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Math 10C

Name: KEY

Review #1

Date: _____

Show all your work for full marks.

1. Which of these numbers is irrational? Mark as either Q or Q above each radical or number. (2 marks)

\overline{Q} \overline{Q} \overline{Q} Q \overline{Q}
 $\sqrt{48}$, $\sqrt[3]{216}$, $\sqrt{\frac{49}{16}}$, -68 , $\sqrt[3]{51}$

2. Write each radical in simplest form. (1 mark each)

a. $\sqrt{108}$
 $\sqrt{36 \cdot 3}$
 $6\sqrt{3}$

b. $\sqrt[3]{384}$
 $\sqrt[3]{64 \cdot 6}$
 $4\sqrt[3]{6}$

3. Write each mixed radical to an entire radical. (1 mark each)

a. $3\sqrt[3]{4}$
 $\sqrt[3]{4 \times (3)^3}$
 $\sqrt[3]{4 \times 27}$
 $\sqrt[3]{108}$

b. $6\sqrt{5}$
 $\sqrt{5 \times (6)^2}$
 $\sqrt{5 \times 36}$
 $\sqrt{180}$

4. Evaluate and show the steps. (2 marks each)

a. $\left(\frac{2}{3}\right)^{-3}$
 $\left(\frac{3}{2}\right)^3$

b. $(-64)^{\frac{2}{3}}$
 $\left(\sqrt[3]{-64}\right)^2$
 $(-4)^2$
 16

$\frac{27}{8}$

5. Simplify. Write using powers with positive exponents.

a. $\frac{12p^3q^{-7}}{15pq^6}$

$\frac{4p^2q^{-13}}{5}$

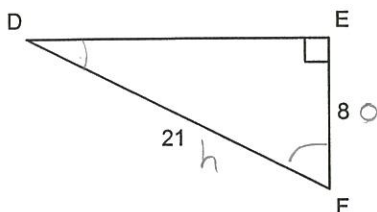
$\frac{4p^2}{5q^{13}}$

b. $(6x^4y^7)(2x^{-5}yz^2)$

$12x^{-1}y^8z^2$

$\frac{12y^8z^2}{x}$

6. Solve the following triangles for all missing sides and angles. (10 marks)



$(21)^2 - (8)^2 = f^2$

$441 - 64 = f^2$

$377 = f^2$

$\sqrt{377} = f$

$19.4 = f$

$\cos \theta = \frac{a}{h}$

$\sin \theta = \frac{8}{h}$

$\cos \angle F = \frac{8}{21}$

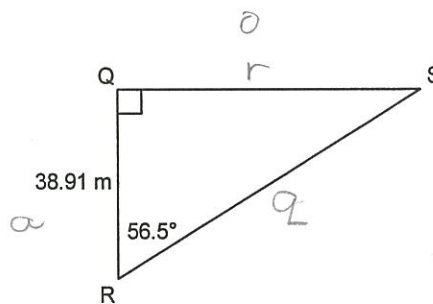
$\sin \theta = \frac{8}{21}$

$\cos^{-1}\left(\frac{8}{21}\right)$

$\angle F = 68^\circ$

$\sin^{-1}\left(\frac{8}{21}\right)$

$\angle D = 22^\circ$



$\angle S = 180^\circ - (90^\circ + 56.5^\circ)$
 $\angle S = 33.5^\circ$

$\tan \theta = \frac{r}{a}$

$\cos \theta = \frac{a}{h}$

$\tan 56.5^\circ = \frac{r}{38.91}$

$\cos 56.5^\circ = \frac{38.91}{q}$

$r = 38.91 \times \tan 56.5^\circ$
 $r = 58.8 \text{ m}$

$q = \frac{38.91}{\cos 56.5}$

$q = 70.5$

7. Expand the following: (10 marks)

a. $(9x+1)(-5x+3)$

$$-45x^2 + 27x - 5x + 3$$

$$-45x^2 + 22x + 3$$

b. $3(2x+1)(x-10)$

$$(6x+3)(x-10)$$

$$6x^2 - 60x + 3x - 30$$

$$6x^2 - 57x - 30$$

c. $(6x+2)(4x^2-5x+7)$

$$24x^3 - 30x^2 + 42x + 8x^2 - 10x + 14$$

$$24x^3 - 22x^2 + 32x + 14$$

d. $(2x+3)(x-9) - (4x+5)(2x-1)$

$$2x^2 - 18x + 3x - 27 - [8x^2 - 4x + 10x - 5]$$

$$2x^2 - 15x - 27 - [8x^2 + 6x - 5]$$

$$2x^2 - 15x - 27 - 8x^2 - 6x + 5$$

$$-6x^2 - 21x - 22$$

e. $(2x+3)^2$

$$(2x+3)(2x+3)$$

$$4x^2 + 6x + 6x + 9$$

$$4x^2 + 12x + 9$$

8. Factor the following: (11 marks)

a. $x^2 - 13x + 12$ $\begin{matrix} \times 12 \\ + 13 \end{matrix}$ 12, 1

λ $\begin{array}{l} x^2 - 12x \quad | \quad -1x + 12 \\ x(x-12) \quad | \quad -1(x-12) \\ \hline (x-1)(x-12) \end{array}$

