

QUIZ #1 @ 85 points

Write neatly. Show all work. Write all responses on separate paper. Please write only on one side and clearly label the exercises.

1) Solve the following equation by the square root property. Give exact answers. $(2x+1)^2 = 24$

2) Solve the following equation by the quadratic formula. Give exact answers.

a) $3 - \frac{4}{x} - \frac{2}{x^2} = 0$

b) $2x^2 - 3x + 1 = 0$

3) Solve the following equation. Write any restrictions that might apply.

$$\frac{2x-5}{x} = \frac{x-2}{3}$$

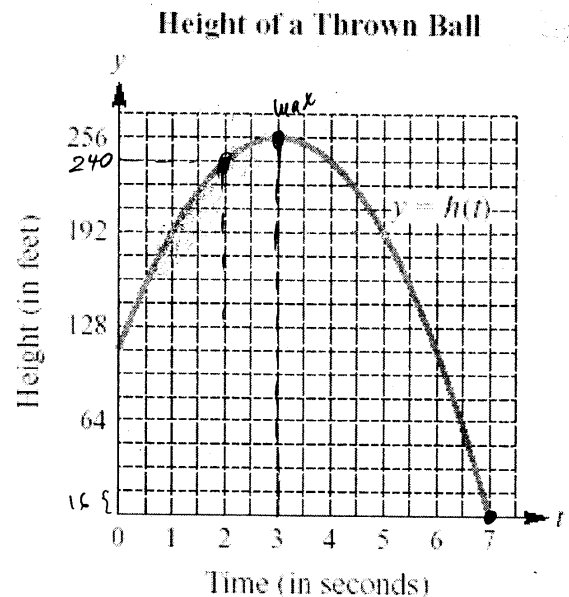
4) $f(x) = 2x^2 - 3x + 1$, $g(x) = \frac{x-2}{3x+1}$. Find the following:

a) The domain of f and g .

b) Find $f(-x)$, $f(a+h)$, and $g(2x)$.

5) A ball is thrown straight up into the air. The function defined by $y = h(t)$ gives the height of the ball (in feet) at t seconds.

- What is the height of the ball after 2 seconds?
- When will the height be 192 feet?
- During what time intervals is the ball going up? Down?
- How high does the ball go, and when does the ball reach its maximum height?
- At how many seconds does the ball hit the ground?



$$(1) (2x+1)^2 = 24 \quad / \sqrt{\quad}$$

$$\sqrt{(2x+1)^2} = \sqrt{24}$$

$$2x+1 = \pm \sqrt{6 \cdot 4}$$

$$2x+1 = \pm 2\sqrt{6}$$

$$2x = -1 \pm 2\sqrt{6}$$

$$\boxed{x = \frac{-1 \pm 2\sqrt{6}}{2}}$$

$$(2) (a) 3 - \frac{4}{x} - \frac{2}{x^2} = 0 \quad / \cdot x^2 \quad (x \neq 0)$$

$$3x^2 - 4x - 2 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \begin{cases} a=3 \\ b=-4 \\ c=-2 \end{cases}$$

$$x = \frac{4 \pm \sqrt{16 - 4(3)(-2)}}{2(3)} = \frac{4 \pm \sqrt{40}}{6}$$

$$x = \frac{4 \pm 2\sqrt{10}}{6} = \frac{2(2 \pm \sqrt{10})}{6}$$

$$\boxed{x = \frac{2 \pm \sqrt{10}}{3}}$$

$$(b) 2x^2 - 3x + 1 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \begin{cases} a=2 \\ b=-3 \\ c=1 \end{cases}$$

$$x = \frac{3 \pm \sqrt{9 - 4 \cdot 2}}{2(2)} = \frac{3 \pm 1}{4}$$

$$x = 1 \text{ OR } x = \frac{1}{2}$$

$$\boxed{x \in \left\{1, \frac{1}{2}\right\}}$$

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

$$x \neq 0$$

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

$$6x-15 = x^2-2x$$

$$x^2-2x-6x+15=0$$

$$x^2-8x+15=0$$

$$(x-3)(x-5)=0$$

$$x=3 \text{ OR } x=5$$

$$\boxed{x \in \{3, 5\}}$$

$$(4) f(x) = 2x^2 - 3x + 1$$

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

$$(a) \text{ Domain of } f = \mathbb{R} \text{ (no restrictions)}$$

$$\text{Domain of } g$$

$$\text{Condition: } 3x+1 \neq 0 \\ x \neq -\frac{1}{3}$$

$$\boxed{\text{Domain of } g = \mathbb{R} \setminus \left\{-\frac{1}{3}\right\}}$$

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

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

$$f(a+h) = 2(a+h)^2 - 3(a+h) + 1 \\ = 2(a^2 + 2ah + h^2) - 3a - 3h + 1$$

$$\boxed{f(a+h) = 2a^2 + 4ah + 2h^2 - 3a - 3h + 1}$$

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

$$\boxed{g(2x) = \frac{2x-2}{6x+1}}$$

(5) (a) when $t=2$, $y = 192 + 16(3)$
 $y = 240$ ft

(b) $y = 192$ ft, $t = 1$ sec OR
 $t = 5$ sec

(c) going up when $t \in [0, 3]$ seconds
going down when $t \in [3, 7]$ seconds

(d) maximum height = 256 ft
when $t = 3$ seconds

(e) $y = 0$ ft when $t = 7$ seconds