

Solutions.

Name: _____

This quiz is worth 66 points. There are 8 questions and you have 30 minutes to complete them. Attempt all questions and show all *necessary* work. Do not just word vomit. If you get stuck and cannot answer a question, write down, using words, what you would *like* to do and you may receive partial credit. Any questions, just ask. Calculators are **not** allowed.

1. (8 points) Give an example of each of the following:

(a) A natural number

Answer: 1

(b) An integer that is not a natural number

Answer: -2

(c) A rational number that is not an integer

Answer: $\frac{1}{2}$

(d) An irrational number

Answer: $\sqrt{2}$ 2. (6 points) Evaluate the arithmetic expression: $-2 + \left[3 \cdot 6 - 5 \left(3 - \frac{1}{5} \right) \right]$

$$= -2 + [18 - (15 - 1)]$$

$$= -2 + [18 - 14]$$

$$= -2 + 4$$

Answer: 2

3. (8 points) Expand the expression:

(a) $3(x + 7)$

$$= 3 \cdot x + 3 \cdot 7$$

Answer: $3x + 21$

(b) $-3c(6ab - 5bd)$

$= -3c \cdot 6ab - 3c \cdot (-5bd)$

Answer: $-18abc + 15bcd$

4. (6 points) Decide which symbol (<, > or =) should go in the space

(a) $3 < \frac{7}{2}$

(b) $\frac{2}{3} \overset{=}{<} \text{or } 0.67$

(c) $3.5 = \frac{7}{2}$

5. (6 points) Find the indicated set if $A = \{1, 2, 3, 4, 5, 6, 7\}$, $B = \{2, 4, 6, 8\}$ and $C = \{7, 8, 9, 10\}$:

(a) $A \cup B$

Answer: $\{1, 2, 3, 4, 5, 6, 7, 8\}$

(b) $A \cap C$

Answer: $\{7\}$

(c) $B \cup C$

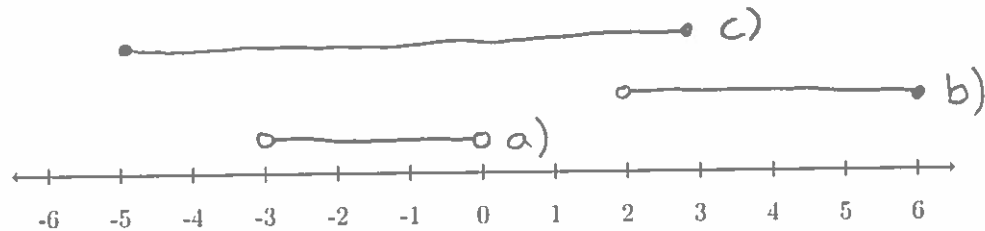
Answer: $\{2, 4, 6, 7, 8, 9, 10\}$

6. (9 points) Using the number line below, graph the following intervals. Clearly label which is which.

(a) $(-3, 0)$

(b) $(2, 6]$

(c) $[-5, 3]$



7. (11 points) Fill in the table below:

$a^m a^n = a^{m+n}$	$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$	$a^{1/2} = \sqrt{a}$
$\frac{a^m}{a^n} = a^{m-n}$	$a^0 = 1$	$a^{1/n} = \sqrt[n]{a}$
$(a^m)^n = a^{mn}$	$a^{-1} = \frac{1}{a}$	$a^{m/n} = \sqrt[n]{a^m}$
$(ab)^n = a^n b^n$	$a^{-n} = \frac{1}{a^n}$	

8. (12 points) Factor the following expressions.

(a) $x^2 - 36 = x^2 - 6^2$

Answer: $(x-6)(x+6)$

(b) $3x^3 - x^2 + 6x - 2$

$$= (3x^3 - x^2) + (6x - 2)$$

$$= x^2(3x - 1) + 2(3x - 1)$$

Answer: $(x^2+2)(3x-1)$

(c) $8x^2 + 10x + 3$

$$8 \cdot 3 = 24 = 4 \times 6$$

$$= (8x^2 + 4x) + (6x + 3)$$

$$= 4x(2x + 1) + 3(2x + 1)$$

Answer: $(4x+3)(2x+1)$

