



Subject: Grade 11 Mathematics

Topic: Mathematics: Term 2 - Exam 1

Total: 26 Marks

1. $x = 2 \mid 2$

3 marks

Explanation:

$$\sqrt{x-2} + x = 2$$

Isolate the surd and square both sides of the equation:

$$\begin{aligned}\sqrt{x-2} &= 2 - x \\ (\sqrt{x-2})^2 &= (2-x)^2 \\ x-2 &= 4 - 4x + x^2\end{aligned}$$

Set the equation equal to zero and solve for x :

$$\begin{aligned}x^2 - 5x + 6 &= 0 \\ (x-3)(x-2) &= 0\end{aligned}$$

$$\therefore x = 3 \text{ or } x = 2.$$

Test whether the solution(s) are valid by substituting the solution back into the equation and making sure LHS=RHS.

Only $x = 2$ is valid.



2. -2,91 | 0,91

4 marks

Explanation:

$$3x(x + 2) = 8$$

Simplify the equation and write it in standard form.

$$3x^2 + 6x - 8 = 0$$

Identify the a , b and c value as this equation cannot be factorised.

$$a = 3, b = 6 \text{ and } c = -8$$

Substitute into the quadratic formula.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(6) \pm \sqrt{(6)^2 - 4(3)(-8)}}{2(3)} \quad \text{Simplify}$$

$$x = \frac{-6 \pm \sqrt{132}}{6}$$

Determine 2 solutions by using the $+$ and $-$ separately.

$$x = -2,91 \text{ or } 0,91$$

3. false

2 marks

Explanation:

The function h passes through point D on function f . The equation of h is given as well as the x -value of D .

Thus q could be solved by substituting $x = -1$ into h .

$$h(-1) = 2(-1) + 6$$

$$\therefore q = 4$$

$$4. y = x + 1 \mid y = 1x + 1 \mid 1x + 1 \mid x + 1 \mid = 1x + 1 \mid = x + 1$$

3 marks

Explanation:

The gradient of the axes of symmetry will be always be $m = 1$ and $m = -1$ as the inclination angle of the two axes will be 45° and 135° respectively.

The axis of symmetry with the positive gradient will be $y = x + c$.

The axes of symmetry both passes through the point where the asymptotes intersect.

Substitute this point $(2; 3)$ into $y = x + c$:

$$\begin{aligned} 3 &= 2 + c \\ \therefore c &= 1 \end{aligned}$$

The equation is $y = x + 1$.

$$5. -1 \mid -2 \mid 3$$

6 marks

Explanation:

We are given the turning point of the parabola.

Substitute this into the equation of a parabola in its vertex form $y = a(x + p)^2 + q$ where the turning point is $(-p; q)$.

$$y = a(x + 1)^2 + 4$$

Another point is needed to substitute in for x and y to solve for a .

A could be solved using the information from h , as A is the x -intercept of h . Substitute $y = 0$:

$$\begin{aligned} 0 &= 2x + 6 \\ \therefore x &= -3 \end{aligned}$$

$$\therefore A(-3; 0)$$

Now this coordinate can also be substituted into the previous equation.

$$\begin{aligned} 0 &= a(-3 + 1)^2 + 4 \\ 0 &= 4a + 4 \\ \therefore a &= -1 \end{aligned}$$

Now we can simplify the vertex form:

$$\begin{aligned} y &= -1(x + 1)^2 + 4 \\ y &= -1(x^2 + 2x + 1) + 4 \\ y &= -x^2 - 2x + 3 \\ \therefore a &= -1; b = -2; c = 3 \end{aligned}$$

6. $x \mid 2 \mid y \mid 3$

8 marks

Explanation:

The standard equation of a hyperbolic function is $y = \frac{a}{x - p} + q$.

The **vertical asymptote** will cut through the x -axis and be read from the given equation as $x = -p$, in this case $x = 2$.

The **horizontal asymptote** will cut through the y -axis and be read from the given equation as $y = q$, in this case $y = 3$.

Total: 26 Marks