

ARE YOU READY FOR PAP PRECALCULUS?

Name Key

Factor out GCF.

1) $12a^3b + 96a^2b + 84ab$

$$12ab(a^2 + 8a + 7)$$

$$12ab(a+7)(a+1)$$

2) $12x^2y^5 + 27xy^2 - 3x^3y^3$

$$3xy^2(4xy^3 + 9 - x^2y)$$

Try factoring the following expressions completely.

3) $x^2 + 2x - 15$

$$(x+5)(x-3)$$

4) $2x^2 + 7x - 4$

$2x^2$	$-1x$	$\cdot \frac{-8}{8}$
$8x$	-4	

$+ \frac{7}{8}$

$$(x+4)(2x-1)$$

5) $x^2 - 9$

$$(x+3)(x-3)$$

6) $6x^2 - 7x - 5$

$6x^2$	$3x$	$\cdot \frac{-30}{-10}$
$-10x$	-5	

$+ \frac{-7}{-10}$

$$(3x-5)(2x+1)$$

7) $xy^5 - 16xy$

$$xy(y^4 - 16)$$

$$xy(y^2 + 4)(y^2 - 4)$$

$$xy(y^2 + 4)(y+2)(y-2)$$

8) $x^3 - 2x^2 + 3x - 6$

x^3	$-2x^2$	$\cdot \frac{-6}{-6}$
$3x$	-6	

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

9) $3x^2 - 5x + 2$

$3x^2$	$-3x$	$\cdot \frac{6}{2}$
$-2x$	2	

$+ \frac{-5}{2}$

$$(3x-2)(x-1)$$

10) $6x^3 - 2x + 3x^2 - 1$

$6x^3$	$-2x$	$\cdot \frac{-1}{-1}$
$3x^2$	-1	

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

Sum/Difference of Cubes formulas:

11) $\sqrt[3]{x^3 - 8}$

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

12) $\sqrt[3]{u^3 + 27v^3}$

$$(u+3v)(u^2 - 3uv + 9v^2)$$

Simplify the following:

Multiply and divide fractions:

$$13) \frac{(x+3)(x+4)}{x^2+7x+12} \cdot \frac{4}{-12} \cdot \frac{1}{x+4}$$

$$\boxed{\frac{x+3}{3}}$$

$$14) \frac{(x+2)(x-2)}{x^2-4} \cdot \frac{2}{2x-4} \cdot \frac{1}{x+2} = \boxed{1}$$

Adding and subtracting fractions (remember: you need a common denominator for these):

$$15) \frac{(4)x}{(4)5} + \frac{3x(5)}{4(5)}$$

$$\frac{4x+15x}{20} = \boxed{\frac{19x}{20}}$$

$$16) \frac{(2)5x}{(2)7} - \frac{(x-4)(7)}{2(7)}$$

$$\frac{10x-7x+28}{14} = \boxed{\frac{3x+28}{14}}$$

Simplify the following as much as possible. Combine like terms and eliminate parentheses in your final answer.

$$17) 5z - [3z - (10z + 8)]$$
$$5z - (3z - 10z - 8)$$
$$5z + 7z + 8$$
$$\boxed{12z + 8}$$

$$18) (3xy)(-2x^3y^2)$$
$$\boxed{-6x^4y^3}$$

$$19) \cancel{(3x+6)(x+2)} - (\sqrt{c} + \sqrt{5})(\sqrt{c} - \sqrt{5})$$
$$c - \sqrt{5}c + \sqrt{5}c - 5$$
$$\boxed{c - 5}$$

$$20) (x-2)(x^2-2x+5)$$
$$x^3 - 2x^2 + 5x - 2x^2 + 4x - 10$$
$$\boxed{x^3 - 4x^2 + 9x - 10}$$

$$21) \frac{x+1}{x^2-2x-3} \cdot \frac{1}{(x-3)(x+1)}$$
$$\boxed{\frac{1}{x-3}}$$

$$22) \frac{x}{x^2+5x} \cdot \frac{1}{x(x+5)}$$
$$\boxed{\frac{1}{x+5}}$$

Solve each equation without using a calculator. Show all work

23) $x^2 - 2x - 8 = 0$

$(x-4)(x+2) = 0$

$x = -2, 4$

24) $2x^2 = 19x + 33$

$2x^2 - 19x - 33 = 0$

x	$2x^2$	$3x$	$\cdot \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
-11	$-22x$	-33	$\frac{-(-19) \pm \sqrt{(-19)^2 - 4(2)(-33)}}{2(2)}$

