

$$\begin{array}{r} 15 \\ \times 15 \\ \hline 75 \\ 150 \\ \hline 225 \end{array}$$

$$3\overline{)243}$$

$$\begin{array}{r} 64 \\ \times 4 \\ \hline 256 \\ 243 \\ \hline 13 \end{array}$$

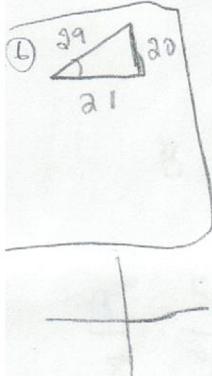
$$9\overline{)13}$$

$$\begin{array}{r} 225 \\ + 20 \\ \hline 245 \end{array}$$

$$\begin{array}{r} 57 \\ 3\overline{)161} \\ -15 \\ \hline 11 \\ -9 \\ \hline 21 \end{array}$$

$$\begin{array}{r} 12 \\ + 14 \\ \hline 26 \\ - 8 \\ \hline 18 \end{array}$$

$$\begin{array}{r} 42 \\ + 180 \\ \hline 222 \\ - 122 \\ \hline 9 \end{array}$$



$$\begin{array}{r} 90 \\ + 60 \\ \hline 150 \\ - 150 \\ \hline 0 \\ + 000 \\ \hline 180 \\ - 150 \\ \hline 30 \end{array}$$

$$\begin{array}{r} 3 \\ 3\overline{)243} \\ -21 \\ \hline 33 \\ -31 \\ \hline 2 \end{array}$$

$$12 - 30 + 3 = 15 - 30 = -15$$

- 1) Given  $f(x) = 3x^2 - 15x + 3$  and  $g(x) = x^2 + 20$ , find  $g(f(2))$ .

$$245$$

- 2) Given  $\frac{x^2-x-2}{x-2}$ , find all asymptotes (vertical, horizontal, oblique).

?  $x \neq 2$  NO asymptotes

- 3) Given  $\log_3 \frac{9^x}{243^y} = 1$  and  $\log_2 \frac{32^y}{16^x} = 7$ . Find  $2x+y+10$ .

$$\left(\frac{1}{5}\right)$$

- 4)  $f(x) = \frac{3x^2+7x-8}{\sqrt{x^3+6x-11}}$ . Find  $f(2)$ .

$$\frac{12+14-8}{\sqrt{8+12-11}} = \frac{18}{3} = 6$$

- 5) Find the center and radius:  $x^2 + y^2 - 6x - 6y + 38 = 64$ .

$$(3, 3) \quad \cancel{216} \quad 2\sqrt{11}$$

- 6) Given  $\tan(x) = \frac{20}{21}$ ,  $\frac{x}{29} = \cos(x)$ , and  $\frac{y}{29} = \sin(x)$ , what is  $2x+4y$ ?

$$x=21 \quad y=20$$

$$42+80=122$$

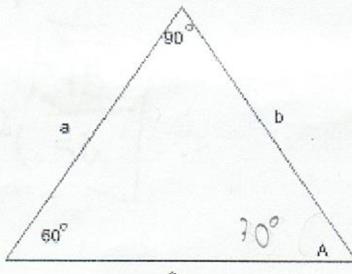
$$\sqrt{44} = 2\sqrt{11} = r$$

- 7) Jonathan the Cat runs a business selling packs of catnip for \$0.50, packs of nutritional yeast for \$0.25 to neighborhood cats. He sells 14 packs total and makes \$4.50. How many packs of nutritional yeast did he sell?

$$c+y=14$$

$$0.5c+0.25y=4.5$$

- 8)  $f(x) = 4x^2 + 2x + 1$ ,  $g(x) = 5x$ . Find  $f(3) - g(4) + f(g(1))$



$$36+7=f(5)$$

$$\begin{aligned} -40-9 &= -49 + 10 \\ 5 &= 5 \\ -49+50 &= \frac{1}{5} \end{aligned}$$

$$\frac{\sin A}{a} = \frac{\sin C}{c}$$

$$\begin{array}{r} 2 | 128 \\ 2 | 64 \\ 2 | 32 \\ 2 | 16 \\ 2 | 8 \\ 2 | 4 \\ 2 | 2 \\ 2 | 1 \end{array}$$

$$\frac{\sin 30^\circ}{a} = \frac{\sin 90^\circ}{6}$$

- 9) Given the following triangle, what is  $2a-8$ ?

$$-2$$

$$b-8$$

- 10) Solve for  $[0 \leq \theta < 360]$ .

$$\begin{aligned} \tan^2 \theta - 1 &= -2\tan^2 \theta \\ \sqrt{10} &= \frac{\pi}{6}, \frac{7\pi}{6} \end{aligned}$$

$$2\tan^2 \theta + \tan^2 \theta - 1 = 0$$

$$3\tan^2 \theta - 1 = 0$$

$$3\tan^2 \theta = 1$$

$$\theta = \tan^{-1} \frac{1}{\sqrt{3}}$$

$$\theta = \tan^{-1} \left( \frac{\sqrt{3}}{3} \right)$$

$$\theta = \frac{\pi}{6}$$

- 11) Find the average rate of change of  $g(x) = x^2$  over the interval  $[-6, 3]$ .

