Name: _____ **Show work needed to justify your answer.** Date: _____

**HW: # 12b:** Math IBSL - Standard 12 - Quadratic Formula and the Discriminant 5 points

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**1** Solve each inequality:

**a** $3x^2 + 5x - 2 \geq 0$

$(3x-1)(x+2) \geq 0$

$x = \frac{1}{3}$ | $x = -2$

-10 0 10

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

(-)(-) (-)(+) (+)(+)

$(-\infty, -2] \cup [\frac{1}{3}, \infty)$

**c** $2x^2 + 6x - 6 < x^2 + 2x$

$x^2 + 4x - 6 < 0$

$x = \frac{-4 \pm \sqrt{16+24}}{2}$

$x = \frac{-4 \pm \sqrt{40}}{2}$ $\rightarrow x \approx 1.16$ $\rightarrow x \approx -5.16$

-10 0 10

-5.16 1.16

$(-5.16, 1.16)$

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**4** Find the value(s) of $m$ such that the equation $x^2 + 6mx + m = 0$ has no real roots.

$b^2 - 4ac < 0$

$(6m)^2 - 4(1)(m) < 0$

$36m^2 - 4m < 0$

$4m(9m-1) < 0$

$m = 0$ | $m = \frac{1}{9}$

-10 $\frac{1}{10}$ 10

(+) 0 (-) $\frac{1}{9}$ (+)

(-)(-) (+)(-) (+)(+)

$(0, \frac{1}{9})$

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**5** Find the value(s) of $k$ for which the quadratic equation $kx^2 - 6kx + 2 + k = 0$ has two distinct real roots.

$b^2 - 4ac > 0$

$36k^2 - 4(k)(2+k) > 0$

$36k^2 - 4k(k+2) > 0$

$36k^2 - 4k^2 - 8k > 0$

$32k^2 - 8k > 0$

$8k(4k-1) > 0$

$k = 0$ | $k = \frac{1}{4}$

-10 $\frac{1}{10}$ 10

(+) 0 (-) $\frac{1}{4}$ (+)

(-)(-) (+)(-) (+)(+)

$(-\infty, 0)$ And $(\frac{1}{4}, \infty)$

Name: _____ **Show work needed to justify your answer.** Date: _____

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**6** The graph of $f(x) = 3x^2 + px + 4$ has no $x$-intercepts.

**a** Find an expression for the discriminant of $f(x) = 0$ in terms of $p$.

**b** Find the possible values of $p$.

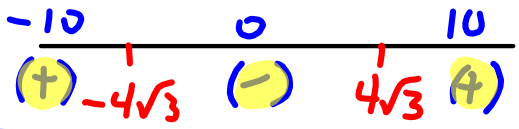
**c** Let $m$ be the largest possible integer value of $p$. Write down the value of $m$.

**d** The function $h(x) = 3x^2 + mx + 4$ can be written in the form $h(x) = a(x - h)^2 + k$. Find the values of $a$, $h$ and $k$.

a) $b^2 - 4ac < 0 \rightarrow p^2 - 4(3)(4) < 0$

$p^2 - 48 < 0$

b) $p^2 = 48 \rightarrow p = \pm\sqrt{16}\sqrt{3} \rightarrow p = \pm 4\sqrt{3}$




$(-4\sqrt{3}, 4\sqrt{3})$

c. $4 \cdot \sqrt{3} \approx 6.9 \rightarrow m = 6$

d) $h(x) = 3x^2 + 6x + 4$

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

$h(x) = 3(x+1)^2 + 1$

a h k