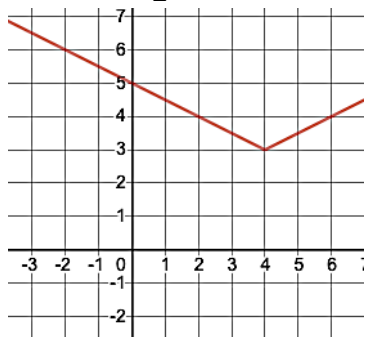


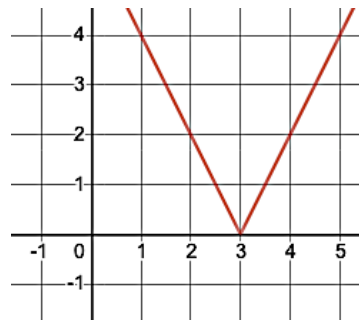
Absolute Value Functions Review

1. Sketch each of the following functions.

a) $g(x) = \frac{1}{2}|x - 4| + 3$



b) $f(x) = |2x - 6|$



2. Solve

a) $2|s - 4| - 6 = 2$

$x = 0 \text{ and } x = 8$

b) $|3x + 6| - 9 \leq 6$

$[-7, 3]$

c) $|3x - \sqrt{2}| = \sqrt{2}$

$x = 0 \text{ and } x = \frac{2\sqrt{3}}{3} \text{ (or } 0.9428)$

d) $\frac{5}{|x + 3|} = 10$

$x = -3.5 \text{ and } x = -2.5$

e) $-|x - 3| + 4 \geq 0$

$[-1, 7]$

f) $|x + 1| - 5 \leq -10$

never

g) $|x - 4| + 2x = 6$

$x = 2$

3. Find the rule of...

a) an absolute value function with zeros of -2 & 6 and a y-intercept of 5

$f(x) = -\frac{5}{2}|x - 2| + 10$

b) an absolute value function with points of (0, 1) (-2, 7) (2, -3) & (4, 3)

$f(x) = 3\left|x - \frac{5}{3}\right| - 4$

4. Given $f(x) = 2x - 3$ and $g(x) = |x + 2|$ solve $f \circ g(x) = 5$

$$x = -6 \text{ and } x = 2$$

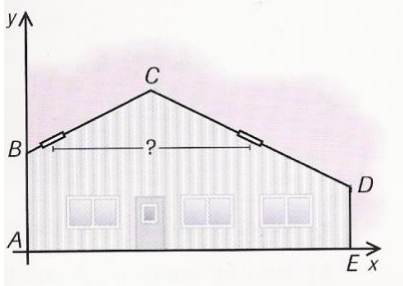
5. Given $f(x) = 4x + 6$ and $g(x) = 3|x - 6| + 7$ solve $g(f(2)^{-1})$

$$g(f^{-1}(2)) = 28$$

6. Kyle bought some shares on the stock market. During the first 60 days, the value of the shares, in dollars, varied according to the rule $V(n) = -\frac{1}{3}|n - 24| + 15$ where n is the number of days since the shares' purchase. If the same rule continues to apply, how many days after their purchase will the shares become worthless?

69 days

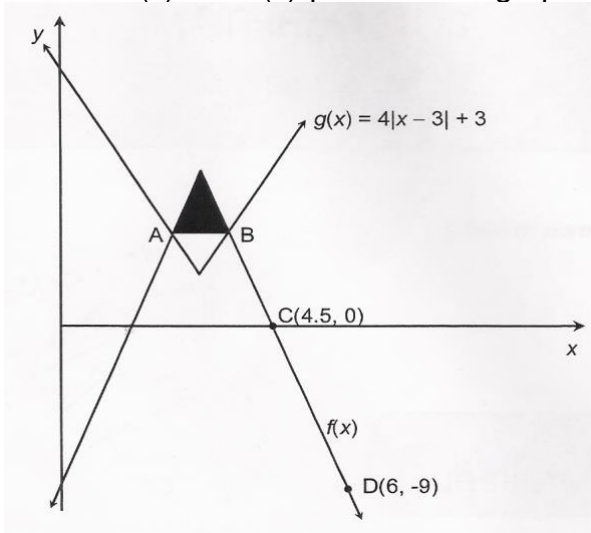
7. The side of a garage is shown in the graph on the right, with the axes scaled in meters. Each sloping side of the roof corresponds to the curve associated with the rule $y = -\frac{1}{2}|x - 4| + 6$. A circular light fixture is installed on each sloping side of the roof such that the center of each light is 4.5m from the ground. What is the distance between the centers of the two lights?



