Answers – Quadratics Inequalities – Q3 and Q4

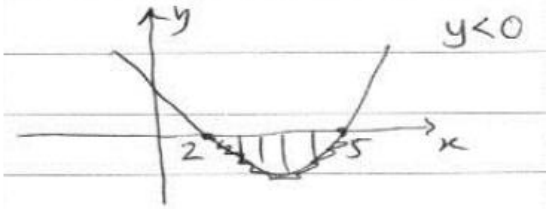
Q3(a)

$x^2 - 7x + 10 < 0$

Critical values:

$x^2 - 7x + 10 = 0$

$x = 2, 5$

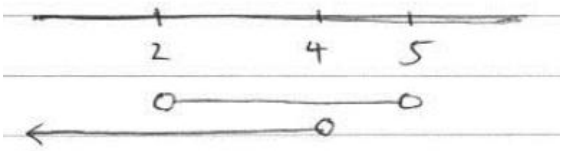


$2 < x < 5$

$3x + 5 < 17$

$3x < 12$

$x < 4$



Common range:

$2 < x < 4$

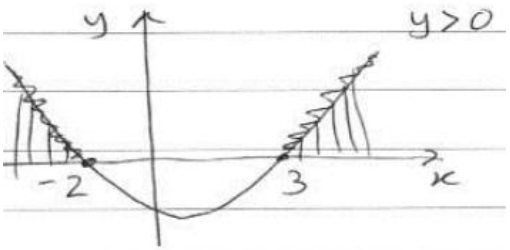
Q3(b)

$x^2 - x - 6 > 0$

Critical values:

$x^2 - x - 6 = 0$

$x = 3, -2$



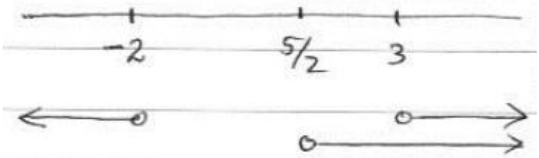
$x < -2$ or $x > 3$

$10 - 2x < 5$

$10 < 2x + 5$

$5 < 2x$

$x > 5/2$



Common range:

$x > 3$

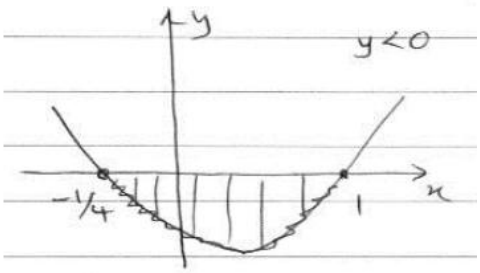
Q3(c)

$4x^2 - 3x - 1 < 0$

Critical values:

$4x^2 - 3x - 1 = 0$

$x = 1, -1/4$



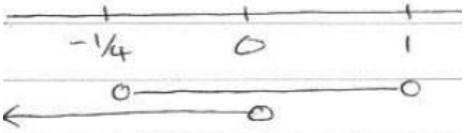
$-\frac{1}{4} < x < 1$

$4(x+2) < 15 - (x+7)$

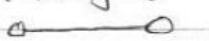
$4x + 8 < 15 - x - 7$

$5x < 0$

$x < 0$



Common range:



$-\frac{1}{4} < x < 0$

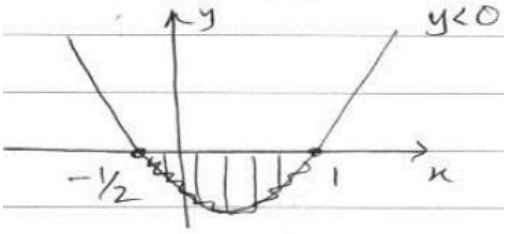
Q3(d)

$2x^2 - x - 1 < 0$

Critical values:

$2x^2 - x - 1 = 0$

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

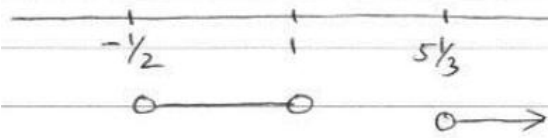


$-\frac{1}{2} < x < 1$

$14 < 3x - 2$

$16 < 3x$

$x > 5\frac{1}{3}$



No common range.

