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# QUIZ 1 (1.1-1.10)

Name:_____ Date: _____ Score: _____ 10 pts. possible

**1. Identify as rational or irrational.**

**a.** 0.315215 rational

**b.** $\sqrt{29}$ irrational

**Solve and/or simplify.**

**TEACHER KEY:**

**2.** $-\frac{1}{5}+\frac{3}{2}$

$-\frac{2}{10}+\frac{15}{10}=\frac{13}{10}$

**3.** $-\frac{7}{6}\div\frac{3}{5}$

$-\frac{7}{6}\cdot\frac{5}{3}=-\frac{35}{18}$

**4.** $\frac{9uv}{3vw}$

$\frac{{}^{3}\cancel{9}u\cancel{v}}{{}^{1}\cancel{3}\cancel{v}w}=\frac{3u}{w}$

**5.** $8r-3(2r-7)+4$

$8r-6r+21+4$

$2r+25$

**6.** $15y-5=6y+3-y$

$15y-5=5y+3$

$15y-5-5y=5y+3-5y$

$10y-5+5=3+5$

$\frac{10y}{10}=\frac{8}{10}$

$y=\frac{8}{10}=\frac{4}{5}$

**Write an equivalent expression without using negative exponents.**

**7.** $(-2x)^{-3}$

$\frac{1}{(-2x)^3}=\frac{1}{-8x^3}=-\frac{1}{8x^3}$

**Multiply and simplify.**

**8.** $(2a^{-3}b^{6})(3a^{5}b^{-2})$ $6a^{2}b^{4}$

**Multiply and write in scientific notation.**

**9.** $(3.0 \cdot 10^{6})(4.0 \cdot 10^{7})$ $12 \times 10^{13} = 1.2 \times 10^{14}$

**State the axiom or property that justifies the following statement:**

**10.** $\frac{5}{2}[a + (-b)] = \frac{5}{2}a + \frac{5}{2}(-b)$ axiom or property: Distributive Property

# TEST 12

Name:_____ Date: _____ Score: _____ 38 pts. possible

**Find equations for $f^{-1}(x)$ for the following. (3 pts. each)**

**TEACHER KEY:**

**1.** $f(x) = \frac{\sqrt{x+2}}{3}$

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

exchange: $x = \frac{\sqrt{y+2}}{3}$

Solve for $y$: $(3x)^2 = y + 2$

$y = 9x^2 - 2$

$f^{-1}(x) = 9x^2 - 2$

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**2.** $f(x) = 4x - 3$

$y = 4x - 3$

$x = 4y - 3$

$x + 3 = 4y$

$y = \frac{x+3}{4}$

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

**Convert the following to logarithmic equations. (2 pts. each)**

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**3.** $(1.2)^x = 15$

$\log_{1.2}(15) = x$

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**4.** $e^x = \frac{2}{3}$

$\log_e\left(\frac{2}{3}\right) = x$

$\ln\left(\frac{2}{3}\right) = x$

**Convert the following to exponential equations. (2 pts. each)**

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**5.** $\ln x = -5$

$e^{-5} = x$

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**6.** $\log_x 23 = 0.4$

$x^{(0.4)} = 23$

**Express the following as a single logarithm. Simplify, if possible. (2 pts. each)**

**7.** $\frac{1}{2}\log_a x - 7\log_a y + \log_a z$

$\log_a x^{\frac{1}{2}} - \log_a y^7 + \log_a z$

$\log_a \frac{\sqrt{x} \cdot z}{y^7}$ OR $\log_a \frac{z\sqrt{x}}{y^7}$

**8.** $\log_a x^2 - 2\log_a \sqrt{x}$

$\log_a x^2 - \log_a x$

$\log_a \frac{x^2}{x}$

$\log_a x$

**Express the following in terms of logarithms of *x*, *y*, and *z*. Simplify, if possible. (2 pts. each)**

**9.** $\log_a \sqrt[4]{\frac{xy}{z^3}}$

$\frac{1}{4}\log_a x + \frac{1}{4}\log_a y - \frac{3}{4}\log_a z$

**10.** $\log_2 8xy^4z^3$

$\log_2 8 + \log_2 x + 4\log_2 y + 3\log_2 z$

$3 + \log_2 x + 4\log_2 y + 3\log_2 z$

**Given $\log_a 3 = 2$, $\log_a 5 = 0.2$, and $\log_a 7 = -1$, find the following. (2 pts. each)**

**11.** $\log_a 45$

$2\log_a(3) + \log_a 5$

$2(2) + .2$

$4.2$

**12.** $\log_a \sqrt[3]{21}$

$\frac{1}{3}\log_a 3 + \frac{1}{3}\log_a 7$

$\frac{1}{3}(2) - \frac{1}{3}$

$\frac{1}{3}$

**Solve the following exponential and logarithmic equations. (2 pts. each)**

**13.** $\log x + \log(x - 3) = 1$

$\log x(x - 3) = 1$

$10^{\log x(x-3)} = 10^1$

$(x - 3)x = 10$

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

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

$x = 5$ ✓ ~~$x = -2$~~

**14.** $2^{x-1} = 8^x$

$(x-1)\log 2 = x\log 8$
$x\log 2 - x\log 8 = \log 2$
$x(\log 2 - \log 8) = \log 2$
$x = \dfrac{\log 2}{(\log 2 - \log 8)}$
$x = -.5$

**Easier**
$2^{x-1} = 2^{3x}$
$x - 1 = 3x$
$2x = -1$
$x = \dfrac{-1}{2}$

**15.** $3^x = 7$

$\log 3^x = \log 7$
$x\log 3 = \log 7$
$x = \dfrac{\log 7}{\log 3}$
$x = 1.771$

**16.** $\log x - \log(x+3) = -1$

$\log \dfrac{x}{(x+3)} = -1$
$\dfrac{x}{(x+3)} = \dfrac{1}{10}$
$10x = x + 3$
$9x = 3$
$x = \dfrac{1}{3}$

**Use common logarithms to find the following. (2 pts.)**

**17.** $\log_4 80$

$= \dfrac{\log 80}{\log 4}$
$= 3.161$

**Solve. (2 pts.)**

**18.** The population of a colony of cells growing exponentially in a culture is 300 after 2 minutes and 1400 after 5 minutes. Find $k$ in the growth formula and estimate the population of the colony after 20 minutes.

$P = P_o e^{kt}$
$\dfrac{1400}{300} = e^{3k}$
$\ln \dfrac{1400}{300} = 3k$
$k = .5135$

$P = 1400e^{(.5135)(15)}$
$\approx 3{,}099{,}000$

**Check:**
$P = 300e^{(.5135)(18)}$
$P = 3{,}100{,}000 \approx 3{,}099{,}000$