b. $x^2 - 2x - 24$ $\begin{matrix} \times 24 \\ - 2 \end{matrix}$ -6, +4

λ $\begin{array}{l} x^2 - 6x \quad | \quad +4x - 24 \\ x(x-6) \quad | \quad +4(x-6) \\ \hline (x+4)(x-6) \end{array}$

c. $4x^2y^5 - 16xy^3 + 8x^4y^2$ GCF: $4xy^2$

| $4xy^2(xy^3 - 4y + 2x^3)$

d. $15x^3 - 20x^2 - 30x$ GCF: $5x$

| $5x(3x^2 - 4x - 6)$

e. $4x^2 + 4x - 24$ GCF: 4

λ $\begin{array}{l} 4(x^2 + x - 6) \quad \begin{matrix} \times 6 \\ - 1 \end{matrix} \quad 3, -2 \\ \begin{array}{l} x^2 + 3x \quad | \quad -2x - 6 \\ x(x+3) \quad | \quad -2(x+3) \\ \hline 4(x-2)(x+3) \end{array} \end{array}$

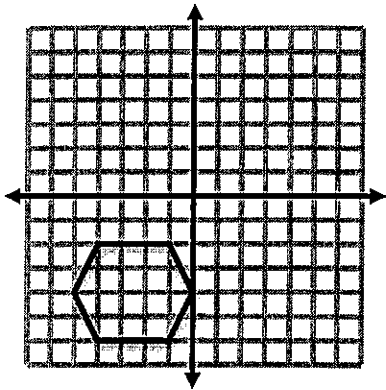
f. $9c^2 - 12c + 4$ $\begin{matrix} \times 36 \\ + 12 \end{matrix}$

λ $\begin{array}{l} 9c^2 - 6c \quad | \quad -6c + 4 \\ 3c(3c-2) \quad | \quad -2(3c-2) \\ \hline (3c-2)(3c-2) \end{array}$ -6, -6

g. $36x^2 - 49$

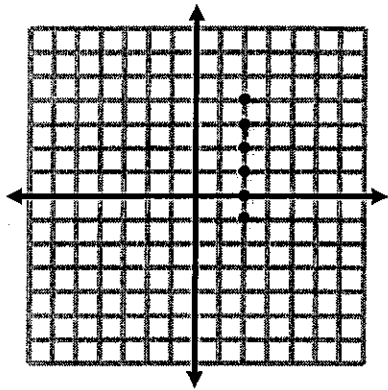
| $(6x-7)(6x+7)$

9. Write the domain and range for each graph and state whether it is a function. (3 marks each)



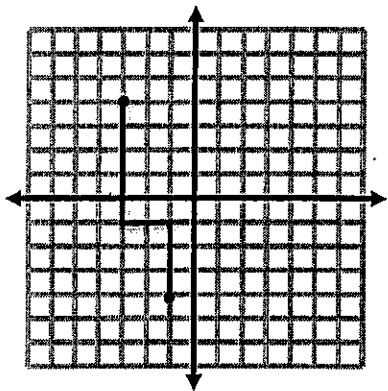
$$D: \{-5 \leq x \leq 0\}$$
$$R: \{-6 \leq y \leq -2\}$$

No, $f(x)$



$$D: \{2\}$$
$$R: \{-1, 0, 1, 2, 3, 4\}$$

No, $f(x)$



$$D: \{-3 \leq x \leq -1\}$$
$$R: \{-4 \leq y \leq 4\}$$

No, $f(x)$

10. Given the $f(x) = 2x - 1$, determine the following: (2 marks each)

$$\text{a. } f(-4) = 2(-4) - 1$$

$$f(-4) = -8 - 1$$

$$f(-4) = -9$$

$$\text{b. } f(0) = 2(0) - 1$$

$$f(0) = -1$$

$$\text{c. } f(x) = 0$$

$$0 = 2x - 1$$
$$+1 \quad +1$$

$$1 = 2x$$
$$\frac{1}{2} \quad \frac{1}{2}$$

$$\frac{1}{2} = x$$

$$\text{d. } f(x) = 9$$

$$9 = 2x - 1$$
$$+1 \quad +1$$

$$10 = 2x$$
$$\frac{10}{2} \quad \frac{2x}{2}$$

$$5 = x$$