Ch 3 Test (Quadratic Functions)

Name: SaySay

1. Solve the following quadratic equations using the best method (factoring is better than the quadratic formula if factoring is possible).

[6]

(a) $(2x-3)(x+7)=0$

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

$x = -7$

(b) $2x^2 + 2.7x - 5.1 = 0$

$= \frac{-2.7 \pm \sqrt{2.7^2 \; 4(2)(-5.1)}}{2(2)}$

$= \frac{-2.7 \pm \sqrt{7.29 + 408}}{4}$

$= \frac{-2.7 \pm \sqrt{415.29}}{4}$

(c) $2x^2 - 9x - 5 = 0$

-10   -9 1×-10

$2x^2 + 1x - 10x - 5$

$x(2x+1) - 5(2x+1)$

$(2x+1)(x-5)$

$x = -\frac{1}{2}$

$x = 5$

2. Simplify

[1]

(a) $\sqrt{108} = \sqrt{27}\,\sqrt{4}$

$= 2\sqrt{27} \to$

$\sqrt{3}\,\sqrt{9}\,\sqrt{4}$

$3 \times 2\sqrt{3}$

$6\sqrt{3}$

[2]

(b) $4\sqrt{12} - 3\sqrt{48} =$

$12 \to 4(2\sqrt{3}) - 3(4\sqrt{3})$

$8\sqrt{3} - 12\sqrt{3} \to -4\sqrt{3}$

[3]

(c) $(7\sqrt{2}+\sqrt{3})(7\sqrt{2}-\sqrt{3}) =$

$49\sqrt{2}^2 - 7\sqrt{2}\sqrt{3} + 7\sqrt{2}\sqrt{3} - \sqrt{3}^2$

$49\sqrt{2}^2 - \sqrt{3}^2$

$49(2)(3)$

$98 - 3$

95

[3]

(d) $(3-2\sqrt{7})^2$

?

$(3-2\sqrt{7})(3-2\sqrt{7})$

$9 - 6\sqrt{7} - 6\sqrt{7} + 4\sqrt{7}^2$

$9 - 12\sqrt{7} + 4(7)$

$9 - 12\sqrt{7} + 28$

$37 - 12\sqrt{7}$

3. (a) Convert $f(x) = -3(x+4)^2 + 27$ directly to

(i) standard form (ii) factored form

[4]

$f(x) = -3(x^2 + 8x + 16) + 27$

$= -3x^2 - 24x - 48 + 27$

$= -3x^2 - 24x - 21$

$f(x) = -3(x+4)^2 + 27$

$-27 = -3(x+4)^2$

$\frac{27}{3} = (x+4)^2$

$x + 4 = \pm\sqrt{9}$

$x = 4 \pm \sqrt{9}$

$x = 4 \pm 3$

$f(x) = -3(x+7)(x+1)$

(b) State the

[5]

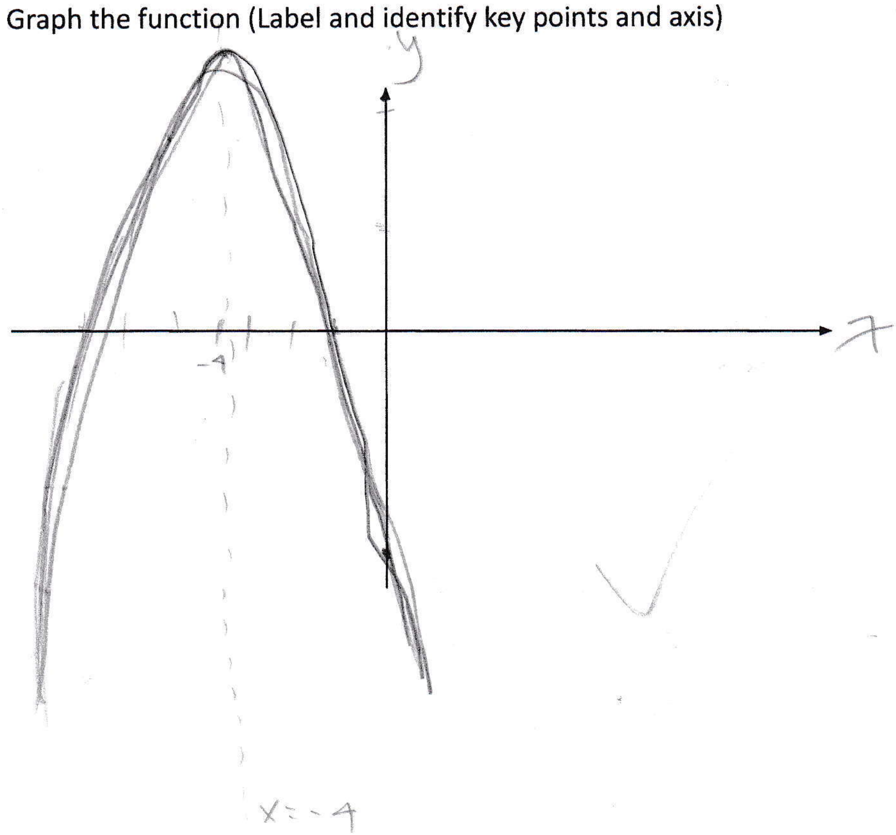
(i) y-intercept = -21 (ii) x-ints = -7 and -1

(iii) Vertex = $(-4, 27)$ (iv) axis of symmetry x = -4

(v) max or min 27 (circle the right word and state the value)

(c) Graph the function (Label and identify key points and axis)

[4]



4. Firas and Ron are playing baseball. Firas pitches the ball to Ron and Ron hits the ball. t seconds after the ball is hit, its height in meters is given by $h(t) = -5t^2 + 20t + 0.8$. Determine the following:

(a) How high was the ball above the ground when it was hit?

[1]

(b) What is the maximum height of the ball?

$h(t) = -5(t^2 - 4t) + 0.8$

[3]

$= -5(t^2 - 4t + 4t) + 0.8$

$= -5[(t-2)^2 - 4] + 0.8$

$= -5(t-2)^2 + 20 + 0.8$

$= -5(t-2)^2 + 20.8$

The maximum height of the ball is 20.8 m high

(c) When will the ball hit the ground?

[3]

(d) When does the ball have a height of 4 meters?

[3]

$h(t) = -5t^2 + 20t + 0.8$

$$t = \frac{-20 \pm \sqrt{20^2 - 4(-5)(0.8)}}{2(-5)}$$

$t = -20 \pm \sqrt{400 + 16}$

$t = -20 \pm \sqrt{416}$