

# Key

$$\textcircled{1a} 3x(2x+5)^{-0.5} + 3(2x+5)^{\frac{1}{2}} = \frac{3x}{(2x+5)^{\frac{1}{2}}} + 3(2x+5)^{\frac{1}{2}} \left( \frac{(2x+5)^{\frac{1}{2}}}{(2x+5)^{\frac{1}{2}}} \right)$$

$$= \frac{3x}{(2x+5)^{\frac{1}{2}}} + \frac{3(2x+5)}{(2x+5)^{\frac{1}{2}}} = \frac{3x+6x+15}{(2x+5)^{\frac{1}{2}}} = \boxed{\frac{9x+15}{(2x+5)^{\frac{1}{2}}}}$$

$$\textcircled{1b} \frac{\frac{3}{2(x+h)}(x) - \frac{3}{2x}\left(\frac{(x+h)}{(x+h)}\right)}{h} = \frac{\frac{3x}{2x(x+h)} - \frac{3(x+h)}{2x(x+h)}}{h} = \frac{\frac{3x-3x-3h}{2x(x+h)}}{h}$$

$$= \frac{-3h}{2x(x+h)} = \boxed{\frac{-3}{2x(x+h)}}$$

$$\textcircled{2} \left(x^{\frac{5}{2}} + \frac{3}{\sqrt{2}}\right)^2 = \left(x^{\frac{5}{2}} + \frac{3}{\sqrt{2}}\right)\left(x^{\frac{5}{2}} + \frac{3}{\sqrt{2}}\right) = x^5 + \frac{3x^{\frac{5}{2}}}{\sqrt{2}} + \frac{3x^{\frac{5}{2}}}{\sqrt{2}} + \frac{9}{2}$$

$$= \boxed{x^5 + \frac{6x^{\frac{5}{2}}}{\sqrt{2}} + \frac{9}{2}}$$

$$\textcircled{3} -x^2 + 4x = x^2$$

$$+x^2 \quad +x^2$$

$$4x = 2x^2$$

$$-4x \quad -4x$$

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

$$0 = 2x(x-2)$$

$$\boxed{x=0, 2}$$

$$y(0) = 0$$

$$y(2) = 4$$

Points of Intersection:

$$(0, 0)$$

$$(2, 4)$$

$$\textcircled{4} 2x + 3y = 6$$

$$\frac{3y}{3} = \frac{-2x+6}{3}$$

$$y = \frac{-2}{3}x + 2$$

$$m = -\frac{2}{3}$$

$$m_{\perp} = \frac{3}{2}$$

$$y = mx + b$$

$$m_{\perp} = \frac{3}{2} \quad (-1, 4)$$

$$4 = \frac{3}{2}(-1) + b$$

$$4 = -\frac{3}{2} + b$$

$$\frac{+3}{2} \quad \frac{+3}{2}$$

$$\frac{11}{2} = b$$

$$\boxed{y = \frac{3}{2}x + \frac{11}{2}}$$

$$(5a) f(3) = 3 - (3)^2 = 3 - 9 = -6$$

$$(5b) f(k) = 3 - k^2$$

$$(5c) f(2 + \Delta x) = 3 - (2 + \Delta x)^2$$

$$(6) \frac{g(x + \Delta x) - g(x)}{\Delta x} = \frac{(x + \Delta x)^2 + 3(x + \Delta x) - 1 - (x^2 + 3x - 1)}{\Delta x}$$

$$= \frac{\cancel{x^2} + 2x\Delta x + \Delta x^2 + \cancel{3x} + 3\Delta x - \cancel{1} - \cancel{x^2} - \cancel{3x} + \cancel{1}}{\Delta x}$$