$(x-11)(2x+3) = 0$

$x = 11, -3/2$

25) $\frac{5x-4}{5x+4} = \frac{2}{3}$

$2(5x+4) = 3(5x-4)$

$10x + 8 = 15x - 12$
 $-10x + 12 \quad -10x + 12$

$20 = 5x$

$x = 4$

27) $\sqrt{x^2} = \sqrt{11}$

$x = \pm \sqrt{11}$

26) $10 - \frac{18}{x} = 4 + \frac{5}{x}$

$\frac{6}{1} = \frac{18}{x}$

$6x = 18$

$x = 3$

28) $(x-12)^2 = 16$

$x-12 = \pm 4$

$x = 16, 8$

29) $2x^2 - 5x - 3 = 0$

$2x^2 - 5x - 3 = 0$

x	$2x^2$	$1x$	$\cdot \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
-3	$-6x$	-3	$\frac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(-3)}}{2(2)}$

$(x-3)(2x+1) = 0$

$x = 3, -1/2$

30) $\frac{4x+1}{x} = \frac{3}{x} \rightarrow \frac{4x^2+x-3}{x} = \frac{3}{x}$

$4x^2 + x - 3 = 0$

$4x^2 + x - 3 = 0$

x	$4x^2$	$-3x$	$\cdot \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
1	$4x$	-3	$\frac{-1 \pm \sqrt{(-1)^2 - 4(4)(-3)}}{2(4)}$

$(x+1)(4x-3) = 0$

$x = -1, 3/4$

31) $\frac{5x}{4} + \frac{1}{2} = \frac{x}{4} - \frac{1}{2}$

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

$5x+2 = 4x-2$
 $-4x-2 \quad -4x-2$

$x = -4$

32) $x^2 + 8x - 4 = 0$

$x = \frac{-8 \pm \sqrt{8^2 - 4(1)(-4)}}{2(1)}$

$x = \frac{-8 \pm \sqrt{80}}{2} < \frac{\sqrt{16}}{\sqrt{5}}$

$x = \frac{-8 \pm 4\sqrt{5}}{2}$

$x = -4 \pm 2\sqrt{5}$

33) $x^3 + 2x^2 + 3x + 6 = 0$

	x	2
x^2	x^3	$2x^2$
3	$3x$	6

$(x^2 + 3)(x + 2) = 0$

$x = \pm i\sqrt{3}, -2$

34) $\sqrt{2x} - 10 = 0$

$(\sqrt{2x})^2 = (10)^2$

$2x = 100$

$x = 50$

35. Find the domain of each function

a) $f(x) = \frac{3x+1}{x+2}$

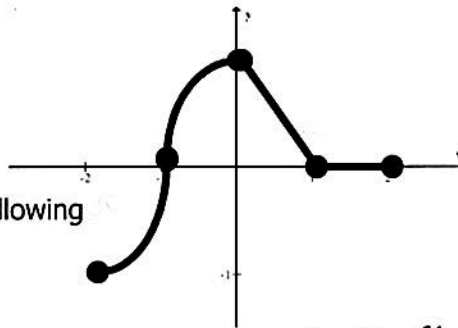
$D: \mathbb{R}, x \neq -2$

b) $f(x) = \sqrt{x^2 - 4}$

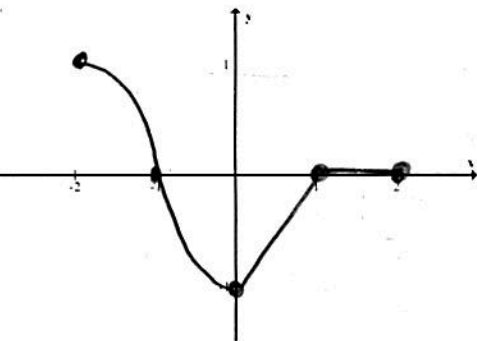
$(-\infty, -2] \cup [2, \infty)$

36. The given graph is $f(x)$.

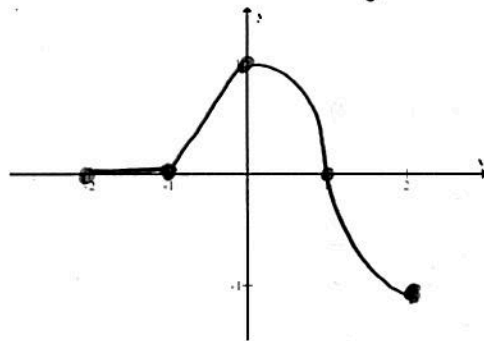
Carefully sketch a graph of each of the following



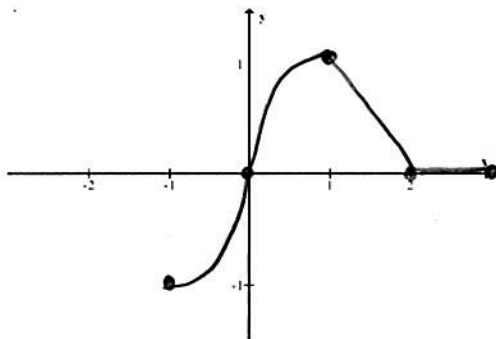
a. $y = -f(x)$ reflect over x-axis



b. $y = f(-x)$ reflect over y-axis



c. $y = f(x-1)$ R1



d. $y = f(x) - 1$ D1

