

NO CALCULATOR!! CLEARLY SHOW ALL WORK!! NO DECIMALS!!

1. State the domain of each function.

a)  $f(x) = \sqrt{9x-3}$

b)  $f(x) = \sqrt{11-2x}$

c)  $f(x) = \sqrt{16-8x}$

d)  $h(x) = \frac{1}{x^2-25}$

e)  $h(x) = \frac{12x}{x^2-8}$

f)  $h(x) = \frac{3x-4}{7-x^2}$

g)  $h(x) = \frac{x}{\sqrt{3x-7}}$

<p><b>CHECK ANSWERS#1-11</b></p> <p><math>x \leq \frac{11}{2}</math>    <math>x \geq \frac{1}{3}</math>    <math>x &gt; \frac{7}{3}</math></p> <p><math>x \leq 2</math>    <math>x \neq \pm\sqrt{7}</math>    <math>x \neq \pm 2\sqrt{2}</math></p> <p><math>x \neq \pm 5</math>    <math>72x^{17}</math>    <math>\frac{\sqrt{17}-\sqrt{3}}{7}</math></p> <p><math>x^2(3x+2)(x-7)</math>    <math>4 \pm \sqrt{3}</math></p>	<p>2. Simplify the expression.</p> $(2x^3)^9 \left(\frac{3}{8x^5}\right)^2$	<p>3. Simplify the expression. Eliminate any negative exponents.</p> $\left(\frac{8}{3}m^{-2}n^9p\right)\left(\frac{1}{3}n^2p^{-5}\right)^{-2}$
<p><math>8^{7x+2}</math>    <math>8^{x-3}</math>    <math>8xy^{\frac{13}{15}}</math></p> <p><math>m^{26}n^{34}</math>    <math>m^2p^4\sqrt{n^3}</math>    <math>\frac{24n^5p^{11}}{m^2}</math></p>	<p>4. Simplify the expression.</p> $32^{\frac{3}{5}} \cdot x^{\frac{1}{4}} \cdot x^{\frac{3}{4}} \cdot y^{\frac{2}{3}} \cdot y^{\frac{1}{5}}$	<p>5. Simplify the expression. Leave in simplified radical form.</p> $\sqrt[4]{m^5n^2p^3} \cdot \sqrt[4]{m^3np^1}$
<p>6. Simplify the expression. Eliminate any negative exponents.</p> $\frac{(m^2n^5)^{-3}(m^5n^7)^8}{m^8n^7}$	<p>7. Simplify by writing as a single base using laws of exponents. Clearly show each step.</p> $\frac{8^{4x-1}}{8^{3x+2}}$	<p>8. Simplify by writing as a single base using laws of exponents. Clearly show each step.</p> $8^{x+2} \cdot (8^3)^{2x}$
<p>9. Factor the expression completely.</p> $3x^4 - 19x^3 - 14x^2$	<p>10. Rationalize the denominator and simplify. Be sure to properly use parentheses when applying the conjugate.</p> $\frac{2}{\sqrt{3} + \sqrt{17}}$	<p>11. Solve for x by completing the square: <math>x^2 - 8x + 13 = 0</math></p>

**CHECK ANSWERS#12-17**

$$\frac{11}{25} - \frac{23}{25}i$$

$$-\frac{3}{2} \pm \frac{\sqrt{3}}{2}i$$

$$\left(-\frac{1}{2}, \frac{3}{2}\right)$$

$$\frac{x-2}{2(2x-3)}$$

$$\sqrt{98} \rightarrow \text{so } 7\sqrt{2}$$

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$$\frac{11}{2}$$

12. Simplify the expression by factoring completely.

$$\frac{2x^3 - x^2 - 6x}{8x^3 - 18x}$$

13. Use the least common multiple to cancel the denominators, then combine like terms and solve for x.

$$\frac{4}{x-1} = \frac{35}{x^2-1} - \frac{2}{x+1}$$

14. Solve  $x^2 + 3x = -3$  using the quadratic formula. Express your solution in the form  $a \pm bi$ .15. Simplify the expression and write the result in the form  $a + bi$ . Be sure to use parentheses properly in the numerator and denominator.

$$\frac{5-i}{3+4i}$$

16. For the points  $(-4, 5)$  and  $(3, -2)$ :

(a) Find the distance between them.

17. Solve for x by isolating the radical, then square both sides using parentheses. Check for extraneous solutions.

$$\sqrt{5-x} + 1 = x - 2$$

(b) Find the midpoint of the line segment that joins them.