Problem (1) [10 points] Write the formula
\[ d = \frac{1}{7} + \sqrt{a^4 + b^4} \]
as a C++ statement. Assume all the variables involved have already been declared to be of type double, any needed libraries have been included, etc.: all you need to do is write the C++ statement that does the calculation in the formula.

\[ d = 1.0/7 + sqrt(a*a*a*a + pow(b,4)); \]

Problem (2) [10 points] Assume \( r \), \( g \), and \( b \) are ints that have already been declared.
(a) The following C++ code fragment, which is complete except for the \textbf{if}-condition, should print out "Off by 1" if \( r \) is exactly one less than \( g \), or \( r \) is exactly 1 less than \( b \).

\[
\text{if ( // condition missing } \\
\quad \text{cout } << \text{"Off by 1" } < < \text{endl;} \\
\]

Write the C++ for the missing condition here:

\[ \text{if}(r == g-1 || r == b-1) \]
(b) Suppose $r=10$, $g=10$, and $b=20$. Does the following logical expression evaluate to **true** or **false**? Circle the correct answer below, and show enough work to indicate how you obtained your answer.

$$(! (r == b)) || ((r < g) && (g < b))$$

Answer:

**true**

```plaintext
r=10, g=10, b=20
(! (r == b)) || ((r < g) && (g < b))
(! (10 == 20)) || ((10 < 10) && (10 < 20))
(! (false)) || ((false) && (true))
(true) || (false)
true
```

**Problem (3) [10 points]** Suppose $d$ and $e$ are ints, and consider the following code:

```plaintext
if (d/10 == e/10 || d%10 == e%10)
    cout << "Meets condition" << endl;
else
    cout << "Does not meet condition" << endl;
```

For each of the three cases below, circle whether the code would output "**Meets condition**" or "**Does not meet condition**".

(a) $d = 12$, $e = 82$

**Meets condition**

```plaintext
(d/10 == e/10 || d%10 == e%10)
(12/10 == 82/10 || 12%10 == 82%10)
(true || true)
ture
```

(b) $d = 22$, $e = 253$

**Does not meet condition**

```plaintext
```
problem (4) [10 points] Find 3 possible places for errors in the following code. Explain specifically what causes the error and whether it is a syntax, runtime or logic error:

```c
int main()
{
    cin << x;
    if (x < '10');
    {
        cout << "x is less than 10\n";
    }
    return 0;
}
```

Any 3 of these 4:
1. cin << x;
x has not been declared. Syntax error

2. cin << x;
Inequality symbols going the wrong way, should be cin >> x. Syntax error.

3. if (x < '10');
'10' is two characters and not one. If x is an int/double should be: if (x < 10). Syntax error.

4. if (x < '10');
Semi colon after if statement, so even if x is 22 (assumed x is type int) the cout statement would run. Logic error.

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