

Are there any Homework Questions you would like to see on the board?

Last day's work: pp. 198-199 #1c, 2ac, 3, 4ab, 5-8 [11]

Return and Correct SWYK 3.2

Today's Homework Practice includes:
Review
pp. 202-203 #1 - 12, 13 - 17, 19 - 23

HIGHLY RECOMMENDED

Worksheet on Class Website:

"Word Problems Involving Quadratics" #1 - 10

p. 198 2. Determine the point(s) of intersection algebraically.

a) $f(x) = -x^2 + 6x - 5, g(x) = -4x + 19$

b) $f(x) = 2x^2 - 1, g(x) = 3x + 1$

c) $f(x) = 3x^2 - 2x - 1, g(x) = -x - 6$

$$a) -x^2 + 6x - 5 = -4x + 19$$

$$0 = x^2 - 6x + 5 - 4x + 19$$

$$= x^2 - 10x + 24$$

$$= (x - 6)(x - 4)$$

$$\therefore x = 6 \text{ or } x = 4$$

$$g(6) = -4(6) + 19 \quad g(4) = -4(4) + 19$$

$$= -24 + 19$$

$$= -16 + 19$$

$$= -5$$

$$= 3$$

$\therefore (6, -5)$ and $(4, 3)$ are the solutions

\hookrightarrow P.O.I.s.

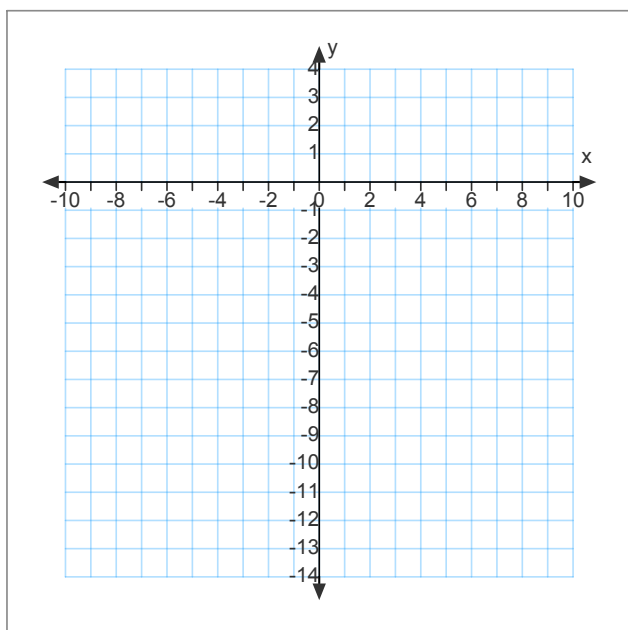
Quadratics Review

Date: _____

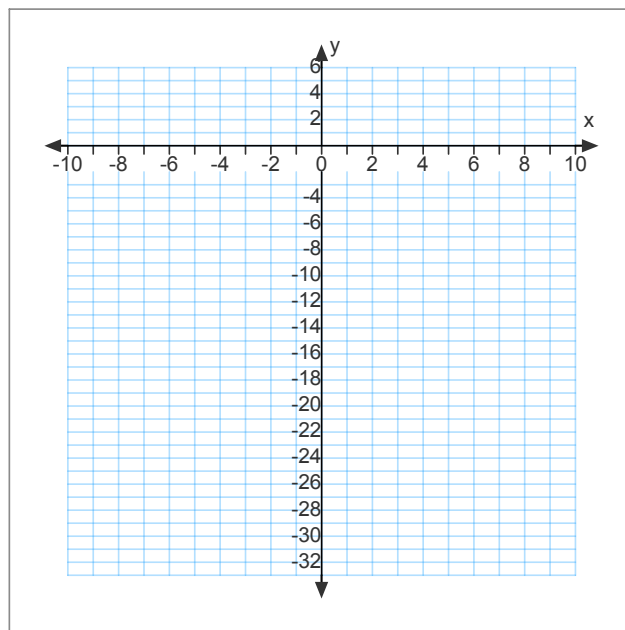
1. For each function below state the direction of the opening, the vertex, axis of symmetry, max or min value, and the domain and range. Finally, sketch the function.

a) $f(x) = -2(x - 5)^2 - 4$

b) $f(x) = 2(x - 3)(x + 5)$



$$y = -2(x - 5)^2 - 4$$



$$y = 2(x - 3)(x + 5)$$

2. a) The height, $h(t)$, in metres, of the trajectory of a football is given by $h(t) = 2 + 28t - 4.9t^2$, where t is the time in flight, in seconds. Determine the maximum height of the football and the time when that height is reached.

$$h(t) = -4.9t^2 + 28t + 2$$

Ans: $t = \frac{-b}{2a}$

$$= \frac{-(28)}{2(-4.9)}$$

$$= 2.857$$

$$h(2.86) = -4.9(2.86)^2 + 28(2.86) + 2$$

$$\frac{14}{4.9}$$

- b) How long will it take for the ball to hit the ground?