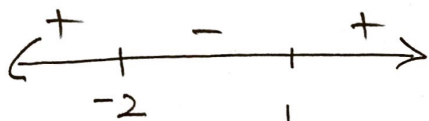
$$= \frac{2x\Delta x + \Delta x^2 + 3\Delta x}{\Delta x} = \frac{\cancel{\Delta x}(2x + \Delta x + 3)}{\cancel{\Delta x}} = \boxed{2x + \Delta x + 3}$$

$$(7a) f(g(x)) = \frac{1}{\sqrt{x^2 - 5}}$$

$$(7b) g(f(x)) = \left(\frac{1}{\sqrt{x}}\right)^2 - 5$$

$$(8) x^2 + x - 2 > 0$$

$$(x + 2)(x - 1) > 0$$



$$\text{Domain: } (-\infty, -2) \cup (1, \infty)$$

$$(9a) \begin{array}{r} hp - 1 = g + kp + 6p \\ -kp \quad -g \quad -g \quad \quad -hp \end{array}$$

$$-g - 1 = kp + 6p - hp$$

$$-g - 1 = p(k + 6 - h)$$

$$\boxed{\frac{-g - 1}{k + 6 - h} = p}$$

$$(9b) \quad 3(p+2)^{-1} - \frac{4}{p} = 0$$

$$\left(\frac{p}{p}\right) \frac{3}{p+2} - \frac{4}{p} \left(\frac{p+2}{p+2}\right) = 0$$

$$\frac{3p - 4p - 8}{p(p+2)} = 0$$

$$\frac{-p - 8}{p(p+2)} = 0$$

$$-p - 8 = 0$$

$$-p = 8$$

$$p = 8$$

$$(12a) \quad x^6 - 16x^4 = 0$$

$$x^4(x^2 - 16) = 0$$

$$x^4 = 0 \quad x^2 - 16 = 0$$

$$x = 0$$

$$x = \pm 4$$

$$(12b) \quad 8x^3 + 27 = 0$$

$$8x^3 = -27$$

$$x^3 = \frac{-27}{8}$$

$$x = \sqrt[3]{\frac{-27}{8}} = \frac{-3}{2}$$

$$(10) \quad 5x^2 + 5y^2 - 20x + 10y + 21 = 0$$

$$5x^2 - 20x + 5y^2 + 10y = -21$$

$$x^2 - 4x + 4 + y^2 + 2y + 1 = \frac{-21}{5} + 4 + 1$$

$$(x-2)^2 + (y+1)^2 = \frac{4}{5}$$

Center: (2, -1)

