

Additional Review Questions for the Math 30 final

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1. Find the domain of each of the following functions:

(a) $f(x) = \ln(x^2 + x - 6)$

(b) $g(x) = \log_3 \frac{x+3}{x-4}$

(c) $h(x) = \sqrt{x^2 - 8x + 16}$

(d) $h(x) = \sqrt{-x^3 - 2x^2 + 9x + 18}$

(e) $k(x) = \frac{2x-3}{2x^3 - x^2 - 7x + 6}$

2. For each of the following pair of functions find the formula and the domain for $f \circ g$ and $g \circ f$.

(a) $f(x) = \frac{2x-3}{x-2}$, $g(x) = \frac{2x}{3x-1}$

(b) $f(x) = \frac{3}{x^2-4}$, $g(x) = \sqrt{x+2}$

(c) $f(x) = x^2 - 2x + 4$ and $g(x) = 1 - \sqrt{x-3}$

3. For each of the following functions find the domain, the range and the inverse function.

(a) $g(x) = \sqrt{3x-4}$

(b) $f(x) = \frac{2x}{3x-1}$

(c) $k(x) = 2x^2 - 4x + 9$, with domain $(-\infty, 1]$

(d) $f(x) = -x^2 + 6x - 8$, with domain $[3, \infty)$

(e) $h(x) = 2^{4x-5}$