∴ No solution.

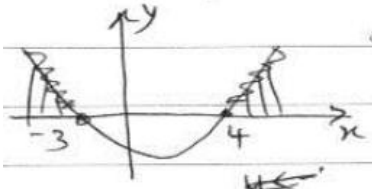
Q3(e)

$x^2 - x - 12 > 0$

Critical values:

$x^2 - x - 12 = 0$

$x = 4, \ -3$

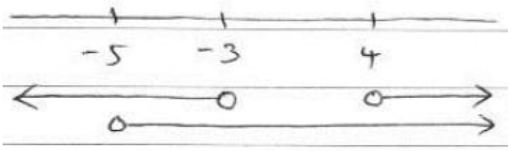


$x < -3$ or $x > 4$

$3x + 17 > 2$

$3x > -15$

$x > -5$



Common range:

$-5 < x < -3$ or $x > 4$

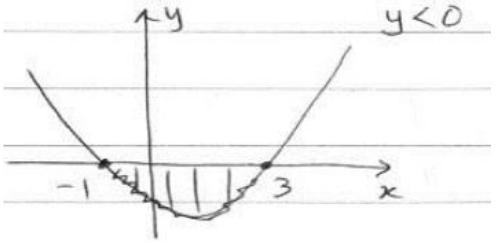
Q3(f)

$x^2 - 2x - 3 < 0$

Critical values:

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

$x = 3, \ -1$



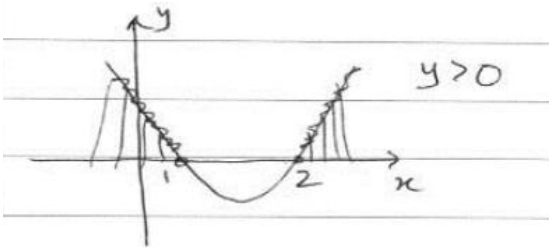
$-1 < x < 3$

$x^2 - 3x + 2 > 0$

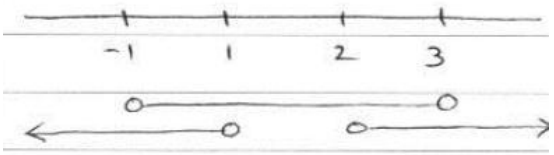
Critical values:

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

$x = 2, \ 1$



$x < 1$ or $x > 2$



Common range:

$-1 < x < 1$ or $2 < x < 3$

Q4(a)

$x^2 - kx + (k+3) = 0$

$a=1,\ b=-k,\ c=k+3$

If it has real roots,

$b^2 - 4ac \geq 0$

(This is because, real roots means, there could be two distinct real roots or one repeated real root)

$(-k)^2 - 4(1)(k+3) \geq 0$

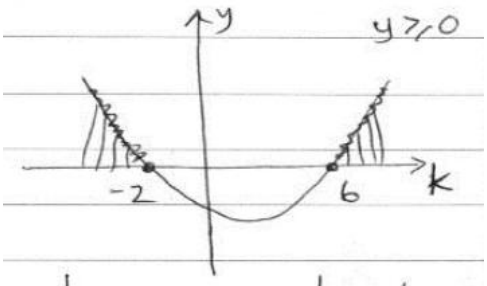
$k^2 - 4k - 12 \geq 0$

$k^2 - 4k - 12 \geq 0$

Critical values:

$k^2 - 4k - 12 = 0$

$k = 6, -2$



$k \leq -2$ or $k \geq 6$

Q4(b)

$px^2 + px - 2 = 0$

If the roots are real,

$b^2 - 4ac \geq 0$

$p^2 - 4(p)(-2) \geq 0$

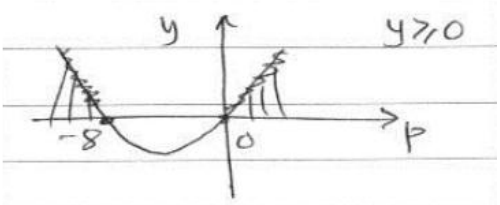
$p^2 + 8p \geq 0$

Critical values:

$p^2 + 8p = 0$

$p(p+8) = 0$

$p = 0,\ p = -8$



$p \leq -8$ or $p > 0$