The lights are 6m apart

8. The logo below was created using two absolute value functions represented by $f(x)$ and $g(x)$. The logo has an axis of symmetry passing through the vertices of $f(x)$ and $g(x)$. The rule of the function is $g(x) = 4|x - 3| + 3$.

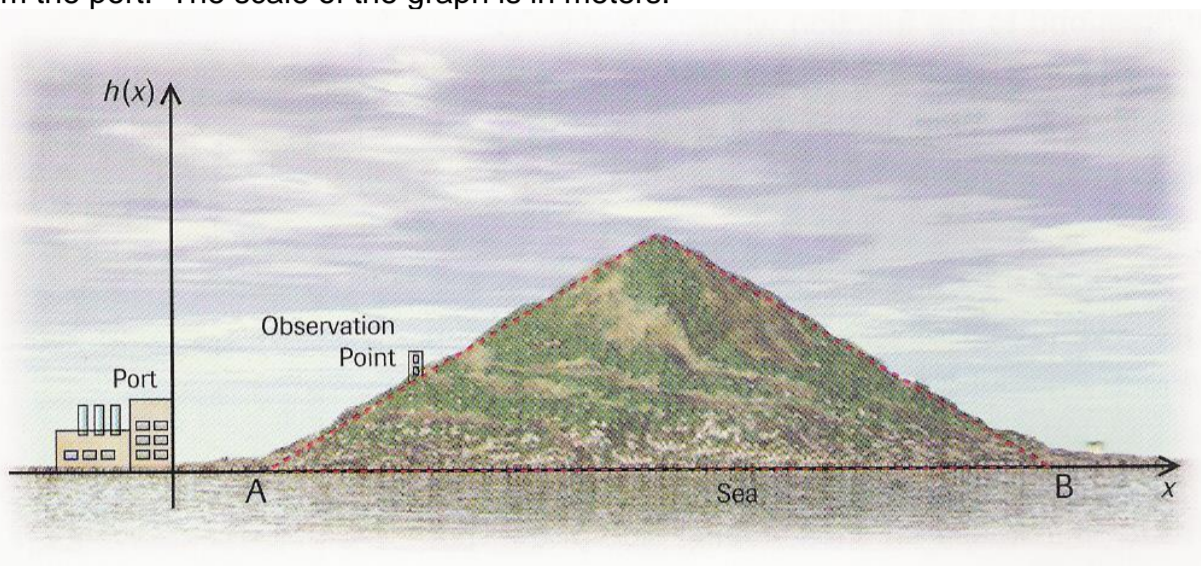
Points A and B represent the points of intersection between $f(x)$ and $g(x)$. Point C (4.5, 0) is one of the zeros of $f(x)$ and $f(x)$ passes through point D (6, -9). The maximum of function $f(x)$ is 9.



What is the area of the shaded triangular region in the logo?

Area = 2.16 units

9. If seen from a boat, the profile of a mountain close to the shore resembles an isosceles triangle. The congruent sides are represented by the function whose rule is $h(x) = -0.6|x - 1550| + 750$ where $h(x)$ is the height of the mountain and x is the distance from the port. The scale of the graph is in meters.



Tourists can visit the observation post located on the west side of the mountain, at an altitude of 300m.

A tourist brochure says, from the foot of the mountain at A, the observation post is an 854m walk up the west side of the mountain. Is this true?

No, it is not true.

10. During an emergency flight, a helicopter left the roof of a 40-meter tall hospital. The helicopter flew at a constant speed and reached a maximum height of 140 meters after 80 seconds. Then, the helicopter descended to the ground at the same speed as it has ascended. The helicopter's flight can be represented by an absolute value function.

How long did the helicopter maintain a height of at least 60 meters?

128 seconds