$$h(t) = 0$$

$$0 = -4.9t^2 + 28t + 2$$

$$= \frac{140}{49}$$

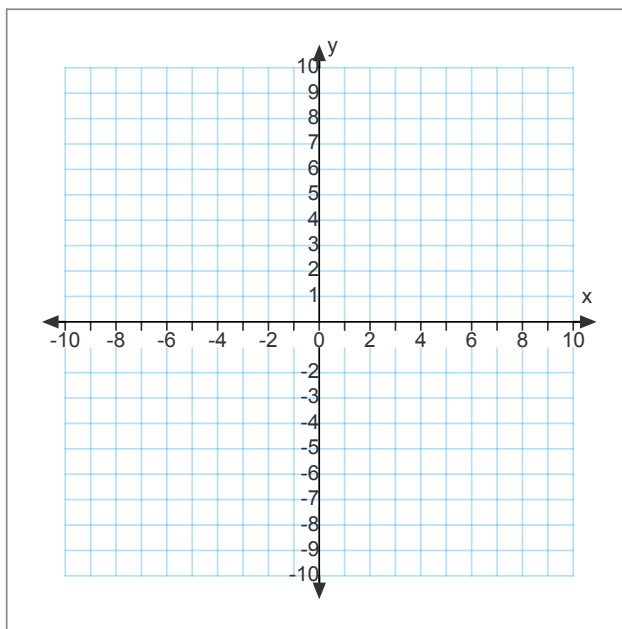
$$= \frac{20}{7}$$

3. a) Determine the inverse of $f(x) = -3(x-4)^2 + 2$

b) Graph $f(x)$ and $f^{-1}(x)$

c) Is the inverse a function?
Explain using words.

d) State the domain and
range of $f(x)$ and $f^{-1}(x)$



4. Express each radical in simplest radical form.

a) $\sqrt{98}$

b) $-5\sqrt{50}$

c) $-2\sqrt{12} + 4\sqrt{48}$

5. Determine an expression in lowest terms for the perimeter AND area of the rectangle.

$P = 2l + 2w$

$= 2(1 + 3\sqrt{20}) + 2(9 - 2\sqrt{45})$

$= 2 + 6\sqrt{20} + 18 - 4\sqrt{45}$


$= 20 + 6\sqrt{4}\sqrt{5} - 4\sqrt{9}\sqrt{5}$

$= 20 + 6(2)\sqrt{5} - 4(3)\sqrt{5}$

$= 20 + 12\sqrt{5} - 12\sqrt{5}$

$= 20 \text{ units}$

$1 + 3\sqrt{20}$



$9 - 2\sqrt{45}$

$A = lw$

$= (1 + 3\sqrt{20})(9 - 2\sqrt{45})$

$= (1 + 3\sqrt{4}\sqrt{5})(9 - 2\sqrt{9}\sqrt{5})$

$= (1 + 3(2)\sqrt{5})(9 - 2(3)\sqrt{5})$

$= (1 + 6\sqrt{5})(9 - 6\sqrt{5})$

$= 9 - 6\sqrt{5} + 54\sqrt{5} - 36(5)$

$= 9 + 48\sqrt{5} - 180$

$= -171 + 48\sqrt{5}$

6. a) The height, $h(t)$, of a projectile, in metres, can be modelled by the equation $h(t) = 14t - 5t^2$, where t is the time in seconds after the projectile is released. Can the projectile ever reach a height of 9 m?

**if vertex is 9 m or higher. ✓*

$$h(t) = -5t^2 + 14t$$

$$t = \frac{-b}{2a} = -5 \left(t^2 - \frac{14}{5}t + \left(\frac{7}{5}\right)^2 - \frac{7^2}{5} \right)$$

$$= 1.4 = -5 \left(t - \frac{7}{5} \right)^2 - 5 \left(-\frac{49}{25} \right)$$

$$= -5 \left(t - \frac{7}{5} \right)^2 + \frac{49}{5}$$

max height is $\frac{49}{5}$

$$= 9 \frac{4}{5} \text{ m}$$

∴ Yes.

b) How long will it take for it to hit the ground?

$$h(t) = 0$$

$$0 = -5t^2 + 14t$$

$$= -5t \left(t - \frac{14}{5} \right)$$

↓

$$t = 0 \quad \text{or} \quad t = \frac{14}{5}$$

$$= 2.8 \text{ sec}$$

∴ the ball hits the ground at 2.8 sec.

7. Determine the value(s) for k for which the function has no ^{Real} roots.

$$f(x) = 3x^2 - 4x + k$$

$$a=3 \quad b=-4 \quad c=k$$

$$b^2 - 4ac < 0$$

$$(-4)^2 - 4(3)(k) < 0$$

$$16 - 12k < 0$$

$$\begin{array}{l} \downarrow \\ -12k < -16 \end{array} \quad \begin{array}{l} \searrow \\ 16 < 12k \end{array}$$

$$k > \frac{-16}{-12}$$

$$\frac{16}{12} < k$$

$$k > \frac{4}{3}$$

$$\frac{4}{3} < k$$

8. Determine the equation of parabola that has roots $\sqrt{5}$ and $-\sqrt{5}$ and goes through point $(-1, 6)$.

$$r = \sqrt{5} \quad s = -\sqrt{5}$$

$$y = a(x-r)(x-s)$$

$$y = a(x-\sqrt{5})(x+\sqrt{5})$$

$$6 = a(-1-\sqrt{5})(-1+\sqrt{5})$$

$$6 = a(1 - \sqrt{5} + \sqrt{5} - 5)$$

$$6 = a(1-5)$$

$$6 = -4a$$

$$\frac{6}{-4} = a$$

$$a = -\frac{3}{2}$$

$$\therefore y = -\frac{3}{2}(x-\sqrt{5})(x+\sqrt{5})$$

is the equation

$$\text{or } y = -\frac{3}{2}(x^2 - 5)$$

$$= -\frac{3}{2}x^2 + \frac{15}{2}$$

9. Solve $3x^2 - 4x + 2 = 0$

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