 \). So only at \( x=5 \) and \( x=6 \) do we have negative values.

23. **D.** The slope of an asymptote is \( 3/4 \) and putting the conic in the form  
\[
\frac{(y-1)^2}{B} - \frac{(x+2)^2}{4} = 1
\]  gives the slope of asymptotes \( \sqrt{\frac{B}{2}} \). Setting this equal to \( 3/4 \) gives \( B=9/4 \).

24. **A.** The sum of the two irrational roots is 3 and the product is 7, so \( x^2 - 3x + 7 \) is a factor of \( f \). Multiply by \((x-4)\) to get choice A.

25. **D.** \( \cos(\Omega + \phi) = \cos \Omega \cos \phi - \sin \Omega \sin \phi \)  
\[
= \frac{24}{25} \cdot \frac{7}{25} - \frac{3}{25} \cdot \frac{3}{25} = \frac{75}{125} = \frac{3}{5}.
\]

26. **E.** The polynomial factors to \((x+2)^3(x+4)\) so the distinct roots are -2 and -4.

27. **B.** Let the roots be \( a, -a \) and \( b \). The sum of the roots is then \( b \), and since \(-B/A\) (coefficients) gives the sum is -3, then \( b=-3 \). The product of the roots is \( E/A=-12 \), then \(-3a^2=-12\) gives the other roots are 2 and -2. For \( x=\) any of these roots, set the polynomial \( =0 \) to get \( k= -4 \).

28. **C.** \( \sec(3x) = \sqrt{2} \) for \( \frac{\pi}{4} \) and \( \frac{7\pi}{4} \),  
\[
2\pi + \frac{\pi}{4} \text{ and } 2\pi + \frac{7\pi}{4}, \text{ and } 4\pi + ...
\]

Since is equal to \( 3x \), we get \( \frac{\pi}{12}, \frac{7\pi}{12}, \frac{15\pi}{12}, \frac{17\pi}{12}, \frac{23\pi}{12} \). Sum is \( 6\pi \).

29. **D.** \( y=\frac{(2x+1)(x+5)}{(x+12)(x-10)} \) has vertical asymptotes where the function is undefined. At \( x=-12, x=10 \), choice D.

30. **C.** The sum of the zeros is \( -B/A = 1/2 \).