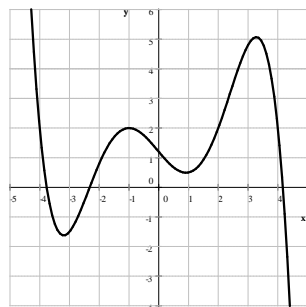


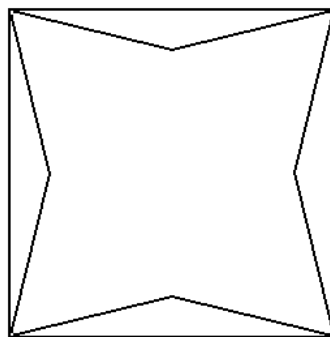
Review Problems

1. Compute the exact value of $\sin \frac{x}{2}$ if $\cos x = \frac{1}{3}$.
2. Compute the exact value of $\tan 22.5^\circ$.
3. Solve each of the following triangles.
 - a) $b = 12$, $\alpha = 25^\circ$, and $\beta = 100^\circ$
 - b) $a = 6$, $b = 16$, and $\beta = 42^\circ$
 - c) $a = 17$, $b = 13$, and $\gamma = 20^\circ$
 - d) $a = 21$ $b = 25$ $\alpha = 40^\circ$
 - e) $a = 6$ $b = 20$ $\alpha = 40^\circ$
4. Find the inverse for each of the following functions.
 - a) $f(x) = 3x - 1$
 - b) $f(x) = 5^{2x+1}$
 - c) $f(x) = \frac{3x - 5}{x + 7}$
 - d) $f(x) = 3 \ln(2x - 1)$
 - e) $f(x) = \frac{-3x + 7}{4x + 3}$
5. In triangle ABC , $\gamma = 90^\circ$ and $\cos \alpha = \frac{4}{5}$. If D is the midpoint of side AC , find the exact value of the cosine of angle CDB .
6. Find the exact value of the cosine of the smallest angle in a triangle with sides 3, 5, and 6.
7. Find the **exact value** of the area of a triangle with sides 2, 3, and 4.
8. Point D is on side AB of triangle ABC , with $\angle ACD = \angle BCD = 60^\circ$, $AC = 5$, and $BC = 15$. Find the length of line segment CD .
9. Triangle SML has sides of length 6, 7, and 8. Find the exact value of $\cos S + \cos M + \cos L$.
10. A triangle has sides of length a , b , and c , which are consecutive integers in increasing order, and $\cos \gamma = \frac{5}{16}$. Find $\cos \alpha$.
11. Sketch the graph of each of the following functions.
 - a) $f(x) = (x + 2)(x - 1)(x - 4)$
 - b) $f(x) = -x^3 + 4x$
 - c) $f(x) = -\frac{1}{2}x(x - 3)^2$
12. Sketch the graph of each of the following functions.
 - a) $f(x) = -2(x + 3)x(x - 2)(x - 4)$
 - b) $f(x) = x^4 - 4x^2$
 - c) $f(x) = -x^2(x - 3)^2$
13. Sketch the graph of each of the following functions.
 - a) $f(x) = \frac{-1}{x - 2}$
 - b) $f(x) = \frac{5x - 3}{x + 2}$
 - c) $f(x) = \frac{2x + 1}{x - 3}$

14. The picture below shows the graph of a function $f(x)$. Graph $h(x) = \frac{1}{f(x)}$.



15. Compute the exact value of the side of a regular triangle written into a circle with radius 1 unit.
16. Consider a square with sides 1 unit long. To the inside of each side, we draw an isosceles triangle with its greatest angle, opposite the unit long base, measures 150° . Consider all vertices of these triangles that are not on the square. If we connect these vertices, we obtain a square. Compute the exact value of the area of this square.

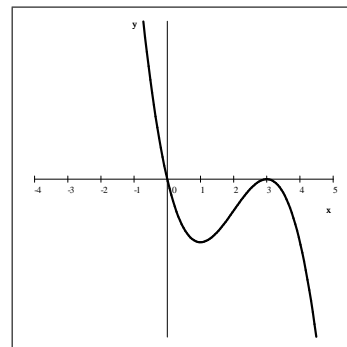
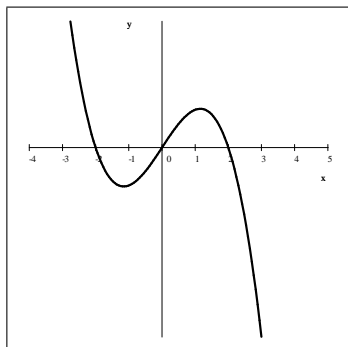
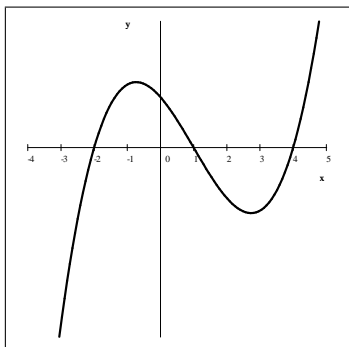


