

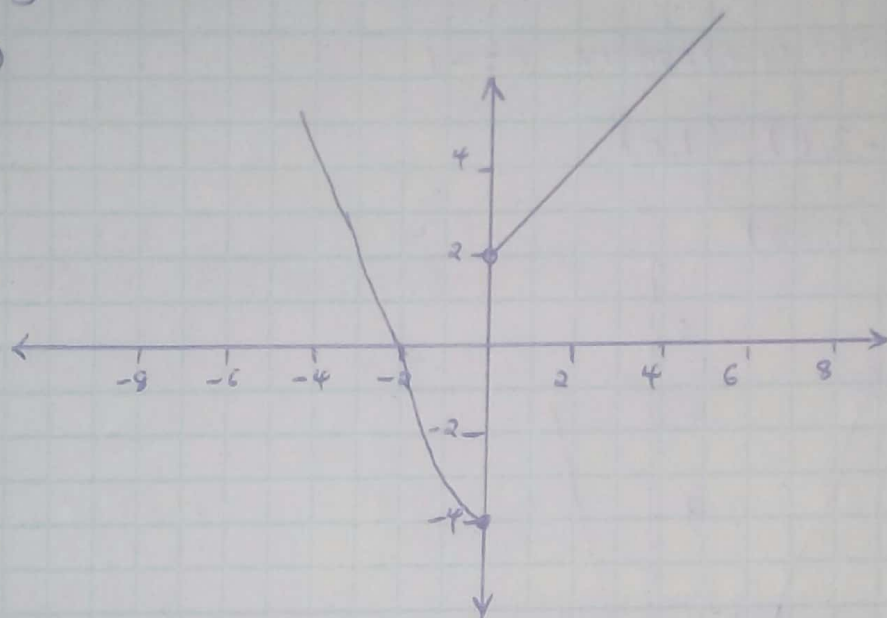
IBRAHIM ALABBAD

1. Shift left 3 units, reflect on x-axis, shift 20 units downward

2. (a) $g(-1) = -3$

(b) $g(0) = -4$

(c)



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

Increasing Interval(s) = $(-\infty, -2)$ Decreasing Interval(s) = $(-2, \infty)$

Relative Maximum Point(s) = $(-2, 6)$

4

(a) $g^{-1}(x) = \frac{\ln x}{\ln 5}$

~~(b) Domain = $(0, \infty)$~~

(b) Domain $g(x) = (-\infty, \infty)$

(c) Domain $g^{-1}(x) = (0, \infty)$

5 $f(x) = x + 1$, $g(x) = x^2 + 6$

(a) $g(f(x)) = (x+1)^2 + 6 = x^2 + 2x + 1 + 6$
 $= x^2 + 2x + 7$

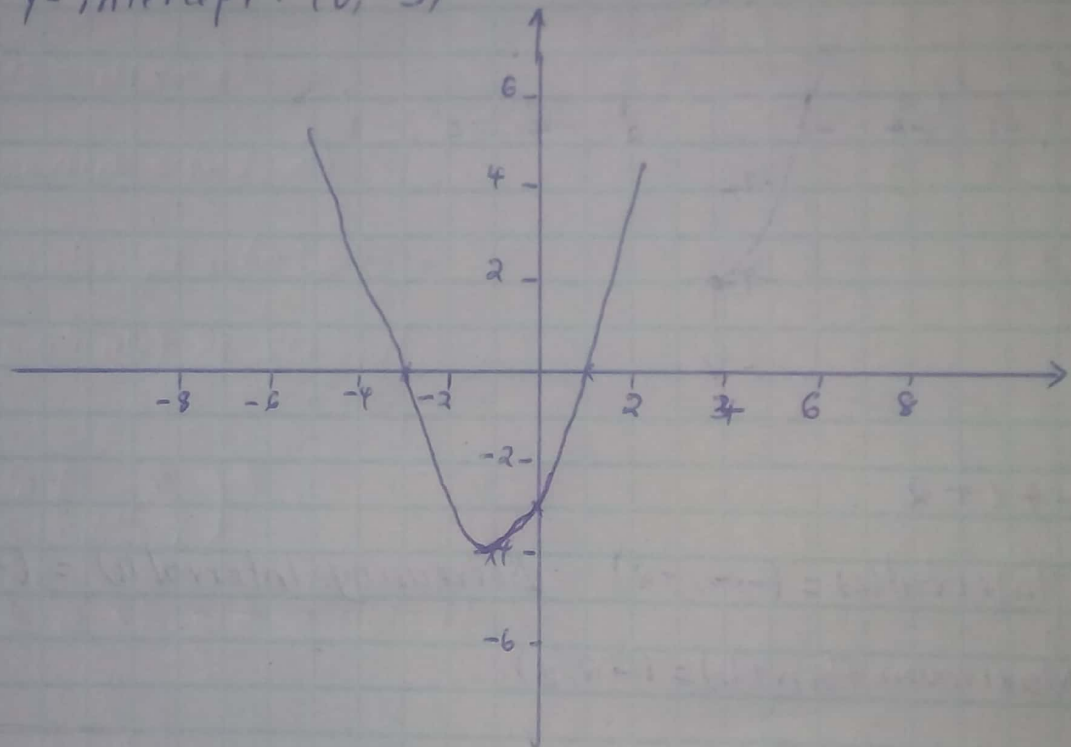
$$\begin{aligned}
 (b) (f \cdot g)(x) &= (x+1)(x^2+6) \\
 &= x^3 + 6x + x^2 + 6 \\
 &= x^3 + x^2 + 6x + 6
 \end{aligned}$$

