

HLi quiz practice

$$(1) (a) u_7 = u_3 + 4d$$

$$40 = 16 + 4d$$

$$24 = 4d$$

$$\underline{\underline{6 = d}}$$

$$(2) (a) u_4 = u_2 \cdot r^2$$

$$\frac{1}{16} = 16r^2$$

$$\frac{1}{16^2} = r^2$$

$$\underline{\underline{\frac{1}{16} = r}}$$

$$(3) (a) d = 66 - 75 = -9$$

$$u_n = u_1 + (n-1)d$$

$$-375 = 75 + (n-1)(-9)$$

$$-450 = (n-1)(-9)$$

$$50 = n-1$$

$$\underline{\underline{51 = n}}$$

$$(b) u_3 = u_1 + 2d$$

$$16 = u_1 + 2(6)$$

$$\underline{\underline{4 = u_1}}$$

$$(b) u_2 = u_1 \cdot r$$

$$16 = u_1 \cdot \frac{1}{16}$$

$$16^2 = u_1$$

$$\underline{\underline{u_1 = 256}}$$

$$(b) S_n = \frac{n}{2}(u_1 + u_n)$$

$$S_{51} = \frac{51}{2}(75 + -375)$$

$$= \frac{51}{2}(-300)$$

$$= 51(-150)$$

$$= \underline{\underline{-7650}}$$

$$\begin{array}{r} 150 \\ 51 \\ \hline 150 \\ 750 \\ \hline 7650 \end{array}$$

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$$r = \frac{\frac{p^{14/3}}{q^{17/2}}}{\frac{p^4}{q^7}} = \frac{p^{14/3} q^{14/2}}{q^{17/2} p^{12/3}} = \frac{p^{2/3}}{q^{3/2}}$$

$$u_{40} = u_1 r^{39} = \frac{p^4}{q^7} \left(\frac{p^{2/3}}{q^{3/2}} \right)^{39} = \frac{p^4}{q^7} \cdot \frac{p^{26}}{q^{107/2}} = \frac{p^{30}}{q^{131/2}}$$

5) $d = (7a - 5b) - (3a - 4b) = 4a - b$

$$\begin{aligned} S_{10} &= \frac{10}{2} (2(3a - 4b) + (10 - 1)(4a - b)) \leftarrow \\ &= 5(6a - 8b + 36a - 9b) \\ &= 5(42a - 17b) \\ &= \underline{210a - 85b} \end{aligned}$$

$$S_n = \frac{n}{2} (2u_1 + (n-1)d)$$

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$$S_{10} = \frac{u_1 (1 - r^{10})}{1 - r} = \frac{128 (1 - (\frac{1}{2})^{10})}{1 - \frac{1}{2}}$$

$$= 256 \left(\frac{2^{10} - 1}{2^{10}} \right) = 2^8 \left(\frac{1023}{2^{10}} \right) = \frac{1023}{4}$$

