

PRACTICE TEST #1 - QUADRATIC FUNCTIONS

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(3) 1. Identify each relation as either linear, quadratic or neither.

a) $f(x) = 3x(x - 1)$

$= 3x^2 - 3x$

quadratic

b) $5y + 2x = 10$

linear

c) $2x^2 + 4y = 64$

quadratic(1) 2. For the function $f = \{(-3, -1), (-2, 6), (0, 8), (1, 7)\}$, $f(-2) = \underline{6}$ 3. A function is defined by $f(x) = 2(x - 3)^2 + 4$.(3) a) List the transformations to the graph $g(x) = x^2$ to get $f(x)$.

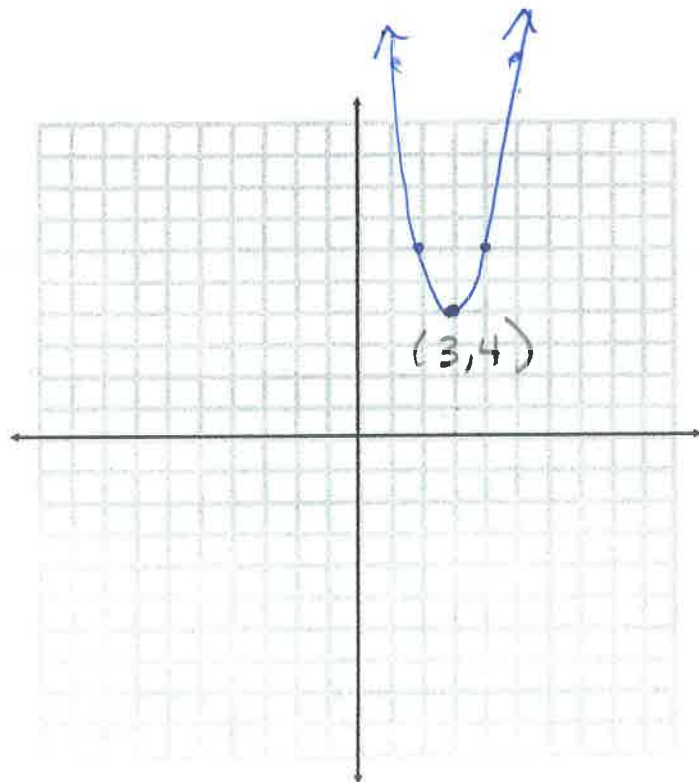
1. vertical stretch by factor of 2
2. shift right by 3
3. shift up by 4

 $(3, 4)$

(5) b) Graph the function using the step pattern,

and label completely.

1, 3, 5, 7, 9

Step Pattern: 2, 6, 10, 14

(c) State the domain and the range of the function in set notation. (4 marks)

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

R = $\{y \in \mathbb{R} \mid y \geq 4\}$

4. A football is kicked from a height of 1.0 m. The height of the football is modelled by the function $h(t) = -4.9t^2 + 19.35t + 1$, where t is the time measured in seconds and $h(t)$ is the height given in metres.

(1) a) What is the maximum height of the ball?

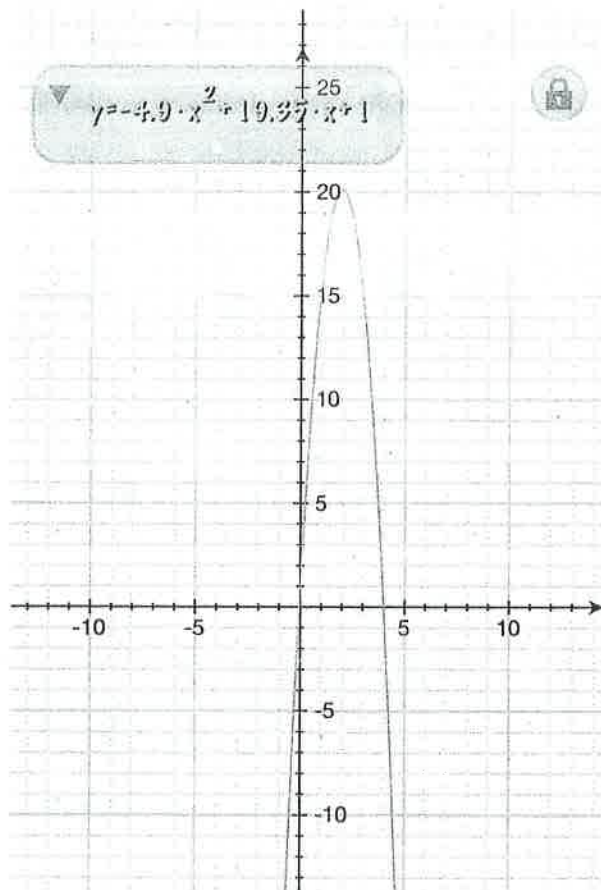
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(1) b) What time does the football reach maximum height?