6 Vertex: $(-1, -4)$

Equation of the axis of symmetry: $x = -1$

x-intercepts: $(-3, 0), (1, 0)$

y-intercept: $(0, -3)$



$$\begin{array}{r}
 7. \quad \begin{array}{r}
 x^2 - 4x - 6 \\
 x-2 \overline{) \begin{array}{r}
 x^3 - 6x^2 + 2x - 4 \\
 \underline{-x^3 + 2x^2} \\
 -4x^2 + 2x - 4 \\
 \underline{-4x^2 + 8x} \\
 -6x - 4 \\
 \underline{-6x + 12} \\
 -16
 \end{array} } \\
 \end{array}
 \end{array}$$

$$= x^2 - 4x - 6 - \frac{16}{x-2}$$

$$8 = 3 + 6i$$

$$9 \quad \frac{(2-4i)}{(3+i)} \cdot \frac{(3-i)}{(3-i)} = \frac{6-2i-12i-4}{9-3i+3i+1}$$

$$= \frac{2-14i}{10}$$

$$= \frac{1}{5} - \frac{7}{5}i$$

$$10 \quad \text{Zeros} = -3, 1, 2$$

$$\text{factor} = (x+3)(x-1)(x-2)$$

$$11 \quad \text{Domain: } (-\infty, -2) \cup (-2, 2) \cup (2, \infty) \quad x\text{-intercept(s): } (5, 0), (-3, 0)$$

$$y\text{-intercept(s): } (0, \frac{15}{8})$$

$$\text{Equation(s) of vertical asymptote(s): } x = -2, x = 2$$

$$\text{Equation(s) of horizontal asymptote(s): } y = \frac{1}{2}$$

$$12 \quad x^2 - x \leq 6$$

$$x^2 - x - 6 \leq 0$$

$$(x-3)(x+2) \leq 0$$

$$-2 \leq x \leq 3$$

$$= [-2, 3]$$

$$13. 2(3)^x = 8$$

$$3^x = 4$$

$$\ln(3^x) = \ln(4)$$

$$x \ln(3) = \ln(4)$$

$$x = \frac{\ln(4)}{\ln(3)}$$

$$= 1.262$$

$$14. f(x) = \ln(x+2)$$

$$\text{Domain} = (-2, \infty)$$

$$x\text{-intercept} = (-1, 0)$$

$$\text{equation(s) of vertical asymptote(s): } x = -2$$

$$15. \ln\left(\frac{x}{x^2-9}\right)^4$$

$$= 4 \ln(x) - 4 \ln(x^2-9)$$

$$16. y = x^3$$

$$y = 3x^2 + 10x$$

$$x^3 = 3x^2 + 10x$$

$$x^3 - 3x^2 - 10x = 0$$

$$x(x^2 - 3x - 10) = 0$$

$$x(x+2)(x-5) = 0$$

$$x = 0, x = -2, x = 5$$

$$x = 0, y = 0$$

$$x = -2, y = -8$$

$$x = 5, y = 125$$

$$= (0, 0), (-2, -8), (5, 125)$$

17. When 3 is raised to 5, the result is 243.

18. (a) $P = 1000 e^{0.042 \times 6}$

$$= 1286.596$$

$$\approx 1287$$

(b) $10,000 = 1000 e^{0.042t}$

$$10 = e^{0.042t}$$

$$0.042t = \ln(10)$$

$$t = \frac{\ln(10)}{0.042}$$

$$= 54.8 \text{ hours}$$