Working with Numbers

Questions

Number Types

Exponents & Radicals

Number Types

Q1) Determine what type each of the following numbers are. Note that some numbers could fall into more than one category.

a) 2

b) 4.567

c) π

d) $\frac{3}{5}$

e) $\sqrt{5}$

f) 4.1

g) $3+\sqrt{16}$

h) 3π

i) $\frac{1}{\sqrt{3}}$

Q2) Write two examples of the following types of number:

Real number, natural number, integer, rational number, irrational number.

Q3) Write five elements of the following sets using set notation. If you can write five elements in order (for example, 3, 4, 5 . . .) do so.

a) Integers

b) Natural numbers

c) Rational numbers

d) Real numbers

Q4) For each of the sets you created in Q3 write a subset containing three elements.

Q5) Draw a Venn diagram to represent the following sets.

a) $A=\{2,4,6\}$

b) $B=\{a,b,c,d\}$

c) $E=\{-2,-5,-8\}$

d) $F=\{a,e,f,h\}$

Q6) For the sets in Q5 write the following using set notation.

a) $A \cup B$

b) $A \cup E$

c) $B \cup E$

d) $E \cup F$

Q7) Identify the elements which are in the intersection of the following pairs of sets.

a) $A = \{2, 4, 6, 8, 10\}$ and $B = \{8, 10, 12, 14, 16\}$

b) $E = \{a, b, e, f, h\}$ and $F = \{a, 10, c, 5, h\}$

Exponents & Radicals

Q1) Use exponent rules to evaluate the following.

a) $a^3 \; x \; a^2$

b) $a^0 \div a^{-2}$

c) $(b^2)^3$

d) $\frac{1}{4^{-2}}$

e) $2^3 \; x \; 2^{-4} \; x \; 2^5$

f) $a^2 \; x \; a^3 \div a^{-5}$

Q2) Simplify the following writing your answer with a positive exponent where possible.

a) $4^4 \div 4^2$

b) $7^0 x \; 7^{-4}$

c) $(4^{-2})^{-3}$

d) $\frac{3}{3^{-4}}$

e) $(3a)^2$

f) $(2m^3)^2$

Q3) Evaluate the following.

a) $8^{\frac{1}{3}}$

b) $9^{\frac{3}{2}}$

c) $25^{\frac{3}{2}}$

d) $16^{\frac{3}{4}}$

e) $4^{-\frac{3}{2}}$

f) $25^{-\frac{3}{2}}$

Q4) Simplify the following surds.

a) $\sqrt{27}$

b) $\sqrt{52}$

c) $\sqrt{12}$

d) $\sqrt{63}$

e) $3\sqrt{10} + 2\sqrt{10}$

f) $\sqrt{27} + \sqrt{12}$

g) $2\sqrt{27} - \sqrt{27}$

h) $4\sqrt{8} - 2\sqrt{18}$

Q5) Evaluate the following.

a) $\sqrt{3} \times \sqrt{5}$

b) $\sqrt{50} \times \sqrt{2}$

c) $\sqrt{4} \times \sqrt{9}$

d) $\sqrt{27} \times \sqrt{3}$

e) $\sqrt{16} \times \sqrt{3}$

f) $\sqrt{2} \times \sqrt{5} \times \sqrt{10}$

g) $\sqrt{3} \times \sqrt{4} \times \sqrt{3}$

h) $\sqrt{9} \times \sqrt{16}$

Q6) Write the following fractions with a rational denominator.

a) $\frac{1}{\sqrt{5}}$

b) $\frac{2}{\sqrt{3}}$

c) $\frac{1}{2\sqrt{3}}$

d) $\frac{2}{3\sqrt{5}}$

e) $\frac{2}{\sqrt{2}}$

f) $\frac{3}{4\sqrt{3}}$