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]

7

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

HIGHLY RECOMMENDED

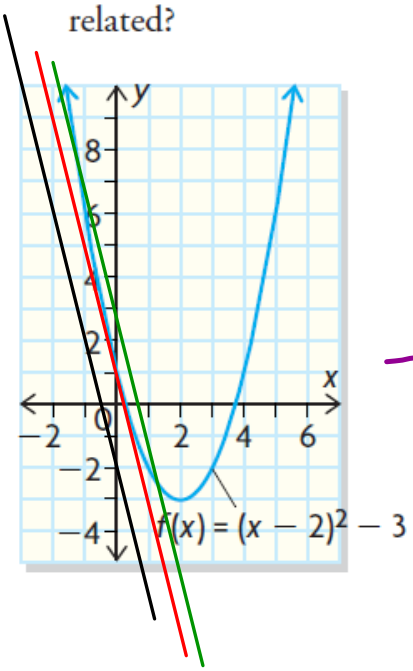
Worksheet on Class Website:
"Word Problems Involving Quadratics" #1 – 10

p. 199 #7

7. a) Copy the graph of $f(x) = (x-2)^2 - 3$. Then draw lines with slope -4 that intersect the parabola at (i) one point, (ii) two points, and (iii) no points.

b) Write the equations of the lines from part (a).

c) How are all of the lines with slope -4 that do not intersect the parabola related?



iii) $y = -4x - 2$

ii) $y = -4x + 3$

i) $y = -4x + 1$

} Estimated

Let $y = -4x + b$ ∩ $y = (x-2)^2 - 3$

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

$-4x + b = x^2 - 4x + 4 - 3$

$0 = x^2 - 4x + 1 + 4x - b$

$0 = x^2 + 0x + 1 - b$

$a \quad b \quad c$

$\therefore a = 1 \quad b = 0 \quad c = 1 - b$

if tangent, then

$b^2 - 4ac = 0$

$(0)^2 - 4(1)(1-b) = 0$

$-4 + 4b = 0$

$4b = 4$

$b = 1$

if no intersection

$b^2 - 4ac < 0$

$\therefore -4 + 4b < 0$

$4b < 4$

$b < 1$

if 2 intersect

$b^2 - 4ac > 0$

$\vdots$

$b > 1$

$\therefore$ if $b = 1$, $y = -4x + 1$ is the equation of the tangent

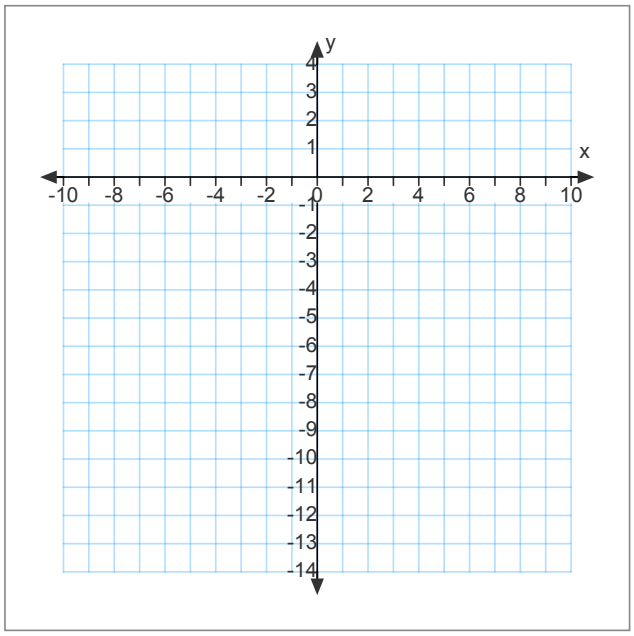
Quadratics Review

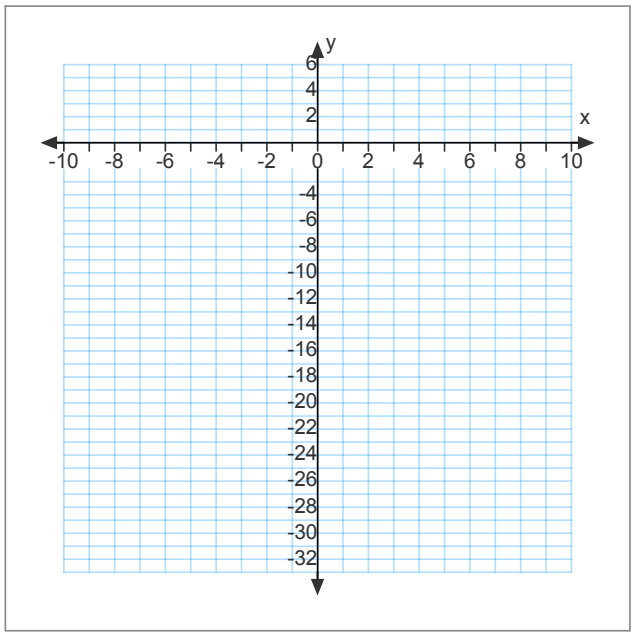
Date: _____

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 tragectory 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.