$$-3$$

$$(-6, 36) \quad (3, 9)$$

$$-9$$

$$-6$$

$$-3$$

- 12) Simplify:  $\cos(-4\theta)\cos(-2\theta)-\sin(-4\theta)\sin(-2\theta)$

$$8 \cos 6\theta$$

- 13) Divide  $\frac{4x^2-19}{x+2}$ . Write your answer in fraction form.

$$\begin{array}{r} 4x-8 \\ \hline 8(x^2+0x-19) \\ -4x^2+8x \\ \hline -8x-19 \end{array}$$

$$\begin{array}{r} -8x+16 \\ \hline -8x-19 \end{array}$$

$$\begin{array}{r} 134 \\ \hline 134 \end{array}$$

$$\cos^{-1}(1)$$

$$x=0$$

$$8\sin^2 x \cos^2 x (8\cos^4 x - 1) = 0$$

$$(8 - 8\cos^2 x)(\cos^2 x)(8\cos^4 x - 1) = 0$$

$$-8\cos^2 x = 0 \quad \cos^2 x = 1$$

$$\cos x = 1 \quad \cos x = -1$$

$$\cos x = 1 \quad \cos x = -1$$

$$64\sin^2 x \cos^6 x - 8\sin^4 x \cos^2 x$$

$$-\sin^2 2(2\theta) = 4$$

$$(4\cos^2 x + 1)(-2\cos^2 x + 1)$$

$$a=3$$

$$\cos^2 x - \sin^2 x$$

## Pre-Calculus Individual

- 14) In an experiment, the probability that event A occurs is  $\frac{3}{8}$  and the probability that event B occurs is  $\frac{5}{7}$ . If A and B are independent events, what is the probability that A and B both occur?

- 15) Bruce throws a basketball launched at a velocity of 20 m/s in a direction making an angle of  $60^\circ$  upward with the horizontal. What is the maximum height reached by the basketball? (It follows parabolic trajectory). The equation for a projectile is

$$\begin{aligned} \cancel{x} &= x_0 + v_0 t + \frac{1}{2} a t^2 \\ \cancel{x} &= 20(0) + \frac{1}{2}(-10)t^2 \\ \cancel{x} &= 40 - 20t \\ \cancel{x} &= 20 \end{aligned}$$

14.)  $A = \frac{3}{8}$

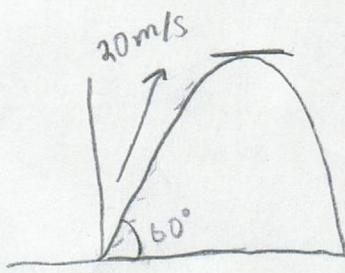
$$B = \frac{5}{7}$$

$$\frac{3}{8} \cdot \frac{5}{7} = \boxed{\frac{15}{56}}$$

**15**

15.)  $v = 20 \text{ m/s}$

$$\theta = 60^\circ$$



$$x = \frac{1}{2} a t^2$$

$$x = \frac{1}{2}(-10)t^2$$

$$x = \frac{1}{2}(-40)$$

$$x = -20$$

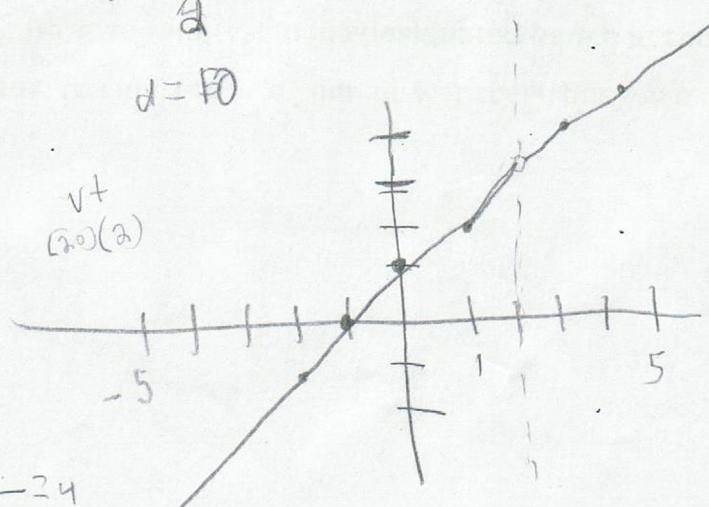
$$\frac{\sqrt{3}}{2} \cdot \frac{7}{1} = \boxed{20}$$

$$d = \frac{v}{t}$$

$$d = \frac{20}{2}$$

$$d = 10$$

$$v + (20)(2)$$



$$v = \frac{d}{t}$$

$$20 = \frac{d}{2}$$

$$d = 40$$

$$\frac{10}{2} = 5 \quad \frac{-2}{-1} = 2$$

$$\frac{-4}{-4} = 1 \quad \frac{0}{-3} = 4$$

$$\frac{4}{1} = 4$$