(f) $g(x) = \ln(5x-2) + 3$

4. Solve:

(a) $x^4 - x^3 - 7x^2 + x + 6 = 0$

(b) $x^4 - 3x^3 + 3x^2 + 12x - 28 = 0$

(c) $x^3 - 6x^2 + 11x - 6 \geq 0$

5. Solve each of the following equations:

(a) $e^{2x} - 3e^x + 2 = 0$

(b) $2^{4x} - 10 \cdot 2^{2x} + 9 = 0$

(c) $\log_3(x - 1) + \log_3(x + 2) = 1$

6. Solve the following equations. You should give *all* solutions.

(a) $\cos^2 x - \cos x = 0$

(b) $2 \sin^2 x - \sin x - 1 = 0$

(c) $\cos 3x = \frac{\sqrt{3}}{2}$

(d) $4 \sin^4 x + 4 \sin^3 x - \sin^2 x - \sin x = 0$

7. For each of the sinusoidal curves in Figures 1 and 2 find an equation of the form:

(a) $A \sin(Bx + C)$ with $A > 0$

(b) $A \sin(Bx + C)$ with $A < 0$

(c) $A \cos(Bx + C)$ with $A > 0$

(d) $A \cos(Bx + C)$ with $A < 0$

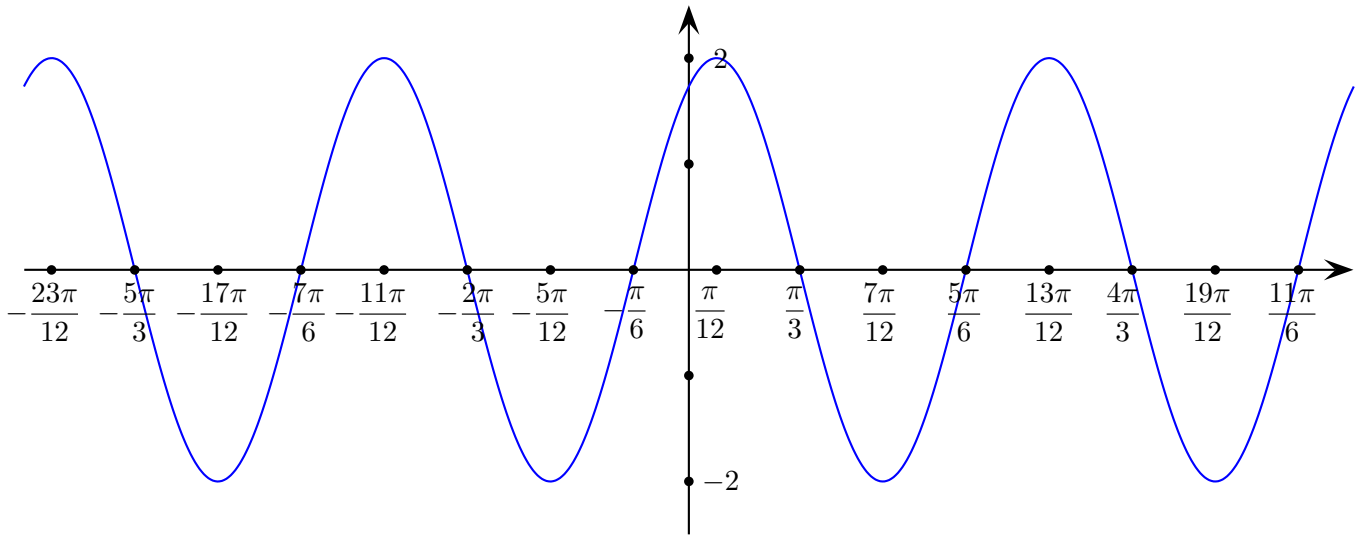


Figure 1: A sinusoidal curve

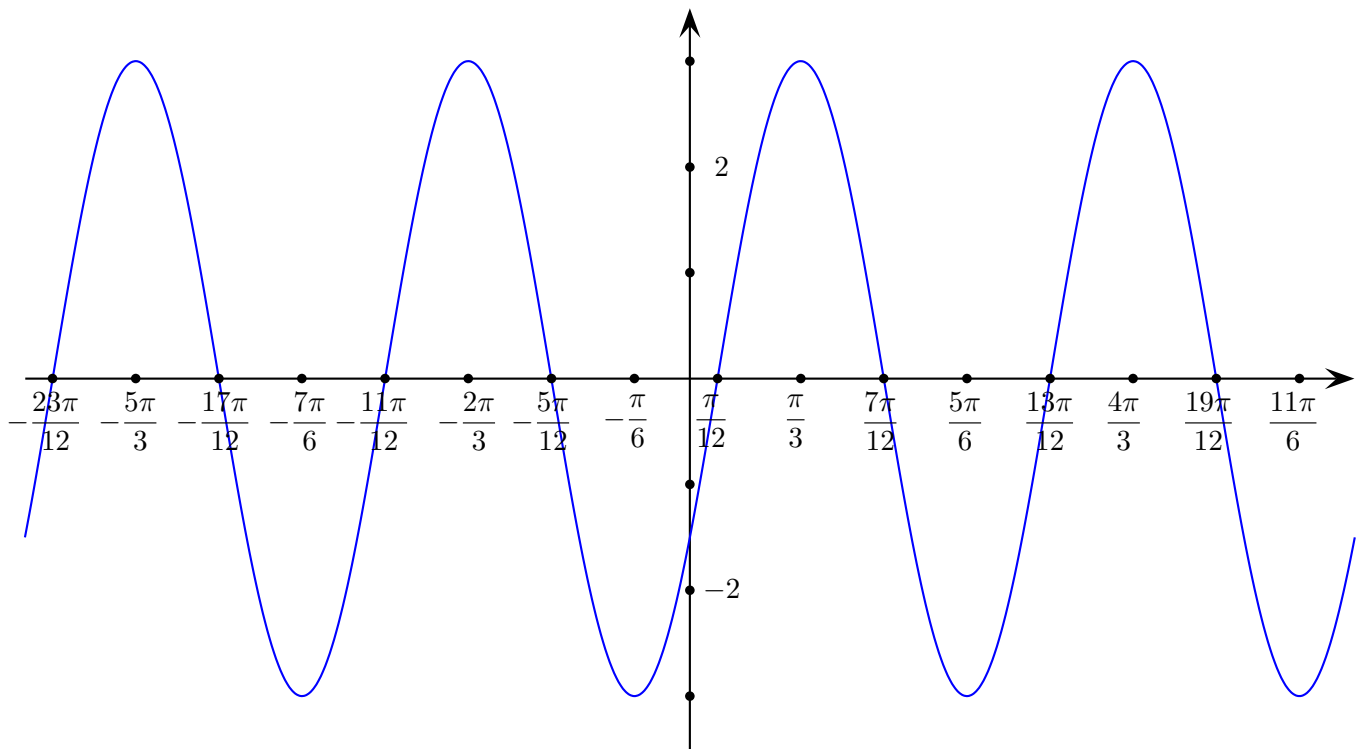


Figure 2: Another sinusoidal curve