

HW 2 Solutions

1. a) $\frac{3}{32}$ of a beat c) 2 beats
 b) $\frac{31}{32}$ of a beat d) $\frac{5}{12}$ beat ($\frac{1}{3} \cdot [1 + \frac{1}{4}] = \frac{5}{12}$) ✓

$$2. (1 + r + r^2 + \dots + r^m) \cdot (1 - r) = 1 + r + r^2 + \dots + r^m - (r + r^2 + \dots + r^m + r^{m+1})$$

$$= 1 + \underbrace{r - r}_{0} + \underbrace{r^2 - r^2}_{0} + \dots + \underbrace{r^m - r^m}_{0} - r^{m+1}$$

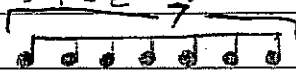
$$= 1 - r^{m+1}$$

∴ if we divide both sides by $(1 - r)$ we have:

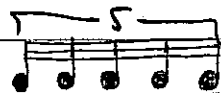
$$1 + r + r^2 + \dots + r^m = \frac{1 - r^{m+1}}{1 - r} \text{ assuming } r \neq 1 \quad ✓$$

This relates to dot notation in music because when we dot a note we increase its duration by half the original (e.g. if a note has duration d , then dotted it has duration $d[1 + \frac{1}{2}]$), and each additional dot add half the previous addition to the duration (e.g. a 3-dotted note of original duration d has duration $d[1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8}]$). Thus we find that, for the above geometric series, $r = \frac{1}{2}$ and an m -dotted note has a duration multiplied by $(\frac{1 - r^{m+1}}{1 - r})$. ✓

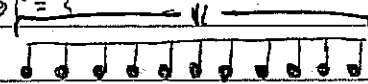
3. a) half note = $\frac{1}{2}$ th note ($n=1$); $k=7$ $2^2 < 7 < 2^3 \rightarrow r=2$ ✓

so want 7 $\frac{1}{2}$ th notes = eighth note 7-tuplet 


- b) $\frac{1}{8}$ th note = $\frac{1}{2^3}$ ($n=3$); $k=5 \rightarrow 2^2 < 5 < 2^3 \rightarrow r=2$




so want 5 $\frac{1}{2^3}$ th notes = thirty-second notes 5-tuplet 

- c) whole note = $\frac{1}{2^0}$ th note ($n=0$); $k=11$ $2^3 < 11 < 2^4 \rightarrow r=2$

so want 11 $\frac{1}{2^3}$ th notes = eighth note 11-tuplets 

In 4 time: a)  = 1 beat (quarter note)

b)  = 2 beats (half note) ✓

4) a) $\frac{3}{4}$  | b) $\frac{4}{4}$  | c) $\frac{9}{8}$  ✓

original: A^b E^b G A^b C E^b



5a) diatonic (up one scale tone); not chromatic 5b) diatonic (up 3 scale tones) & chromatic (up 5 steps) 5c) chromatic (up a minor third); not diatonic

B^b F A^b B^b D^b F D^b A^b C D^b F A^b B G^b B^b B E^b G^b

6) form: AABA

also rhythmic

- melodic translation: meas. 1-6, 9-14, & 25-31
- melodic & rhythmic translation: meas. 9-16 & 25-32
- diatonic transposition shown in meas. 2, 3, & 4
- diatonic transposition in beat 4 of 18 through beats 3 of 21

- 7) a. G
b. D⁷
c. A⁺
d. G^{m7}
e. II^{m7}
f. V⁷
g. VII^{o7}
h. I



8) a) E^bm⁷ b) D dim c) G^b d) C^{#7}

9) a) E^b7 b) E^bm⁷ c) A^{aug} d) G^b

8) See staff paper

9) See staff paper

- 10) a. minor chord
b. Seventh chord
c. full diminished 7
d. Minor 7
e. Seventh chord
a. Seventh chord
b. Minor chord
c. Seventh chord
d. Seventh chord
e. Seventh chord