Review Problems - Answers

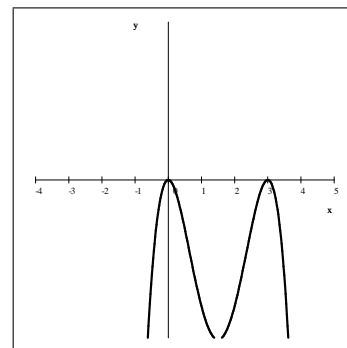
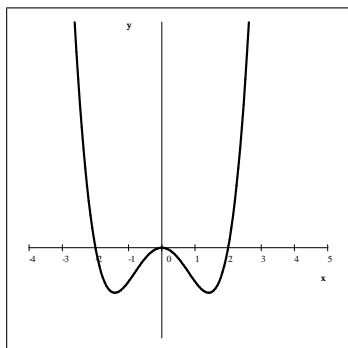
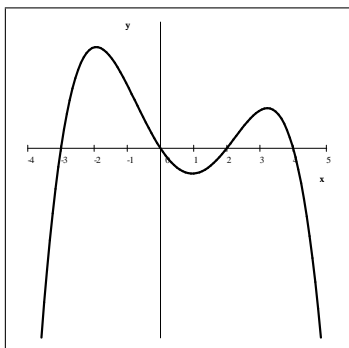
- 1.) $\pm \frac{\sqrt{3}}{3}$ 2.) $\sqrt{2} - 1$
- 3.) a) $\gamma = 55^\circ$, $a = 5.149654$ $c = 9.98146542$ e) no solution
 b) $\alpha = 14.5322^\circ$ $\gamma = 123.4678^\circ$ $c = 19.946979$
 c) $c = 6.531146$ $\alpha = 117.09552^\circ$ $\beta = 42.90448^\circ$
 d) $\beta_1 = 49.926866^\circ$ $\gamma_1 = 90.073134^\circ$ $c_1 = 32.670174$
 $\beta_2 = 130.073134^\circ$ $\gamma_2 = 9.926866^\circ$ $c_2 = 5.632048$
- 4.) a) $f^{-1}(x) = \frac{1}{3}x + \frac{1}{3}$ b) $f^{-1}(x) = \frac{1}{2}(-1 + \log_5 x)$ c) $f^{-1}(x) = \frac{7x + 5}{-x + 3}$
 d) $f^{-1}(x) = \frac{1}{2}(e^{x/3} + 1)$ e) $f^{-1}(x) = \frac{-3x + 7}{4x + 3}$

5.) $\frac{2\sqrt{13}}{13}$ 6.) $\frac{13}{15}$ 7.) $\frac{3\sqrt{15}}{4}$ 8.) $\frac{15}{4}$ 9.) $\frac{47}{32}$ 10.) $\frac{13}{20}$

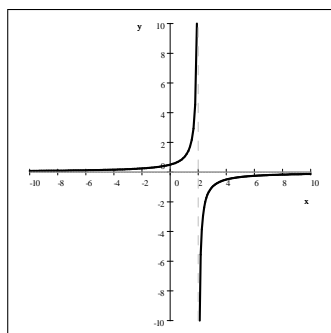
11.) a) $f(x) = (x + 2)(x - 1)(x - 4)$ b) $f(x) = -x^3 + 4x$ c) $f(x) = -\frac{1}{2}x(x - 3)^2$



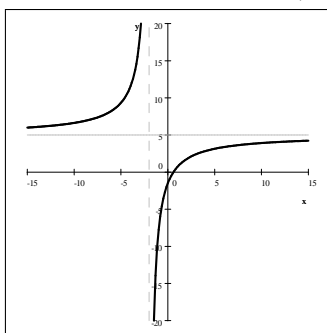
12.) a) $f(x) = -2(x + 3)x(x - 2)(x - 4)$ b) $f(x) = x^4 - 4x^2$ c) $f(x) = -x^2(x - 3)^2$



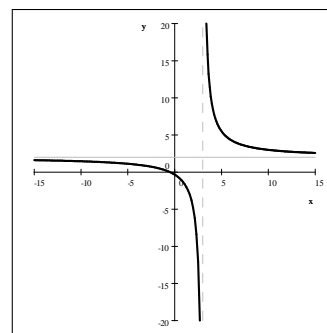
13.) a) $f(x) = \frac{-1}{x - 2}$



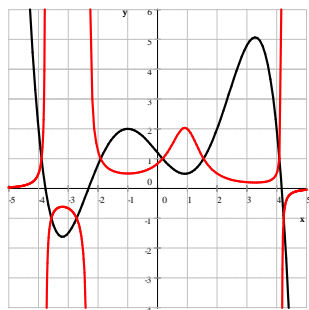
b) $f(x) = \frac{5x - 3}{x + 2}$



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



14.) $h(x) = \frac{1}{f(x)}$



15.) $\frac{\sqrt{3}}{3}$

16.) $2 - \sqrt{3}$