Name: ____________________ **Precalc 11**

$\frac{}{20}$

Chapter 3 TEST

NON-Calculator

Multiple Choice

A 1. What are the x-intercepts of $y = (x-6)(x-9)$?

- A 6 and 9
- B –6 and –9
- C –6 and 9
- D 6 and –9

C 2. What is the vertex of $y = 7(x+5)^2 + 4$?

- A (5, 4)
- B (–4, 5)
- C (–5, 4)
- D (7, –4)

C 3. What are the coordinates of the vertex of the quadratic function $y = 4x^2 + 8x - 2$?

- A (–6, –1)
- B (8, –2)
- C (–1, –6)
- D (8, –6)

$\frac{-b}{2a} = \frac{-8}{8} = -1$

B 4. Which function is *not* quadratic?

- A $f(x) = (6x+9)\left(\frac{1}{9}x - 9\right)$
- B $f(x) = x(x-9)(6x+8)$ cubic!
- C $f(x) = 7x^2 + 8$
- D $f(x) = 6(x-9)^2$

D 5. What is the function $y = 2(x-4)^2 - 2$ written in standard form?

$y = 2(x^2 - 8x + 16) - 2$
$= 2x^2 - 16x + 30$

- A $y = 2x^2 - 8x + 30$
- B $y = 2x^2 - 8x + 34$
- C $y = 2x^2 - 16x + 34$
- D $y = 2x^2 - 16x + 30$

D 6. What is the axis of symmetry for the quadratic function $y = (-1/3)x^2 - (1/2)x - 1$?

$\frac{-b}{2a} = \frac{1/2}{-2/3} = \frac{1}{2} \times \left(-\frac{3}{2}\right) = -\frac{3}{4}$

- A $x = -\frac{1}{48}$
- B $x = -\frac{117}{4}$
- C $x = -\frac{13}{16}$
- D $x = -\frac{3}{4}$