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

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

$x = -3(y-4)^2 + 2$

$x - 2 = -3(y-4)^2$

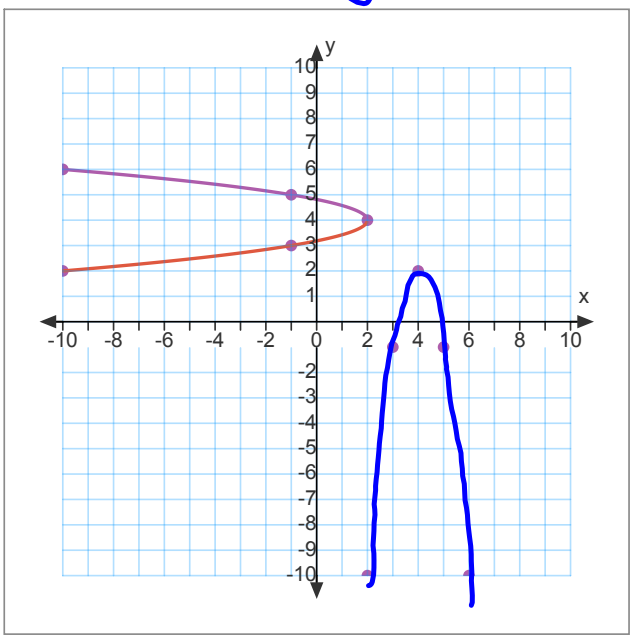
$\frac{x-2}{-3} = (y-4)^2$

$\pm\sqrt{\frac{x-2}{-3}} = y-4$

$\pm\sqrt{\frac{x-2}{-3}} + 4 = y$

$\pm\sqrt{-\frac{1}{3}(x-2)} + 4 = y$

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



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

No, it fails the VLT.

d) State the domain and range of $f(x)$ and its inverse.

$f(x)$

D: $\{x \in \mathbb{R}\}$

R: $\{y \in \mathbb{R} \mid y \leq 2\}$

inverse

D: $\{x \in \mathbb{R} \mid x \leq 2\}$

R: $\{y \in \mathbb{R}\}$

$$y = -\sqrt{\frac{x-2}{-3}} + 4$$

$$y = \sqrt{\frac{x-2}{-3}} + 4$$

$$y = -3(x-4)^2 + 2$$

4. Express each radical in simplest radical form.

a) $\sqrt{98}$

$=\sqrt{49}\sqrt{2}$

$=7\sqrt{2}$

b) $-5\sqrt{50}$

$=-5\sqrt{25}\sqrt{2}$

$=-5(5)\sqrt{2}$

$=-25\sqrt{2}$

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

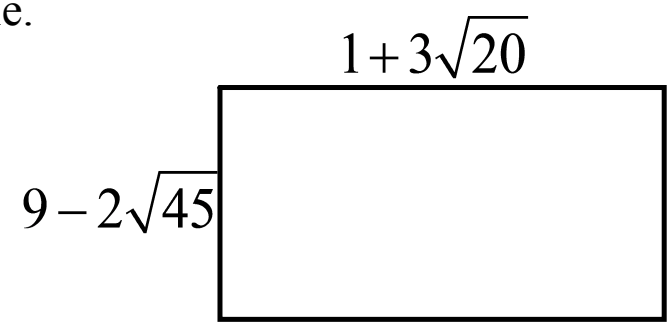
$=-2\sqrt{4}\sqrt{3}+4\sqrt{16}\sqrt{3}$

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

$=-4\sqrt{3}+16\sqrt{3}$

$=12\sqrt{3}$

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



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?

Let $h(t) = 9$

$9 = 14t - 5t^2$

$5t^2 - 14t + 9 = 0$

$a = 5 \quad b = -14 \quad c = 9$

if possible $b^2 - 4ac \geq 0$

Check:

$b^2 - 4ac$

$= (-14)^2 - 4(5)(9)$

$= 196 - 180$

$= 16$

$\therefore b^2 - 4ac > 0$

$\therefore$ 2 solutions.

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

Let $h(t) = 0$

$0 = 14t - 5t^2$

$= t(14 - 5t)$

$t = 0$ or $14 - 5t = 0$

$t = \frac{14}{5}$

$= 2.8$ sec

$\therefore$

7. Determine the value(s) for k for which the function has no roots.

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

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

$r=\sqrt{5}$ $s=-\sqrt{5}$ (x, y)

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

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

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

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

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

$=a(1-5)$

$=a(-4)$

$6=-4a$

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

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

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

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

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]

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