Decimals

Problems about decimal numbers.

Problem 1 *On the number line below, a point is marked A. Select all options which could be candidates for the value of A.*

Select All Correct Answers:

(a) 3.6278 ✓

(b) 3.627783 ✓

(c) 3.68

(d) 3.62788983 ✓

(e) 3.629

Problem 2 *Select all fractions below which have terminating decimal representation.*

Select All Correct Answers:

(a) $\frac{1}{10}$ ✓

(b) $\frac{1}{30}$

(c) $\frac{1}{80}$ ✓

(d) $\frac{1}{64}$ ✓

(e) $\frac{1}{125}$ ✓

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(f) $\dfrac{1}{250}$ ✓

(g) $\dfrac{1}{385}$

(h) $\dfrac{1}{2048}$ ✓

(i) $\dfrac{1}{4228}$

(j) $\dfrac{1}{2^{19} \times 5^{47}}$ ✓

Problem 3 *A harder version of the previous problem: select all fractions below which have terminating decimal representation.*

Select All Correct Answers:

(a) $\dfrac{14}{10}$ ✓

(b) $\dfrac{6}{30}$ ✓

(c) $\dfrac{4}{60}$

(d) $\dfrac{7}{98}$

(e) $\dfrac{11}{125}$ ✓

(f) $\dfrac{3}{150}$ ✓

(g) $\dfrac{11}{385}$

(h) $\dfrac{2}{2049}$

(i) $\dfrac{1057}{4228}$ ✓

(j) $\dfrac{3^4 \times 7^{11} \times 19}{3^2 \times 5^{22} \times 19}$ ✓

Hint: *Don't forget to reduce the fractions to lowest terms!*

Problem 4 *Give an example of an irrational number. For a challenge, don't pick π, e, or $\sqrt{p}$ where p is prime.*

Free Response: ***Hint:*** *One of my favorites is* $0.01001000100001000001\ldots$. *This number's decimal representation is neither terminating nor repeating, though it* does *have a pattern!*

Problem 5 *Without doing the long division, after how many places would you expect* $\dfrac{1}{47}$ *to repeat?*

We expect the repetition to occur after at most $\underset{\text{given}}{\boxed{46}}$ *places.*

Problem 6 *Without doing the long division, after how many places would you expect* $\dfrac{3}{104}$ *to repeat?*

We expect the repetition to occur after at most $\underset{\text{given}}{\boxed{103}}$ *places.*

Problem 7 *Write each of the following decimals as a fraction. Enter your answer as a single fraction reduced to lowest terms.*

(a) $0.\overline{215} = \dfrac{\boxed{215}}{\boxed{999}}$

(b) $0.0\overline{317} = \dfrac{\boxed{317}}{\boxed{9990}}$

(c) $0.\overline{0317} = \dfrac{\boxed{317}}{\boxed{9999}}$

(d) $0.16\overline{23} = \dfrac{\boxed{1607}}{\boxed{9900}}$

Problem 8 *We have seen that* $0.\overline{9} = 1$. *Using these same ideas we saw in that argument, what are the following numbers equal to?*

(a) $1.\overline{9} = \boxed{2}$

(b) $0.5\overline{9} = \boxed{0.6}$

(c) $2.34\overline{9} = \boxed{2.35}$

(d) $0.87893\overline{9} = \boxed{0.87894}$