Radius:  $\sqrt{\frac{4}{5}}$

$$(11a) \quad 5^{x+1} = 125$$

$$5^{x+1} = 5^3$$

$$x+1 = 3$$

$$x = 2$$

$$(11b) \quad \frac{1}{3} = 3^{x+2}$$

$$3^{-1} = 3^{x+2}$$

$$-1 = x+2$$

$$-3 = x$$

$$(3a) 4x^2 + 12x + 3 = 0$$

$$x = \frac{-12 \pm \sqrt{12^2 - 4(4)(3)}}{2(4)}$$

$$x = \frac{-12 \pm \sqrt{144 - 48}}{8}$$

$$x = \frac{-12 \pm \sqrt{96}}{8}$$

$$x = \frac{-12 \pm 4\sqrt{6}}{8}$$

$$x = \frac{-3 \pm \sqrt{6}}{2}$$

$$(3b) \frac{(x+1)(x+1)}{(x+1)x} - \frac{x}{x+1} \left(\frac{x}{x}\right) = 0$$

$$\frac{x^2 + 2x + 1}{x(x+1)} - \frac{x^2}{x(x+1)} = 0$$

$$\frac{2x + 1}{x(x+1)} = 0$$

$$2x + 1 = 0$$

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

$$(14a) |5x - 2| = 8$$

$$5x - 2 = 8$$

$$5x = 10$$

$$x = 2$$

$$5x - 2 = -8$$

$$5x = -6$$

$$x = -\frac{6}{5}$$

$$(14b) |2x + 1| = x + 3$$

$$2x + 1 = x + 3$$

$$x = 2$$

$$2x + 1 = -x - 3$$

$$3x = -4$$

$$x = -\frac{4}{3}$$

$$(15a)$$

$$(3x - y - 7 = 0) \cdot 5 \rightarrow 15x - 5y - 35 = 0$$

$$x + 5y + 8 = 5$$

$$x + 5y + 8 = 5$$

$$16x - 27 = 5$$

$$16x = 33$$

$$x = \frac{33}{16}$$

$$(15b) 3x - y - 7 \leq 0$$

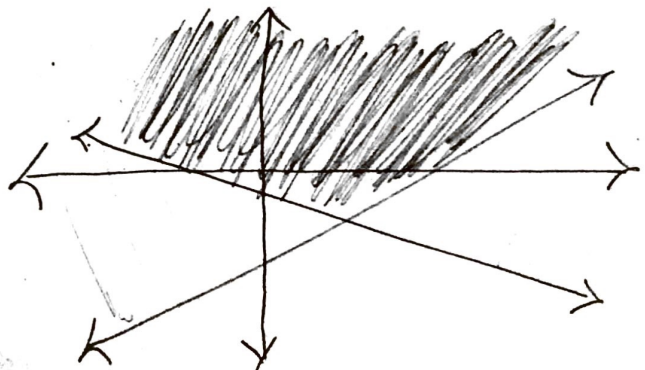
$$-y \leq -3x + 7$$

$$y \geq 3x - 7$$

$$x + 5y + 8 \geq 5$$

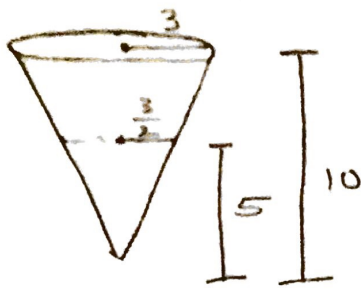
$$5y \geq -x - 3$$

$$y \geq -\frac{1}{5}x - \frac{3}{5}$$





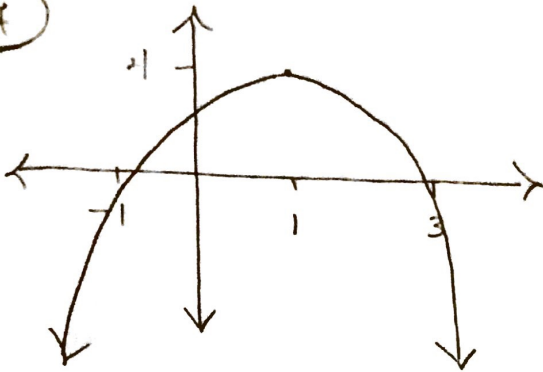
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$$SA_{\text{water}} = \pi r^2$$

$$= \pi \left(\frac{3}{2}\right)^2 = \frac{9}{4} \pi \text{ m}^2$$

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$$y = a(x-h)^2 + k$$

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

$$(3, 0)$$

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

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

$$y = -x^2 + 2x - 1 + 4$$

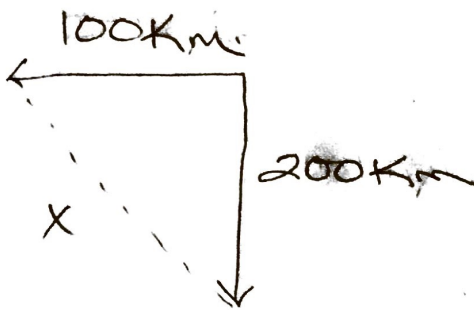
$$y = -x^2 + 2x + 3$$

$$0 = a(3-1)^2 + 4$$

$$0 = 4a + 4$$

$$a = -1$$

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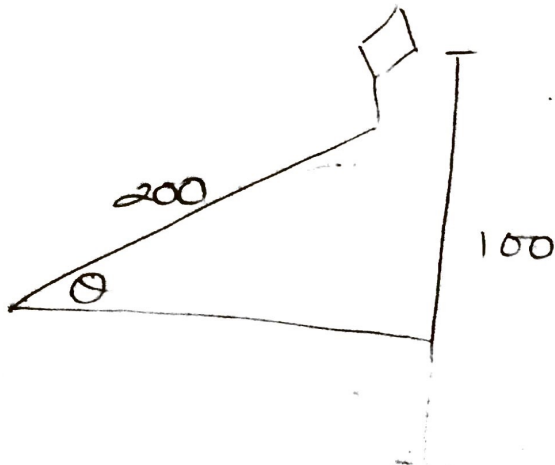


$$100^2 + 200^2 = x^2$$

$$10,000 + 40,000 = x^2$$

$$\sqrt{50,000} \text{ km} = x$$

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$$\sin \theta = \frac{1}{2}$$

$$\theta = 30^\circ$$