

7. a) false b) true c) true d) false
 e) true f) false g) false h) true

17. a) $\log(xy)^{10} = 10 \log xy = 10 \log x + 10 \log y$

b) $\log_5 \left(\frac{x^2}{yz^3} \right) = \log_5 x^2 - \log_5 yz^3 = 2 \log_5 x - 3 \log_5 yz$

$$2 \log_5 x - 3 \log_5 y + 3 \log_5 z$$

23. a) $\frac{1}{2} \log_4 (y+1) - \frac{1}{2} \log_4 (y-1) = \log_4 (y+1)^{\frac{1}{2}} - \log_4 (y-1)^{\frac{1}{2}}$

$$= \log_4 \left(\frac{y+1}{y-1} \right)^{\frac{1}{2}}$$

b) $4 \log x - \frac{1}{3} \log(x^2+1) + 2 \log(x-1)$

$$= \log x^4 - \log(x^2+1)^{\frac{1}{3}} + \log(x-1)^2$$

$$= \log x^4 - \log((x^2+1)^{\frac{1}{3}}(x-1)^2)$$

$$= \log \frac{x^4}{(x^2+1)^{\frac{1}{3}}(x-1)^2}$$

26. $\log(10^{27}a) - \log(a) = \log\left(\frac{10^{27}a}{a}\right)$

$$= \log 10^{27} = 27$$

32. $= \log\left(\frac{1}{100}a\right) - \log(a) = \log \frac{\frac{1}{100}a}{a}$

$$\log \frac{1}{100} = -2$$

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- ⑦ a) False e) False
b) True f) False
c) True g) False
d) False h) True

⑩ a) $\log(xy)^{10}$ b) $\log_5\left(\frac{x^2}{yz^3}\right)$
 $10 \log(xy)$ $\log_5 x^2 - \log_5 yz^3$
 $10 \log x + 10 \log y$ $2 \log_5 x - \log_5 y + 3 \log_5 z$

⑩ a) $\frac{1}{2} \log_4(y+1) - \frac{1}{2} \log_4(y-1)$ b) $4 \log x - \frac{1}{3} \log(x^2+1) + 2 \log(x-1)$
 $\log_4(y+1)^{\frac{1}{2}} - \log_4(y-1)^{\frac{1}{2}}$ $\log x^4 - \log(x^2+1)^{\frac{1}{3}} + \log(x-1)^2$
 $\log_4 \frac{(y+1)^{\frac{1}{2}}}{(y-1)^{\frac{1}{2}}}$ $\log \frac{x^4(x-1)^2}{(x^2+1)^{\frac{1}{3}}}$
 $\log_4 \sqrt{\frac{y+1}{y-1}}$

⑩ $\log(10^{27}x) - \log(x) = \log\left(\frac{10^{27}x}{x}\right)$
 $= \log(10^{27}) = 27$

⑩ $\log\left(\frac{1}{100}e\right) - \log(e) = \log\left(\frac{\frac{1}{100}e}{e}\right)$
 $= \log\left(\frac{1}{100}\right) = -2$

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- 7.) A) Fake C) True E) Fake G) False
B) True D) False F) False H) True

17) A) $\log(xy)^{10}$ B) $\log 5 \left(\frac{x^2}{y^2} \right)$
 $\log x^{10} + \log y^{10}$

23) A) $\frac{1}{2} \log(y+1) - \frac{1}{2} \log(y-1)$
 $\log(y+1)^{1/2} - \frac{1}{2} \log y$

7. a) False

b) True

c) True

d) False

e) False

f) True

g) False

h) True

17. a) $10 \log x + 10 \log y$

b) $2 \log_5 x + (3 \log_5 y + 3 \log_5 z)$

23. $\log_4 \frac{(y+1)^{1/2}}{(y-1)^{1/2}}$

b) $\log \left(\frac{x^4}{(x^2-1)^3} \right) + (x-1)^2$

$\log \left(\frac{x^4}{(x^2-1)^3} (x-1)^2 \right)$

26. $\log(10^{27} w) = \log(w)$

$= \log \left(\frac{10^{27} w}{w} \right)$

$= \log(10^{27}) = 27 \log 10$

32. $\log \left(\frac{1}{100A} \right) - \log(A)$

$= \log \left(\frac{1}{100A} \cdot \frac{1}{A} \right) = \log \left(\frac{1}{100} \right)$

7 A $\log\left(\frac{x}{y}\right) = \frac{\log x}{\log y}$ false

B true

C true

D false

E false

F false

G false

H true

17 A $\log(xy)^{10} = 10\log(x) + 10\log(y)$

B $\log_5\left(\frac{x^2}{yz^3}\right) = \log_5(x^2) - \log_5(yz^3)$
 $2\log_5(x) - (\log_5(y) + 3\log_5(z))$

23 $\frac{1}{2}\log_4(y+1) - \frac{1}{2}\log_4(y-1) = \log_4\left(\frac{y+1}{y-1}\right)^{1/2}$

4 $4\log x - \frac{1}{3}\log(x^2+1) + 2\log(x-1)$

$\log x^4 - \log(x^2+1)^{1/3} + \log(x-1)^2$

$\log\left(\frac{x^4}{(x^2+1)^{1/3}(x-1)^2}\right)$

26 $\log(10^{27} \cdot h) - \log(h) = \log\left(\frac{10^{27} \cdot h}{h}\right) = \log(10^{27}) = 27$

32 $\log(5) - \log(5 \cdot \frac{1}{100})$