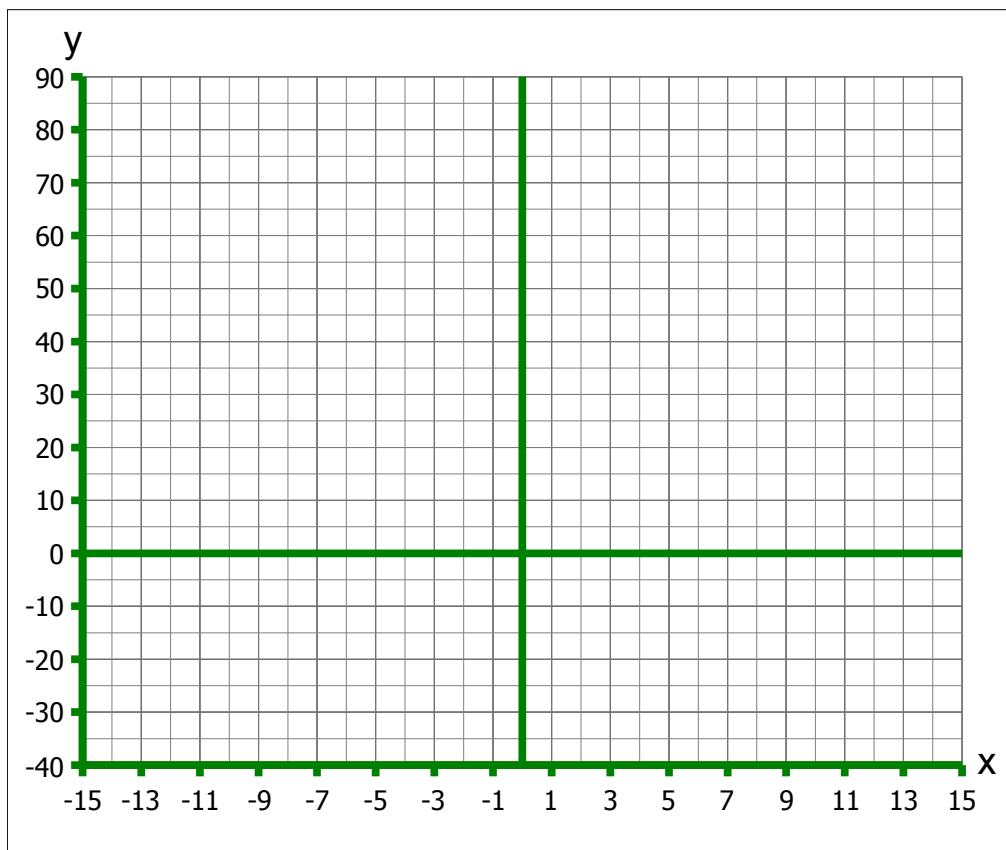
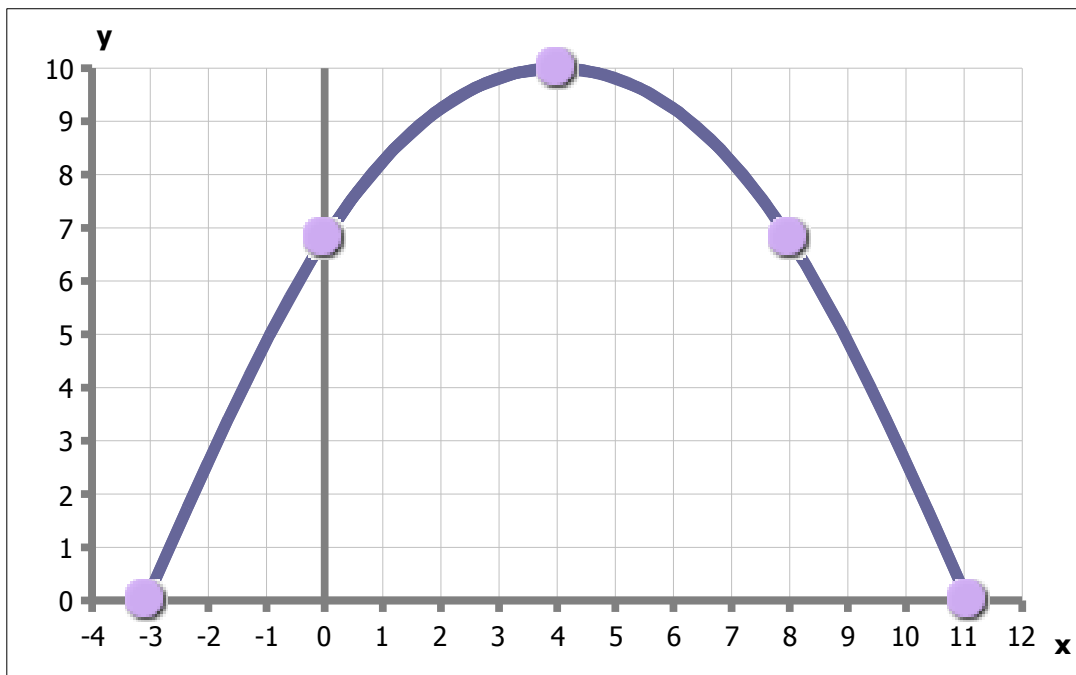


