

Precalculus Answer Key

①

$$\textcircled{1} \quad y - y_1 = m(x - x_1) \quad (-3, 10) \quad m = -4$$

$x_1 \quad y_1$

$$y - (10) = -4(x - (-3))$$

$$y - 10 = -4(x + 3)$$

$$\textcircled{2} \quad Ax + By = C \quad \text{No decimals or fractions}$$

A must be positive

$$\text{Find slope } (-2, 6) (5, 2) \quad m = \frac{2 - 6}{5 - (-2)} = \frac{-4}{7}$$

$x_1 \quad y_1 \quad x_2 \quad y_2$

$$\text{Point-Slope Form: } y - 2 = -\frac{4}{7}(x - 5)$$

$$y - 2 = -\frac{4}{7}x + \frac{20}{7}$$

$$\text{Put in Standard Form: } 7\left(\frac{4}{7}x + y = \frac{20}{7} + \frac{14}{7}\right)$$

$$4x + 7y = 34$$

$$\textcircled{3} \quad y = mx + b \quad (-1, -5) (6, 0)$$

$$\text{Find slope: } m = \frac{0 - (-5)}{6 - (-1)} = \frac{5}{6}$$

$$\text{Point Slope Form: } y - 0 = \frac{5}{6}(x - 6)$$

$$\text{Slope-Intercept Form: } y = \frac{5}{6}x - 5$$

$$\textcircled{4} \quad \text{Find slope } \perp \text{ to } -5x - 7y = 2$$

$$-7y = 5x + 2$$

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

$$m_{\perp} = \frac{7}{5}$$

Point-Slope Form: $y + 5 = \frac{7}{5}(x - 6)$

Slope Intercept Form: $y + 5 = \frac{7}{5}x - \frac{42}{5}$
 $y = \frac{7}{5}x - \frac{42}{5} - \frac{25}{5}$
 $y = \frac{7}{5}x - \frac{67}{5}$

⑤ $y = 3x$ Standard form: $-3x + y = 0$
 $3x - y = 0$

⑥ a) $3(x - 2) + 7 = 2(x + 5)$
 $3x - 6 + 7 = 2x + 10$
 $x = 9$

b) $3(x - 4) - 4(x - 3) = x - (x - 2)$
 $3x - 12 - 4x + 12 = x - x + 2$
 $-x = 2$
 $x = -2$

⑦ a) $m = \frac{2 - 1}{2 + 2} = \frac{1}{4}$

b) $m = \frac{-2 + 2}{3 - 4} = \frac{0}{-1} = 0$ horizontal line

c) $m = \frac{-7 - 3}{5 - 5} = \frac{-10}{0} = \text{undefined}$ vertical line

⑧ a) $\left(\frac{x}{4} = 2 + \frac{x - 3}{3}\right) 12$
 $3x = 24 + 4(x - 3)$
 $3x = 24 + 4x - 12$
 $-x = 12$
 $x = -12$

b) $\left(\frac{x + 3}{6} = \frac{3}{8} + \frac{x - 5}{4}\right) 24$
 $4(x + 3) = 3(3) + 6(x - 5)$
 $4x + 12 = 9 + 6x - 30$
 $-2x = -33$
 $x = \frac{33}{2}$

Point-Slope Form

Slope-Intercept

9 a) $y+2 = -5(x+4)$

a) $y+2 = -5x-20$

$y = -5x-22$

b) $y-0 = -\frac{2}{3}(x-0)$

b) $y = -\frac{2}{3}x$

c) $m = \frac{15-5}{8-3} = \frac{10}{5} = 2$

c) $y-5 = 2x-6$

$y = 2x-1$

$y-5 = 2(x-3)$

d) $(4,0) (0,-2)$

d) $y = \frac{1}{2}x-2$

$m = \frac{-2-0}{0-4} = \frac{-2}{-4} = \frac{1}{2}$

$y-0 = \frac{1}{2}(x-4)$

e) $y+7 = -5x-10$

$y = -5x-17$

e) $m = -5$

$y+7 = -5(x+2)$

10 a) $5(4)+7 = 27$

b) $6(-7+5) - 13$

$6(-2) - 13$

$-12 - 13$

-25

c) $\frac{1-((-1)-2)^2}{1+((-1)-2)^2} = \frac{1-(-3)^2}{1+(-3)^2} = \frac{1-9}{1+9} = \frac{-8}{10} = -\frac{4}{5}$

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

$1 \pm \sqrt{2}$

⑪ a) 16

b) -16

c) $2^5 = 32$

d) 1

e) $3^3 = 27$

f) $2^{-2} = \frac{1}{4}$

⑫ a) $\frac{y}{x^2}$

b) y^5

c) $x^{-5} = \frac{1}{x^5}$

d) x^6

e) x^{21}

f) $9x^4y^{10}$

⑬ a) $5\sqrt{2}$

b) $3x\sqrt{5}$

c) $\sqrt{12x^3}$
 $= 2x\sqrt{3x}$

d) $\sqrt{50x^3}$
 $5x\sqrt{2x}$

e) $8\sqrt{3}$

f) $2\sqrt{2} + 3\sqrt{2} - 8\sqrt{2}$
 $-3\sqrt{2}$

g) $\frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

h) $\frac{5}{2+\sqrt{3}} \cdot \frac{2-\sqrt{3}}{2-\sqrt{3}} = \frac{5(2-\sqrt{3})}{1}$

