

4pts 1. Evaluate $(5x - 7)^2 + 3x + 7$ when $x = 2$

$$3^2 + 6 + 7 = \boxed{22}$$

4pts 2. Write in roster form $A = \{x/x \text{ is a whole number less than nine}\}$

$$A = \{0, 1, 2, 3, 4, 5, 6, 7, 8\}$$

4pts 3. Evaluate $|27 - 35| + |5|$

$$8 + 5 = \boxed{13}$$

5pts 4. Simplify using positive exponents

$$\frac{x^{24}y^{21}z^{12}}{(x^5y^6z^3)^4} \div \frac{y^{11}z^{15}}{x^6z^{15}}$$

$$\frac{x^{24}y^{21}z^{12}}{x^{20}y^{24}z^{12}} \cdot \frac{x^6z^{15}}{y^{11}} = \boxed{\frac{x^{10}z^{15}}{y^{14}}}$$

4pts 5. Write the following in scientific notation: 5,321,000

$$\boxed{5.321 \times 10^6}$$

4pts 6. Simplify the following:

$$\sqrt{\frac{16}{25}} = \boxed{\frac{4}{5}}$$

5pts 7. Simplify the following:

$$\sqrt[3]{x^8y^{10}z^{-6}} \sqrt[3]{x^{10}y^5z^{30}} = \sqrt[3]{x^{18}y^{15}z^{24}} = \boxed{x^6y^5z^8}$$

6pts 8. Evaluate the following (3pts each)

a) $16^{3/4}$
 $(\sqrt[4]{16})^3 = 2^3 = \boxed{8}$

b) $125^{2/3}$
 $(\sqrt[3]{125})^2 = 5^2 = \boxed{25}$

4pts 9. Rationalize the denominator and simplify

$$\frac{11x}{\sqrt{10} - \sqrt{3}} \left(\frac{\sqrt{10} + \sqrt{3}}{\sqrt{10} + \sqrt{3}} \right)$$

$$\boxed{\frac{11x(\sqrt{10} + \sqrt{3})}{7}}$$

4pts 10. Simplify $(7x^4 + 5x^2)(8x^3 + 9x - 4)$

$$56x^7 + 40x^5 + 63x^5 + 45x^3 - 20x^2 - 28x^4$$

$$56x^7 + 103x^5 - 28x^4 + 45x^3 - 20x^2$$

8 pts 11. Factor completely (4pts each)

a) $3x^8 - 192x^5$

$$3x^5(x^3 - 64)$$

$$3x^5(x-4)(x^2+4x+16)$$

b) $16x^4 - 256$

$$16(x^4 - 16)$$

$$16(x^2 - 4)(x^2 + 4)$$

$$16(x-2)(x+2)(x^2+4)$$

5pts 12. Simplify: $\frac{\left(\frac{x^2 - 8x + 12}{x^2 - 36}\right)}{\left(\frac{x^2 - 2x - 8}{x^2 + 11x + 30}\right)}$

$$\frac{(x-2)(x-6)}{(x-6)(x+6)}$$

$$\frac{(x+5)(x+6)}{(x-4)(x+2)}$$

$$= \frac{(x-2)(x+5)}{(x-4)(x+2)}$$

4pts 13. Solve $5(3x - 7) + 2x = 8x + 1$

$$15x - 35 + 2x = 8x + 1$$

$$9x = 36$$

$$x = 4$$

4pts 14. Solve: $\left|\frac{2x-3}{5}\right| = 7$

$$\frac{2x-3}{5} = -7 \quad 2x-3 = -35$$

$$x = -16$$

$$\frac{2x-3}{5} = 7$$

$$2x-3 = 35$$

$$x = 19$$

4pts 15. Solve $2x^2 + 7x = 15$ by factoring

$$2x^2 + 7x - 15 = 0$$

$$(2x-3)(x+5) = 0$$

$$x = \frac{3}{2} \text{ or } -5$$

4pts 16. Solve $10x^2 - 33x - 7 = 0$ by using the quadratic formula

$$x = \frac{33 \pm \sqrt{33^2 - 4(10)(-7)}}{20} = \frac{33 \pm \sqrt{1369}}{20} = \frac{33 \pm 37}{20}$$

$$\boxed{\frac{7}{2} \text{ or } -\frac{1}{5}}$$

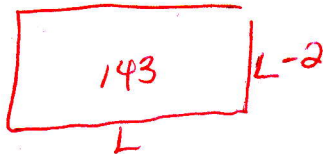
5pts 17. Solve $\sqrt{x-3} + 4 = x - 1$

$$\begin{aligned} \sqrt{x-3} &= x-5 \\ x-3 &= x^2 - 10x + 25 \end{aligned}$$

$$\begin{aligned} x^2 - 11x + 28 &= 0 \\ (x-7)(x-4) &= 0 \end{aligned}$$

$$\boxed{x=7 \text{ or } x=4}$$

5pts 18. Find the dimensions of the rectangle with area 143 square feet if the width is 2 feet less than the length.



$$L(L-2) = 143$$

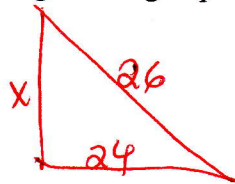
$$L^2 - 2L - 143 = 0$$

$$(L+11)(L-13) = 0$$

$$\begin{aligned} L &= -11 && \text{Length } 13 \\ L &= 13 && \text{Width } 11 \end{aligned}$$

$$\boxed{13 \times 11 \text{ ft}}$$

5pts 19. A 26 foot ladder leans against a building. If the base of the ladder is 24 feet away from the building how high up the building does the ladder reach?



$$24^2 + x^2 = 26^2$$

$$576 + x^2 = 676$$

$$x^2 = 100$$

$$\boxed{x = 10 \text{ ft}}$$

12pts 20. Specify the solutions for the following in interval notation (4pts each)

a) $-3x + 7 > 28$

$$-3x > 21$$

$$\boxed{x < -7}$$

$$(-\infty, -7)$$

b) $|3x - 5| \leq 13$

$$-13 \leq 3x - 5 \leq 13$$

$$-8 \leq 3x \leq 18$$

$$-\frac{8}{3} \leq x \leq \frac{18}{3}$$

$$\boxed{\left[-\frac{8}{3}, 6\right]}$$

c) $\frac{2x}{3} - \frac{x-6}{5} \leq 4$

$$10x - 3x + 18 \leq 60$$

$$7x \leq 42$$

$$x \leq 6$$

$$\boxed{(-\infty, 6]}$$

Some formulas you may need

1. $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

2. $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

3. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

4. $c^2 = a^2 + b^2$