2s

(1) c) How long is the ball in the air?

4s



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

a) Evaluate (2 marks each)

i) $f(-1)$

$$\begin{aligned} f(-1) &= 3(-1-1)^2 + 2 \\ &= 3(-2)^2 + 2 \\ &= 12 + 2 \\ &= 14 \end{aligned}$$

ii) $f(2)$

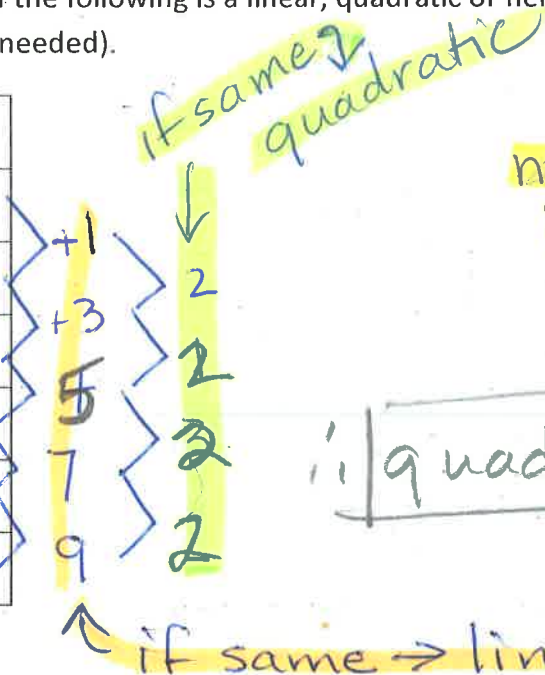
$$\begin{aligned} f(2) &= 3(2-1)^2 + 2 \\ &= 3(1)^2 + 2 \\ &= 3 + 2 \\ &= 5 \end{aligned}$$

iii) $f(-2)$

$$\begin{aligned} f(-2) &= 3(-2-1)^2 + 2 \\ &= 3(-3)^2 + 2 \\ &= 3(9) + 2 \\ &= 29 \end{aligned}$$

- (3) 6. Determine if the following is a linear, quadratic or neither. Use first differences and second differences (if needed).

| x | y |
|---|----|
| 0 | -2 |
| 1 | -1 |
| 2 | 2 |
| 3 | 7 |
| 4 | 14 |
| 5 | 23 |



neither \rightarrow since if neither differences are the same

\therefore quadratic

- (12) 7. List the transformations of $y = x^2$ for each function below. Graph the following relations using key points. Label each graph. (you should have 3 graphs on the same grid including $y = x^2$)

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

a = 1 h = 0 k = -2 vertex = (0, -2)

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

a = -2 h = 2 k = 2 vertex = (2, 2)

$y = x^2$

| x | y |
|----|---|
| -2 | 4 |
| -1 | 1 |
| 0 | 0 |
| 1 | 1 |
| 2 | 4 |
| 3 | 9 |

$x+h$ $ay+k$

| x | y-2 |
|----|-----|
| -2 | 2 |
| -1 | -1 |
| 0 | -2 |
| 1 | -1 |
| 2 | 2 |
| 3 | 7 |

$y = x^2$

| x | y |
|----|---|
| -2 | 4 |
| -1 | 1 |
| 0 | 0 |
| 1 | 1 |
| 2 | 4 |
| 3 | 9 |

| x+2 | -2y+2 |
|-----|-------|
| 0 | -6 |
| 1 | 0 |
| 2 | 2 |
| 3 | 0 |
| 4 | -6 |
| 5 | -16 |