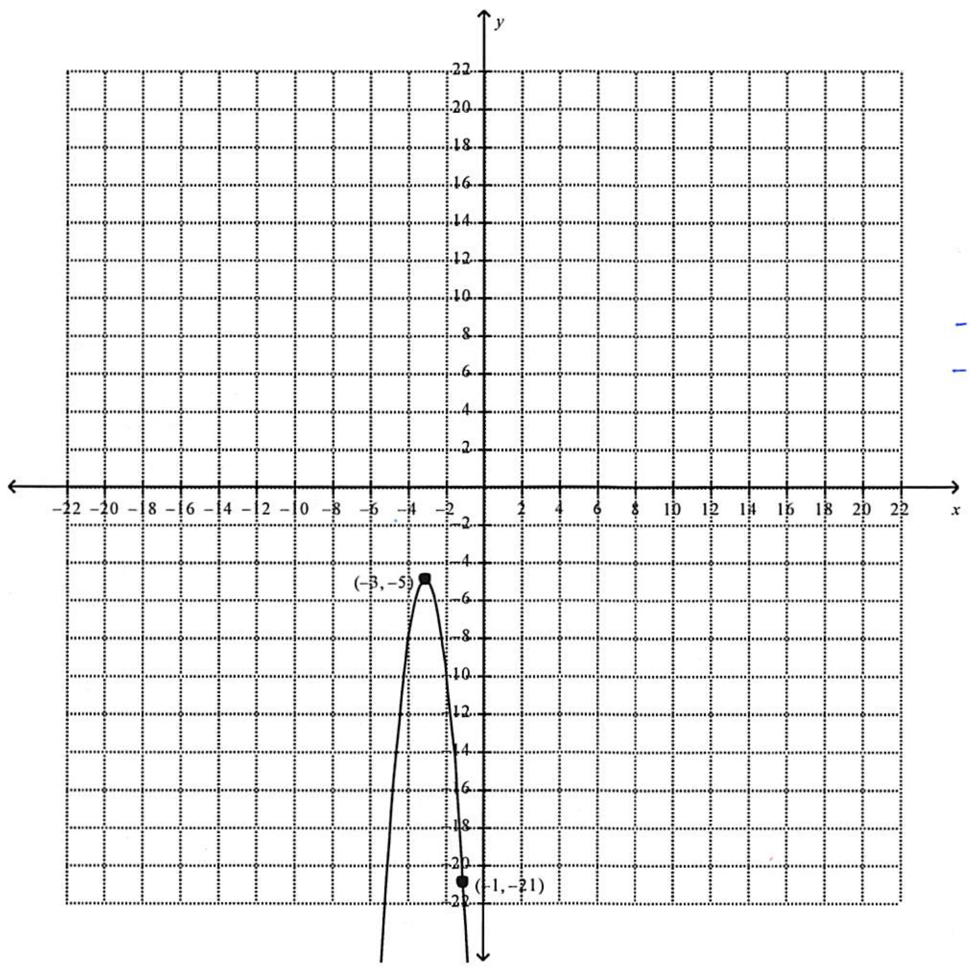
6

Completion

7. A quadratic function with vertex (0, 1) and two x-intercepts will open down.

8. The quadratic function in vertex form that represents the graph shown below is $y = -4(x+3)^2 - 5$

(2) pts



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

$-21 = a(-1+3)^2 - 5$

$-21 = 4a - 5$

$4a = -16$

$a = -4$

9. You can read the y-intercept from a function written in general form. (or standard)

10. The vertex form of $y = 3x^2 - 6x - 22$ is $y = 3(x-1)^2 - 25$

$\frac{-b}{2a} = \frac{6}{6} = 1$ $f(1) = -25$

11. The fully factored form of $-4x^2 + 24x - 36$ is $-4(x-3)^2$

$-4(x^2 - 6x + 9)$

12. The fully factored form of $30x^2 + 5x - 5$ is $5(3x-1)(2x+1)$

$5(6x^2 + x - 1)$ ⊗ -6 ⊕ 1

$5(6x^2 + 3x - 2x - 1)$

$3x(2x+1) - 1(2x+1)$

7

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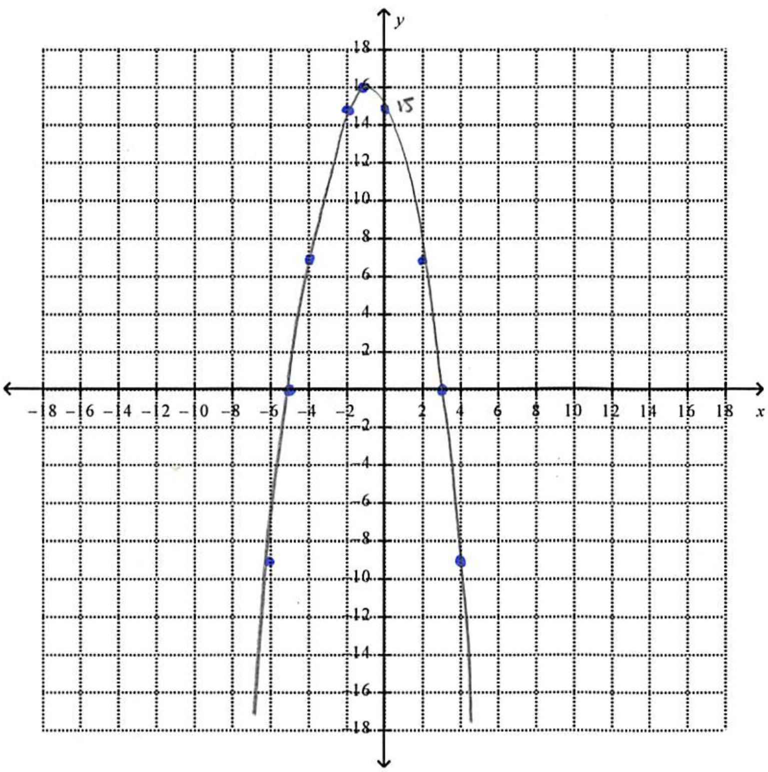
Short Answer

13. **a)** Sketch the graph of the function $y = -x^2 - 2x + 15$. Label the vertex and the y-intercept.



vertex : $\cdot \ \frac{-b}{2a} = \frac{2}{-2} = -1$

$\cdot \ f(-1) = 16 \quad (-1;16)$

$y = -(x^2 + 2x - 15)$
$= -(x+5)(x-3)$

$f(2) = -4 - 4 + 15 = 7$

$f(4) = -16 - 8 + 15 = -9$

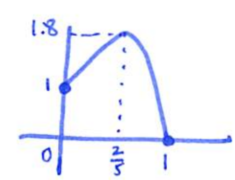
2

b) Determine the x-intercepts graphically.

$x = -5$ and $x = 3$

1

14. A baseball batter hits an infield fly ball. The height, h, in metres, of the baseball after t seconds is approximately modelled by the function $h(t) = -5t^2 + 4t + 1$.
a) State the domain and range of the function.



$D = \{t \in \mathbb{R} \mid 0 \leq t \leq 1\}$
$R = \{h \in \mathbb{R} \mid 0 \leq h \leq 1.8\}$

2

b) At what height did the batter hit the ball?

1 m

1

$-5t^2 + 4t + 1 = 0 \qquad \otimes \ -5$
$-5t^2 + 5t - t + 1 = 0 \qquad \oplus \ 4$
$-5t(t-1) - 1(t-1) = 0$
$(-5t-1)(t-1) = 0$

c) How high is the ball going to go?

1.8 m

1

$-5 \times \left(\frac{2}{5}\right)^2 + 4 \times \frac{2}{5} + 1 = -\frac{4}{5} + \frac{8}{5} + 1$
$= \frac{4}{5} + \frac{5}{5} = \frac{9}{5} = \frac{18}{10}$