Unit IV Review – Exponential Functions June 13/14

1. An antique dresser was worth $560 in 1992. Each year, its value increased by 1.5%.

   a) Write an equation that models the value of the dresser as a function of the year after 1992.

   $$A = P(1+i)^n$$
   $$= 560(1+0.015)^n$$

   b) Determine the value of the dresser in 2000.

   $$A = 560(1.015)^8$$
   $$= 630.84$$

2. Simplify. Write your answer with positive exponents.

   a) $\dfrac{m^{-4}n^{-6}}{(mn^2)^{-0.4}}$

   $$= \frac{m^{-4}n^{-6}}{m^{-0.4}n^{-0.8}}$$
   $$= m^{-3.6}n^{-5.2}$$
   $$= \frac{1}{m^{3.6}n^{5.2}}$$

   b) $[(y^{-3})^5]^{\frac{2}{3}}$

   $$= y^{-3 \cdot 5 \cdot \frac{2}{3}}$$
   $$= y^{-10}$$
   $$= \frac{1}{y^{10}}$$

3. Complete the table.

Exponential Form	Radical Form	Evaluation
$81^{\frac{3}{4}}$	$\left(\sqrt[4]{81}\right)^3$	27
$121^{-\frac{3}{2}}$	$\left(\sqrt{121}\right)^{-3}$	$11^{-3} = \dfrac{1}{11^3} = \dfrac{1}{1331}$
$625^{0.25} = \frac{1}{4}$	$\sqrt[4]{625}$	5

$$a^{\frac{m}{n}}$$
$$= \left(\sqrt[n]{a}\right)^m$$
$$= \sqrt[n]{a^m}$$

1

4. Evaluate. Express your answers in the form $\frac{a}{b}$.

a) $\left(\sqrt[4]{\dfrac{81}{625}}\right)^{-3}$

$= \left(\dfrac{3}{5}\right)^{-3}$

$= \left(\dfrac{5}{3}\right)^{3}$

$= \dfrac{125}{27}$

b) $\left(\dfrac{-2\sqrt[3]{-64}}{\sqrt{64}}\right)^{\frac{1}{2}}$

$= \left(\dfrac{-2(-4)}{8}\right)^{\frac{1}{2}}$

$= \left(\dfrac{8}{8}\right)^{\frac{1}{2}}$

$= 1^{\frac{1}{2}}$

$= 1$

Unit V Review – ~~Trigonometry~~

1. Given the following, determine all values of θ, to the nearest degree, if $0° \le \theta \le 360°$.

a) $\cot\theta = \dfrac{8}{5}$ RAA $\approx 32°$

$\theta \doteq 32°$

or

$\theta \doteq 212°$

b) $\sec\theta = -\dfrac{12}{5}$ RAA $\approx 65°$

cos⁻¹(5/12)
       65.37568165

$\theta \doteq 115°$

or

$\theta \doteq 245°$

2. For the triangle below, calculate the length of GF and DG to the nearest 10th of a cm. Diagram not to scale.
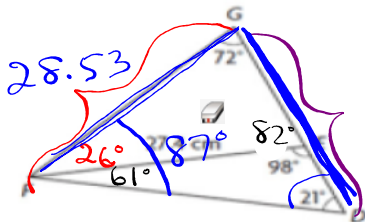
28.53

$\angle GFD = 180° - 72° - 21°$
$= 87°$

$\angle EFD = 180° - 98° - 21°$
$= 61°$

$\angle GFE = 26°$

$\angle GEF = 180° - 98°$
$= 82°$

$\dfrac{GF}{\sin 82°} = \dfrac{27.4}{\sin 72°}$
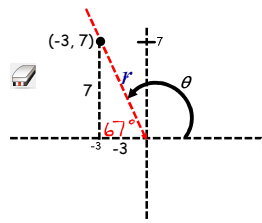
$GF \doteq 28.53$

$\dfrac{DG}{\sin 87°} = \dfrac{28.53}{\sin 21°}$

$DG \doteq 79.5$

3. Given the coordinates: (-3, 7) on the terminal arm of angle θ.

i) State the value θ to the nearest degree if $0° \le \theta \le 360°$ and sketch the angle.

(-3, 7)

67°

ii) Determine the value of r to the nearest tenth of a unit.

$$r^2 = (7)^2 + (-3)^2$$
$$r^2 = 58, \quad r > 0$$
$$r = \sqrt{58}$$
$$r \doteq 7.6$$

iii) State the primary trig ratios of θ.

$$\sin\theta = \frac{7}{\sqrt{58}}$$
$$\cos\theta = \frac{-3}{\sqrt{58}}$$
$$\tan\theta = -\frac{7}{3}$$

iv) State the reciprocal trig ratios of θ.

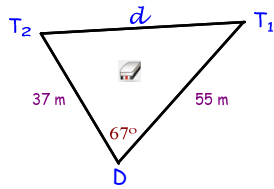$$\csc\theta = \frac{\sqrt{58}}{7}$$
$$\sec\theta = -\frac{\sqrt{58}}{3}$$
$$\cot\theta = -\frac{3}{7}$$

v) Find the value of θ, correct to the nearest degree.

$$RAA \doteq 67°$$
$$\theta = 113°$$

4. From one side of a river, David sees two trees on the opposite side. The distance from David to one tree is 55 m and from David to the other tree is 37 m. The angle between the two trees from David's perspective is 67°. How far apart are the tress, to the nearest metre?

T_2 d T_1

37 m   55 m

67°

D

$$d^2 = (t_1)^2 + (t_2)^2 - 2(t_1)(t_2)\cos D$$
$$= (55)^2 + (37)^2 - 2(55)(37)\cos 67°$$
$$d \doteq 53$$

∴ the trees are 53 m apart.