1. Find the y-intercept for $f(x) = -x^2 + 4x + 77$ (0, _____)
2. Find the zeros of the function $f(x) = -x^2 + 4x + 77$ (_____, 0) (_____, 0)
3. Find the axis of symmetry for $y = -x^2 + 4x + 77$ $x =$ _____
4. Find the vertex (h, k) for $y = -x^2 + 4x + 77$ (_____, _____)
5. Rewrite $y = -x^2 + 4x + 77$ in vertex form: $(y - \text{_____}) = \text{_____} (x - \text{_____})^2$
6. Given $(y - k) = \frac{1}{4p}(x - h)^2$, find the focus distance p for $y = -x^2 + 4x + 77$.
 $p =$ _____
7. Determine the coordinates of the focus for $y = -x^2 + 4x + 77$. (_____, _____)
8. Is the curvature of $y = -x^2 + 4x + 77$ positive or negative? _____
9. Is $f(x) = -x^2 + 4x + 77$ a function? _____
10. Is there an **inverse** function $f^{-1}(x)$ for $f(x) = -x^2 + 4x + 77$? _____
11. Sketch a graph of $y = -x^2 + 4x + 77$ on the chart below.



The problems on this page deal with the following data:

| Label | x | y | Coordinates |
|--------------|---------|-----|--------------|
| vertex | 4 | 10 | (4, 10) |
| x-intercept | -3.0711 | 0 | (-3.0711, 0) |
| x-intercept | 11.0711 | 0 | (11.0711, 0) |
| y-intercept | 0 | 6.8 | (0, 6.8) |
| mirror point | 8 | 6.8 | (8, 6.8) |



12. Use the graph above to find the vertex form for the above arc of a ball through the air.

$$(y - \underline{\hspace{2cm}}) = \underline{\hspace{2cm}} (x - \underline{\hspace{2cm}})^2$$

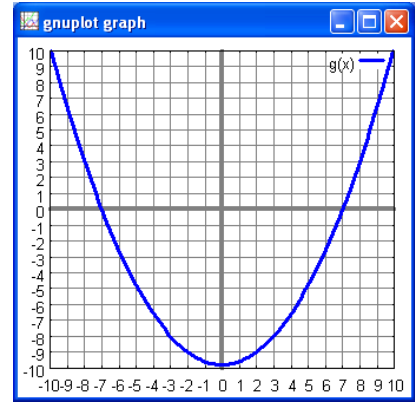
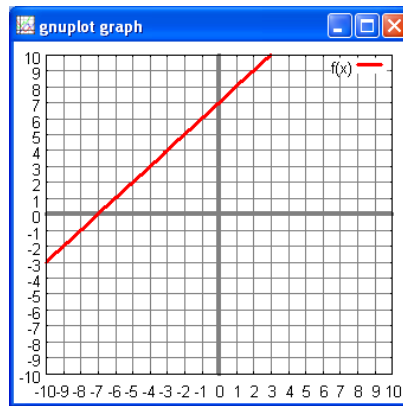
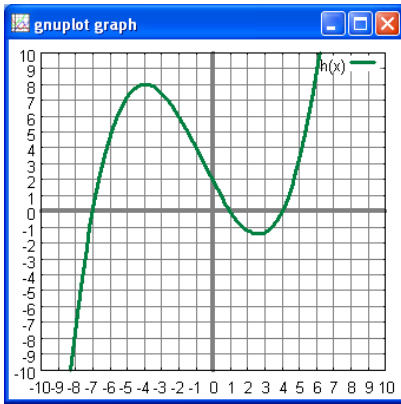
13. Convert the vertex form to quadratic form: $y = \underline{\hspace{2cm}} x^2 + \underline{\hspace{2cm}} x + \underline{\hspace{2cm}}$