⑭ a) $3x(x+2)$

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

⑮ a) $(x^3-2x^2)+(5x-10)$
 $x^2(x-2)+5(x-2)$

$(x^2+5)(x-2)$

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

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

16

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

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

c) $(x-5)(x-3)$

c) $-28 \times 3 = -84$

$-28 + 3 = -25$

$\frac{3}{-28}$

$\frac{3}{3} = 1$

$(3x-28)(x+1)$

17

a) $(x-10)(x+10)$

b) $(8x+9)(8x-9)$

18

a) $(x+1)^2$

b) $(x-7)^2$

c) $(2x+1)^2$

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

19

a) $4(x^2-x-6)$

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

b) $2(x^4-81)$

$2(x^2+9)(x^2-9)$

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

c) $(x^3+2x^2)+(-9x-18)$

$x^2(x+2)-9(x+2)$

$(x^2-9)(x+2)$

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

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

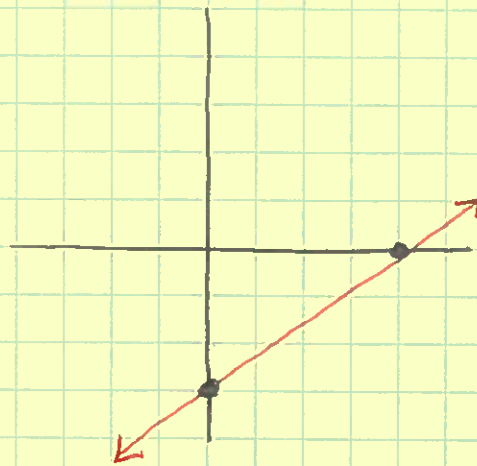
$x(x+2)(x-2)$

20 a) $3x - 4y = 12$

6

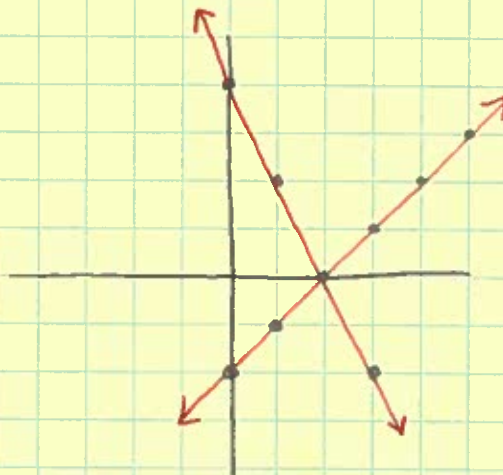
x-int
 $3x - 4(0) = 12$
 $x = 4$
 $(4, 0)$

y-int
 $3(0) - 4y = 12$
 $y = -3$
 $(0, -3)$

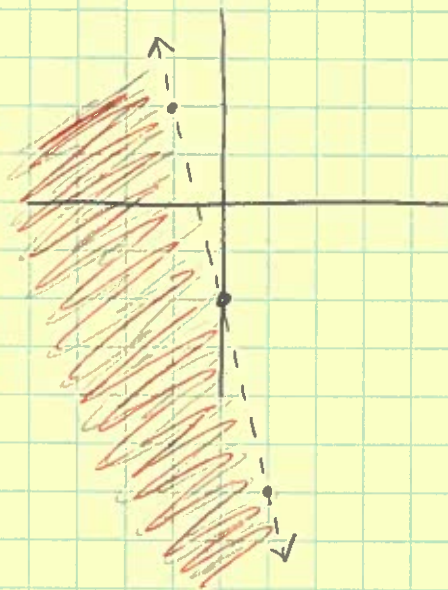


b) $2x + y = 4$
 $y = -2x + 4$

$x - y = 2$
 $-y = -x + 2$
 $y = x - 2$

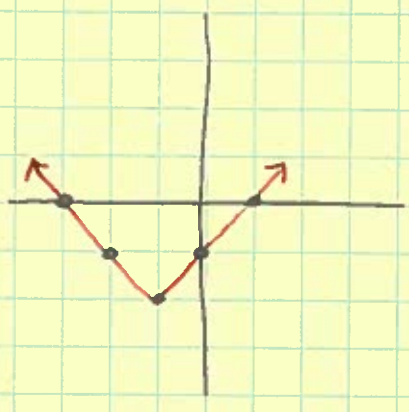


c) $y < -4x - 2$



d)

$y = x $		$x-1$	$y-2$
x	y		
-2	2	-3	0
-1	1	-2	-1
0	0	-1	-2
1	1	0	-1
2	2	1	0



e)

$y = x^2$		$x+1$	$y-4$
x	y		
-2	4	-1	0
-1	1	0	-3
0	0	1	-4
1	1	2	-3
2	4	3	0



f)

$y = x $		x	y-1
x	y		
-2	2	-2	1
-1	1	-1	0
0	0	0	-1
1	1	1	0
2	2	2	1

