

Math 1290 - Algebra/Pre-Calculus Review

Name Key

Please read each question carefully, follow directions and remember to show your work.

1. Simplify the following completely.

a). $3x^2 + 4 - 9x + 3a + 5x - x^2 - 7a = \boxed{2x^2 - 4x - 4a + 4}$

b). $\frac{(2x^2)^3 \cdot 6x}{(2x)^4} = \frac{8x^6 \cdot 6x}{16x^4} = \boxed{3x^3}$

c). $\sqrt{72} = \sqrt{9 \cdot 8} = 3\sqrt{2 \cdot 4} = \boxed{6\sqrt{2}}$

d). $\sqrt{9+16} = \sqrt{25} = \boxed{\pm 5}$

2. Add, subtract, multiply or divide the following fractions as indicated.

a). $\frac{3}{4} + \frac{4}{3} = \frac{9}{12} + \frac{16}{12} = \boxed{\frac{25}{12}}$

b). $\frac{a}{b} \div \frac{b}{a} = \frac{a}{b} \cdot \frac{a}{b} = \boxed{\frac{a^2}{b^2}}$

c). $\frac{1}{4} - \frac{1}{16} = \frac{4}{16} - \frac{1}{16} = \boxed{\frac{3}{16}}$

3. Factor the following completely.

a). $x^2 - 5x + 6 = (x - 3)(x - 2)$

b). $x^2 - 9 = (x - 3)(x + 3)$

c). $x^2 - 6x + 9 = (x - 3)(x - 3)$

5. Simplify the following fractions completely.

a). $\frac{4xh + h^2}{h} = \frac{h(4x + h)}{h} = 4x + h$

$\frac{4xh}{h} + \frac{h^2}{h} = 4x + h$

b). $\frac{4x+h^2}{h}$ simplest form or $\frac{4x}{h} + \frac{h^2}{h} = \frac{4x}{h} + h$

6. Solve the following.

a). $-3(4-x) = 5-(x+1)$
 $-12 + 3x = 4 - x$
 $4x = 16$
 $x = 4$

b). $x^2 + 5x = 6$
 $x^2 + 5x - 6 = 0$
 $(x+6)(x-1) = 0$
 $x = -6 \quad x = 1$

c). $2x^2 - 4x - 8 = 0$
 $2(x^2 - 2x - 4) = 0$
 $x^2 - 2x - 4 = 0$
 $a=1, b=-2, c=-4$
 $x = \frac{2 \pm \sqrt{(-2)^2 - 4(1)(-4)}}{2} = \frac{2 \pm \sqrt{20}}{2}$
 $= \frac{2 \pm 2\sqrt{5}}{2}$
 $= 1 \pm \sqrt{5}$

d). $|2x-6| = 4$
 $2x-6 = 4$ or $2x-6 = -4$
 $2x = 10$ or $2x = 2$
 $x = 5$ or $x = 1$

e). $\frac{4x+7}{4} \leq 15$
 $4x+7 \leq 60$
 $4x \leq 53$
 $x \leq \frac{53}{4}$

f). $4^{5x-2} = \frac{1}{4^6}$
 $4^{5x-2} = 4^{-6}$
 $5x-2 = -6$
 $5x = -4$
 $x = -\frac{4}{5}$
 or $4^{5x-2} \cdot 4^6 = 1$
 $4^{5x+4} = 1$
 $\ln(4^{5x+4}) = \ln(1)$
 $(5x+4)\ln 4 = 0$
 $5x+4 = 0$
 $5x = -4$
 $x = -\frac{4}{5}$

7. Find an equation of the line through (1,3) and perpendicular to the line $y = 4x - 1$. $m_{\perp} = -\frac{1}{4}$

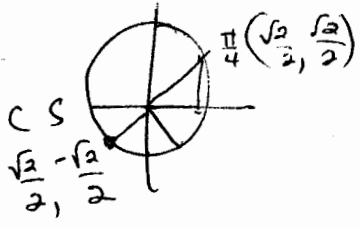
$y = -\frac{1}{4}x + b$
 $b = 3\frac{1}{4} = \frac{13}{4}$

$3 = -\frac{1}{4}(1) + b$
 $3 = -\frac{1}{4} + b$
 $y = -\frac{1}{4}x + \frac{13}{4}$

8. How many degrees is 3 radians? Give both an exact answer and a calculator answer.

Key: $2\pi \text{ rad} = 360^\circ$
 $\frac{3 \text{ rad}}{2\pi \text{ rad}} = \frac{x^\circ}{360^\circ} \Rightarrow x^\circ = \frac{3 \cdot 360}{2\pi} = \frac{540}{\pi} \text{ degrees} \approx 171.89^\circ$

9. Evaluate exactly $\cos(-\frac{3\pi}{4})$.



$\cos(-\frac{3\pi}{4}) = -\frac{\sqrt{2}}{2}$