14. $[0, \underline{\hspace{2cm}}]$ Find the y-intercept for $f(x) = 15x^2 - 34x - 77$

15. Find the zeros of the function $f(x) = 15x^2 - 34x - 77$ Suggestion: complete the square for $15x^2 - 34x - 77 = 0$

$$[\underline{\hspace{2cm}}, 0][\underline{\hspace{2cm}}, 0]$$

Match the following three graphs below to the correct function below the graphs and name the shape.



A.

B.

C.

_____ 16. $f(x) = x + 7$

Name of shape: _____

_____ 17. $f(x) = \frac{x^2}{5} - 9.8$

Name of shape: _____

_____ 18. $f(x) = \frac{x^3 + 2x^2 - 31x + 28}{15}$

Name of shape: _____

19. For the following questions use the three functions:

$f(x) = 4x - 20$

$g(x) = -4x + 20$

$h(x) = x^2 + 2x - 143$

a. _____ Find $(f \circ g)(5)$

b. _____ Find $(g \circ f)(-5)$

c. _____ Find $(f + g)(x)$

d. _____ Find $(f - g)(x)$

e. _____ Find $(f \times g)(x)$

f. _____ Find $(f \div g)(x)$

g. _____ Find $(f \circ g)(x)$

h. _____ Find $(g \circ f)(x)$

i. _____ Find the inverse function $f^{-1}(x)$

j. _____ Find the inverse function $g^{-1}(x)$

k. _____ Find $(f \circ g \circ h)(11)$

20. For the rational function $r(x) = \frac{(5x^2 - 20)}{(x^2 - 9)}$ determine...

a. The graph of $r(x)$. Sketch the graph on the back. You are, of course, free to use the computer based tools of your choice – either Qalculate! or OpenOffice.org.

b. The y-intercept: _____

c. The x-intercepts: _____

d. Determine the domain for $r(x)$: _____

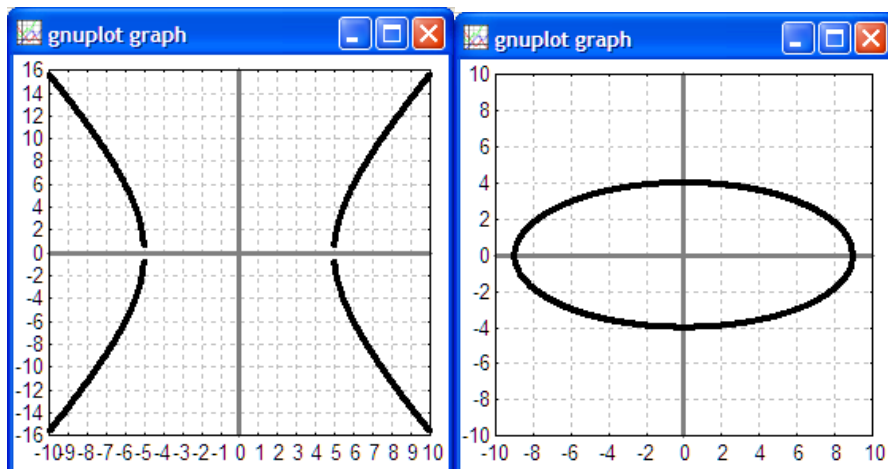
e. The vertical asymptotes: _____

f. The horizontal asymptote: _____

g. Is $r(x)$ a function? _____

h. Is $r^{-1}(x)$ a function? _____

21. Give the name of the following shapes:



22. A wind turbine is used to generate electrical power from the wind. Commercial wind turbines cost about \$1500 per meter of tower height h . The radius r of the rotor for a given tower height can be approximated by the function $r = 0.4h$. The power P generated by a wind turbine based on the radius r and wind velocity v is given by the function $P = 1.92 v^3 r^2$

For $r(h) = 0.4h$ and $P(r) = 1.92 v^3 r^2$

Find $(P \circ r)(h)$

http://en.wikipedia.org/wiki/Wind_power

<http://www.windpower.org/en/tour/econ/index.htm>

<http://www.windpower.org/en/tour/manu/towerm.htm>